COVID-19: CLINICAL MANAGEMENT PROTOCOLS

KASTURBA HOSPITAL MANIPAL
(Teaching hospital of KMC Manipal, a unit of MAHE)

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Message from Dean, KMC, Manipal

We are in the midst of an unprecedented global war, and the entire mankind is facing the same enemy, the coronavirus. To ensure that the war can be won, the strategies are laid down by various health authorities in the world. All of them point towards three basic principles: 1) to slow and stop transmission; 2) provide optimized care for all patients; and 3) minimize the impact of the epidemic on health systems, social services and economic activity.

Hospital is the battle field of this war, where we eliminate the virus, not where the virus defeats us. To ensure that this war can be won, we must first make sure that our medical staff is guaranteed sufficient resources, including experience and technologies.

Faced with an unknown virus, sharing and collaboration are the best remedy. “Covid 19 – clinical management protocols” is the hand book written with this purpose. Experts in various fields who have been treating Covid patients for the last 4 months have contributed to the book. Their personal experience, knowledge and innovation in the field makes the book something special. It’s special because it provides guidelines with a local flavour, considering the load, variety and the presentation of the Covid patients in our set up.

It is not meant to replace clinical judgment or specialist consultation but rather to strengthen frontline clinical management. Considerations for special and vulnerable populations, such as paediatric patients, pregnant women & CKD patients are highlighted in the book. I am sure these guidelines will definitely help us to improve the quality of service which we are providing.

Dr. Sharath K Rao
Dean, KMC Manipal

Date: 20.08.2020
Place: Manipal
**Message from Medical Superintendent, KH, Manipal**

The COVID 19 pandemic has severely affected the functioning of Health care organizations across the world. The Hospitals had to develop strategies and protocols for the management, testing, diagnosis and infection Prevention practices of the COVID-19 outbreak. There were challenges as guidelines and protocols were regularly being updated or changed according to the evidence obtained at different times. The stakeholders at all levels of Disease management were facing difficulties in accessing and understanding latest updates, guidelines and protocols. The Kasturba Hospital took the initiative to prepare a comprehensive document containing all the related guidelines/protocols related COVID 19 infection which would be beneficial to people involved in managing COVID 19 pandemic. The HICC and Department of Infectious Diseases were entrusted with task of preparing a manual in consultation with other experts from various related subjects. The Management of Kasturba Hospital is very pleased that manual on Infection prevention and control in the context of COVID-19 has been released.

This document lays down the protocols and guidance required for the practice of a globally acceptable standard of IPC with respect to Covid 19 in healthcare settings. These guidelines are based on periodic recommendations provided by Ministry of Health, Government of India, ICMR and World Health Organization. I am sure this document will greatly help doctors and other staff at the Hospital in infection control practices related to COVID 19 infection. I request all stakeholders to ensure that these guidelines are widely implemented in departments across the Kasturba Hospital. Manipal.

Dr. Avinash Shetty
Medical Superintendent

Date: 20.08.2020
Place: Manipal
Message from HOD, Infectious Disease, KH, Manipal

COVID-19 pandemic has ravaged nations across the globe and has laid health care systems under tremendous strain. As of 10th August 2020, with more than 19 million cases, global COVID-19 case fatality is around 3.71%. Furthermore, the overall mortality rate for critically ill COVID-19 patients admitted to ICU has ranged from 16% to 78%. The health care professionals and scientific community are functioning at their maximal potential in combating the viral infection. Health care workers (HCW) have the primary duty to look after their patients visiting health care facility as well as stay safe themselves and ensure continuity of care.

In the current backdrop, health care professionals had to adapt their practices to provide care during the pandemic to individuals affected with COVID-19 in particular or taking care of patients in general. Kasturba Hospital, Manipal, being a 2032 bed hospital in coastal Karnataka, India, provides care to patients suffering from a range of infectious diseases from Karnataka and neighboring states.

In this booklet, the Faculty from the Department of Infectious Diseases have compiled the Clinical Management Protocols during the times of COVID-19 pandemic from various Departments at Kasturba Hospital. I want to thank immensely all the Heads and Faculty from various Departments who have responded to our request, furnished the protocols and permitted us to share them in this format.

My sincere thanks to the management of KMC and KH for providing able leadership during the time of COVID-19 pandemic and for encouragement to come up with this booklet. My heartfelt thanks to colleagues in the Department for their hard work in compiling this booklet. There is a section on management of HCW exposed to COVID-19 and the processes to follow in such circumstances; and I want to reiterate that should any HCW need any clarification or help, we are available at any time. Hope you find this compendium informative and helpful. I wish you all the very best in staying safe and providing the best care to your patients.

Dr Kavitha Saravu
Professor and Head, Department of Infectious Diseases.
Joint Coordinator, Manipal Center for Infectious Diseases.

Date: 10.08.2020
Place: Manipal
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INTRODUCTION

Dr Nitin Gupta, Assistant Professor, Department of Infectious Disease

Coronaviruses are a large group of viruses infecting animals and birds and producing a wide variety of diseases. Coronaviruses that infect humans primarily affect the respiratory tract (pharynx, windpipe, lungs). The virus was first grown in 1965 from the samples obtained from a boy with a common cold. The prototype virus was named 229E. Similar coronaviruses that cause cough and cold were named as OC43. They were grouped and named as coronavirus as they have a crown-like appearance in the microscope.

Until the winter of 2002–2003, coronaviruses were responsible for mild cough and cold only. During that winter, a new coronavirus that affected lungs wreaked havoc all around the world: severe acute respiratory syndrome (SARS). The outbreak originated in China. The virus was first derived from bats and was transferred to humans through the palm civet and raccoon dog. Affected humans had severe symptoms leading to death in few. The SARS epidemic was controlled through a massive effort, and the last known case occurred in mid-2004. More recently, a different coronavirus causing severe lung infection has emerged, the Middle East respiratory syndrome coronavirus (MERS). MERS was grown in June 2012 from a sputum sample obtained from a man in Saudi Arabia who died of lung infection. A total of 2374 individuals were affected, most of whom had a lung infection, severe in most and fatal in 823. Humans were believed to be infected from the camels. Both MERS and SARS spread from one human to others, had severe infections and considerable mortality.

Since the end of last year, many thousands of cases of Coronavirus disease-19 (COVID-19) have been reported from Wuhan, Hubei province, China. It was initially named ‘novel’ because no human cases were described before this outbreak. It has now spread all over the world. WHO has declared this initially as a public health emergency of international concern and later as a pandemic. The outbreak was initially thought to be due to people visiting the exotic wildlife market (Bats, snakes). It was assumed that people acquired infection from these wild animals, but this has not been confirmed yet. However, the bigger problem is the fact that the virus is spreading from one human to the other affecting around 46 lakh people to date. The efficiency with which the virus transmits, even from asymptomatic carriers is a matter of great concern. It has now spread to all continents except Antarctica. More than 80% of the cases are mild who recover without any treatment. Severe/critical cases form up to 10-15% of the total cases and require higher levels of care. The mortality rate varies from region to region (2-6%). More than 3 lakh fatalities have been reported to date. Although several drugs are now being investigated and tried for this disease, preventive measures (social distancing, cough etiquette, universal masking) plays the most important role in the control of this outbreak.
DEFINITIONS OF COVID-19, SARI, AND ILI

Dr Muralidhar Varma, Associate Professor, Department of Infectious Diseases

Suspect Case COVID-19:

Following are the criteria for suspecting COVID-19

1. A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness of breath)), AND a history of travel to or residence in a country/area or territory reporting local transmission (See NCDC website for an updated list) of COVID-19 disease during the 14 days prior to symptom onset;

2. A patient/Health care worker with any acute respiratory illness AND having been in contact with a confirmed COVID-19 case in the last 14 days prior to the onset of symptoms;

3. A patient with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness of breath)) AND requiring hospitalization AND with no other aetiology that thoroughly explains the clinical presentation;

4. A case for whom testing for COVID-19 is inconclusive.

Laboratory confirmed case COVID-19:

A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

Influenza Like Illness (ILI)

ILI case is defined as one with acute respiratory infection with fever $\geq 38^\circ$ C and cough

Severe Acute Respiratory Illness (SARI)

SARI case is defined as one with acute respiratory infection with fever $\geq 38^\circ$ C AND cough and requiring hospitalization.

Definition of contact:

A contact is a person that is involved in any of the following:

- Providing direct care without proper personal protective equipment (PPE) for COVID-19 patients
- Staying in the same close environment of a COVID-19 patient (including workplace, classroom, household, gatherings).
- Traveling together in close proximity (1 m) with a symptomatic person who later tested positive for COVID-19.

High-Risk Contact:
- Touched body fluids of the patient (Respiratory tract secretions, blood, vomit, saliva, urine, faeces)
- Had direct physical contact with the body of the patient, including physical examination without PPE.
- Touched or cleaned the linens, clothes, or dishes of the patient.
- Lives in the same household as the patient.
- Anyone in close proximity (within 3 feet) of the confirmed case without precautions.
- Passenger in close proximity (within 3 feet) of a conveyance with a symptomatic person (who later tested positive for COVID-19) for more than 6 hours.

**Low-Risk Contact:**
- Shared the same space (Same class for school/worked in same room/similar and not having a high-risk exposure to confirmed or suspect case of COVID-19).
- Travelled in same environment (bus/train/flight/any mode of transit) but not having a high-risk exposure
GUIDELINES FOR SCREENING AT FEVER CLINIC

Dr. Muralidhar Varma, Associate professor, Dept. of Infectious Diseases

Instructions to doctors and nurses at Fever and COVID clinic

1. All patients and patient relatives entering Hospital should be screened for body temperature.
2. All patients and patient relatives entering Hospital should cover mouth and nose with a mask or in some form.
3. Patients with fever and respiratory symptoms should be triaged as per Hospital protocol.
4. Patients coming from red/orange zones should be triaged separately as per hospital triaging policy by PG/Staff at fever clinic.
5. A daily updated version of various COVID zones as per Karnataka state government will be given to COVID and fever clinic.
6. Minimum of 3 feet distance should be maintained between patient and doctor/nurse.
7. Patient’s details should be entered by the doctor (SPM PG and intern) before sending them inside the hospital.
8. Patients entering hospital should be marked with ink on the right index finger.
9. Doctors and nurses posted in these areas should report to the in-charges in case if they have any fever and/or respiratory symptoms.

Screening Desk Main OPD

Asymptomatic patients presenting from Udupi and Non-Udupi Districts to KH OPD can be sent to registration without further evaluation

Patients with fever and/or ILI symptoms within the last 15 days from both Udupi and Non-Udupi districts should be referred to FEVER CLINIC

OPD Fever clinic will be managed by duty Community medicine PG and shall contact Medicine staff in Medicine OPD-A (0820-2922236) for triaging the patients

Medicine staff in OPD can contact duty IFD staff for any clarifications regarding triaging and testing of symptomatic patients

If decision to test for COVID-19 is made on an outpatient basis, the patients will be directed to the Walk in Sample Collection Kiosk (WISK) at KH Manipal with an appointment

Fever clinic to maintain all details of the patient for whom Prescription has been given in the prescribed format (Refer Chapter: Important Forms)

Screening Desk –Emergency Triage

Asymptomatic patients presenting from Udupi and Non-Udupi Districts to Emergency triage can be sent to registration without further evaluation
Fever clinic at Emergency triage will be managed by Medicine PG and shall contact duty Medicine staff for triaging the patients and should maintain all details of the patient for whom Prescription has been given in the prescribed format

Patients presenting from Udupi and Non-Udupi Districts with SARI to Emergency triage to be shifted to SARI ICU after confirming availability of BEDS with MOD

**Screening Desk-Oncology**

Asymptomatic patients presenting from Udupi and Non-Udupi Districts to Oncology screening area can be sent to registration without further evaluation

Patients with fever and / or ILI symptoms within the last 15 days from both Udupi and Non-Udupi districts should be referred to FEVER CLINIC IN MAIN OPD AREA

Asymptomatic patients from Udupi district for chemotherapy can be sent to Oncology OPD

Asymptomatic patients from Non-Udupi districts for chemotherapy can be sent to SM8

**Screening Desk- Women and Child Block**

Asymptomatic pregnant patient from UDUPI presenting to OBG OPD can be sent directly to registration without further evaluation

Asymptomatic pregnant patient from UDUPI District presenting to Labour Ward (LT) can be admitted directly

All symptomatic pregnant women presenting from UDUPI District and Non-Udupi District to W&C block screening area to be informed to IFD

Asymptomatic children from Udupi District and Non-Udupi Districts presenting to W&C screening area can be sent to registration

All symptomatic children from Udupi District and Non-Udupi Districts presenting to W&C screening area to be informed to IFD

-Asymptomatic patient means-no fever, cough or breathlessness or any respiratory symptoms

In case any devices like thermometer are found to be faulty, in-charge nurse should inform Dr Rahul Munikrishna, Executive- Operations.
GUIDELINES FOR TRIAGING SARI AND ILI IN THE HOSPITAL

Dr Nitin Gupta, Assistant Professor, Department of Infectious Diseases
Dr. Vishal Shanbhag, Assistant Professor, Dept. of Critical Care Medicine

GREEN SYMPTOMS
- RESPIRATORY RATE <24/MIN
- PULSE RATE <100
- SPO2 >94% ROOM AIR
- NORMAL B.P.

YELLOW SYMPTOMS
- RESPIRATORY RATE 24-30/MIN
- PULSE RATE 100-120/MIN
- SPO2 <94% ROOM AIR OR TO MAINTAIN >94% NEEDS OXYGEN

RED SYMPTOMS
- RESPIRATORY RATE >30/MIN
- PULSE RATE >120/MIN
- SPO2 <94% ROOM AIR OR TO MAINTAIN >94% NEEDS OXYGEN >5L/MIN
- SYSTOLIC BP<100 REQUIRING FLUID RESUSCITATION OR INOTROPES

MANAGE AS OUT PATIENT BASIS OR ADMISSION IN WARD

ADMISSION IN ATREYA ISOLATION

ADMIT IN SARI ICU
**When to suspect**

Screening guidelines:

1. All symptomatic contacts (primary or secondary) of laboratory confirmed cases
2. All asymptomatic contacts (primary or secondary) of laboratory confirmed cases
3. All symptomatic health care workers (or personnel involved in COVID control)
4. Refer to the table for all patients and are not covered under points 1-3

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*Stable and Unstable classified at physician’s discretion.*

*Vulnerable- Diabetes, hypertension, chronic kidney disease, chronic liver disease, malignancy, immunosuppressed, age> 60 years*
**TRIAGING OF COVID POSITIVE/SUSPECT PATIENTS COMING TO COVID**

**POSITIVE**
- INFORM IFD STAFF
- INFORM UDUPI TEAM

- TMA PAI HOSPITAL UDUPI

**COVID HELPDESK**

- SCREEN AT FEVER CLINIC

**SUSPECT**
- INFORM IFD STAFF
- INFORM UDUPI TEAM

- TMA PAI HOSPITAL UDUPI

**NOT SUSPECT**
- SCREEN AT FEVER CLINIC

**UNSTABLE. NO SARI/ILI SYMPTOMS**
- EMERGENCY TRIAGE. NON-SARI
- ADMISSION IN WARD/ICU

**STABLE. NO SARI/ILI SYMPTOMS**
- MANAGE AT FEVER CLINIC AND SEND HOME

**SARI/ILI SYMPTOMS OR FEVER**
- STABLE
  - IF NEEDS
  - EMERGENCY TRIAGE. SARI AREA
  - ADMIT TO SARI ICU

- UNSTABLE

**DISCUSS WITH FEVER CLINIC MEDICINE STAFF**

* IN EMERGENCY TRIAGE PATIENTS ARE ASSIGNED AS RED FLAG/YELLOW/GREEN FLAG AND ESCALATE LEVEL OF CARE AT ANY POINT OF TIME.
COVID-19 CLINICAL FEATURES AND COMPLICATIONS

Dr Kavitha Saravu, Professor and Head, Department of Infectious Diseases

COVID 19, originated in China in December 2019 has extended globally and has affected 213 countries as of 26th June 2020. It has succeeded to run a similar course in many countries, causing very high caseloads stretching the health care resources and extraordinary casualties even in many resource-rich countries.

Transmission and Infectiousness

- COVID 19 is transmitted from person to person through respiratory droplets (size < 5microns) or by touching the contaminated surfaces.
- SARS-CoV-2 is highly transmissible. R0 (pronounced as R nought), the basic reproduction number which is a measure of contagiousness, is the average number of infections one case can generate over the course of the infectious period of the virus in a naïve uninfected population. R0 for the SARS CoV2 is 2-2.5 as compared to R0 of H1N1 (1.4-1.6), MERS (<1 ) and SARS (1.7-1.9) [1]. This allows the exponential growth of infected people if unchecked. However, this R0 varies depending on the geography and the containment measures implemented, thereby epidemics evolve differently in various population and geography.
- The infectivity period may start several days before the person becomes symptomatic. Now it is well known that COVID 19 is transmitted even from asymptomatic and pre-symptomatic individuals.

Risk factors for the disease

- People with travel history to areas with ongoing transmission within the previous 14 days/ close contact with a person with travel history
- Close contacts of COVID positive patient (Household contacts, Health care workers)
- Attendees of large gatherings held in areas of ongoing transmission
- Occupational- Health care workers

Clinical features

- COVID 19 is revealing its presence in protean ways. SARS-CoV-2 enters the body through ACE2 receptors present in the respiratory epithelium and consequently affects the upper and lower respiratory tract primarily. ACE2 receptors are also present in the gastrointestinal tract, heart, and kidney, which may explain other clinical features.
• Individuals with the illness often manifest fever, dry cough, breathlessness, fatigue, rarely throat pain, myalgia, diarrhoea, dysgeusia, and anosmia. Based on 55,924 laboratory-confirmed cases, typical signs and symptoms include: fever (87.9%), dry cough (67.7%), fatigue (38.1%), sputum production (33.4%), shortness of breath (18.6%), sore throat (13.9%), headache (13.6%), myalgia or arthralgia (14.8%), chills (11.4%), nausea or vomiting (5.0%), nasal congestion (4.8%), diarrhea (3.7%), and hemoptysis (0.9%), and conjunctiva congestion (0.8%) [2].

• GI manifestations: Diarrhea, nausea, vomiting, abdominal pain and elevated liver enzymes have been reported.

• Cardiovascular manifestations: Myocarditis, arrhythmia and heart failure [3] are being reported.

• Dermatological manifestations: Reported features include dengue-like rash, urticaria, vesicles, and livedo reticularis like exanthema. Acrocyanosis and dry gangrene have been reported in ICU patients [4].

• Neurological manifestations: Infectious, para and post-infectious encephalitis, GBS, and cerebro-vascular accidents, including ischemic strokes, haemorrhage and cerebral venous sinus thrombosis.

• Thrombotic complications: Microthrombi in lungs, pulmonary embolism, large vessel occlusion resulting in a stroke, limb ischemia, deep venous thrombosis, DIC, and underlying antiphospholipid antibody syndrome [5] [6].

• Pediatric Multi-System Inflammatory Syndrome Temporally Associated with COVID-19: Unusual presentations of a Kawasaki disease-like inflammatory syndrome associated with COVID-19 are being reported in children with a quarter of them developing severe illness. They often have fever, rash, abdominal pain, vomiting or diarrhea, and toxic shock syndrome, cardiogenic or vasogenic [7].

• In >80% of patients with COVID 19, the disease is mild in nature and recovers with supportive treatment alone.

• In about 15% of patients, it can give rise to severe manifestations pneumonia, respiratory distress, hypotension requiring oxygen and intensive care treatment.

• In a small proportion of about 3-5% of patients it can be critical with organ failures such as acute respiratory distress syndrome (ARDS) respiratory failure because of the pathological immune response often referred as “cytokine storm”, requiring ventilators, acute kidney failure requiring dialysis, or disseminated intravascular coagulation or other haematological abnormality and septic shock.

• COVID has a case fatality rate of 2.3-3.2%, lower than that of SARS (9.5%) and much lower than that of MERS (34.4%) [1]

**Risk factors for severe disease**

• Individuals at highest risk for severe disease and death from WHO- China joint mission report which analyzed 55,924 laboratory-confirmed cases include people aged over 60 years and those with underlying conditions such as hypertension, diabetes, cardiovascular disease, chronic respiratory disease and cancer [2].
Predictors of mortality were older age, higher SOFA score, and elevated D-dimer >1µg/mL at admission, elevated inflammatory markers, and the presence of secondary infection [8] [9].

References:


Introduction:

The severe acute respiratory syndrome coronavirus 2 i.e SARS-CoV-2 virus (earlier known as 2019 novel coronavirus) belongs to Betacoronavirus genus under the Coronaviridae family. It is an enveloped, positive-sense, single-stranded RNA (30 kb) virus. Approximately 80% nucleotide identity is seen between the SARS coronavirus and SARS-CoV-2 virus. The major structural proteins expressed by this virus are the spike (S), membrane (M), envelope (E), and nucleocapsid (N) proteins. The Coronavirus S glycoprotein provides the crown-like or the corona appearance to the virion.


Laboratory Diagnosis:

Over the course of the current COVID-19 crisis, the importance of reliable, accessible testing to screen for the disease has become increasingly apparent. Testing on clinical specimens from patients meeting the suspected case definition should be performed in well equipped BSL-2 laboratories by staff trained in the relevant technical and safety procedures.

Specimens to be collected:

For molecular diagnosis by RT-PCR, the following samples may be tested for SARS-CoV-2 diagnosis as per CDC: nasopharyngeal swab (preferred specimen), oropharyngeal swab, nasal mid-turbinate swab, anterior nares (nasal) swab, nasopharyngeal wash/aspirate and nasal wash/aspirate. Synthetic fiber flocked swabs with synthetic nylon handles should be used for
sample collection. Lower respiratory tract specimens, sputum (in patients with productive cough), endotracheal aspirate and BAL fluid may also be tested for SARS-CoV-2. Induction of sputum is not recommended. Proper infection control measures should be adopted along with the appropriate use of personal protective equipment (PPE) during the sample collection process.

Packaging and shipment of clinical specimens
The swab specimens should be immediately placed in viral transport media and sent to the laboratory for testing immediately after collection. Correct handling of specimens during the transportation is essential. Triple layer packaging of the specimen is recommended for transporting to the laboratory. Specimens that can be delivered promptly to the laboratory can be stored and shipped at 2-8°C. When there is likely to be a delay in specimens reaching the laboratory, specimens may be frozen to -20°C or ideally -70°C and shipped on dry ice if further delays are expected. It is important to avoid repeated freezing and thawing of specimens.

Laboratory Testing:
There are two categories of SARS-CoV-2 tests: tests that detect the virus itself (viral ribonucleic acid [RNA] or viral antigen) and tests that detect the host’s response to the virus (antibodies). Testing for SARS-CoV-2 viral RNA or antigen identifies SARS-CoV-2-infected individuals during the acute phase of infection.

The strategies recommended by ICMR for COVID-19 testing should be followed by all the laboratories in India. The current testing recommendations are available online on the ICMR website (https://www.icmr.gov.in). Also, the RT-PCR commercial testing kits used for SARS-CoV-2 diagnosis by the labs have to be evaluated and approved by ICMR validation centres. The US-FDA kits with due marketing approval from DCGI may also be used. In India, all SARS-CoV-2 tests of RT-PCR, TrueNat, CBNAAT or Antigen detection should be reported real-time on ICMR data entry portal.

Molecular Assays for Detection of Viral Nucleic Acids:

1. **RT-PCR** relies on its ability to amplify the viral genetic material in the sample and is considered to be the gold standard for identification of SARS-CoV-2 virus. Currently, RT-PCR tests for COVID-19 generally use nasopharyngeal and/or oropharyngeal swab specimens. RT-PCR starts with the conversion of viral genomic RNA into DNA by RNA-dependent DNA polymerase (reverse transcriptase). This reaction relies on small DNA sequence primers designed to specifically recognize complementary sequences on the RNA viral genome and the reverse transcriptase to generate a short complementary DNA copy (cDNA) of the viral RNA. In real-time RT-PCR, the amplification of DNA is monitored in real-time as the PCR reaction progresses. This is done using a fluorescent dye or a sequence-specific DNA probe labelled with a fluorescent molecule and a quencher molecule, as in the case of TaqMan assays. An automated system then repeats the amplification process for about 40 cycles until the viral cDNA can be detected, usually by fluorescent or electrical signal.
To date, the majority of molecular diagnostic tests have utilized the real-time RT-PCR technology targeting different SARS-CoV-2 open reading frame (ORF) regions, and the nucleocapsid (N), spike (S) protein, RNA-dependent RNA polymerase (RdRP), or envelope (E) genes.

Although RT-PCR is the most widely used method for detecting SARS-CoV-2 infections, it has the disadvantage of requiring expensive laboratory instrumentation and well-trained laboratory personnel.

2. **Cartridge Based Nucleic Acid Amplification Test (CBNAAT) using Cepheid Xpert Xpress SARS-CoV2:** Cepheid Xpert Xpress SARS-CoV2 is an FDA approved Cartridge Based Nucleic Acid Amplification Test under Emergency Use Authorization (EUA). It is a rapid, real-time RT-PCR test intended for the qualitative detection of SARS-CoV-2 in upper respiratory specimens. Involves single-use disposable cartridges. As these cartridges are self-contained, cross-contamination between samples is minimized. The results are interpreted automatically by the GeneXpert System in less than an hour. The Xpert Xpress SARS-CoV-2 test provides test results based on the detection of two targeted genes E and N2.

3. **Truenat Beta CoV (MolBio Diagnostics):** Is a chip-based Real Time PCR Test which can be used for screening and confirmation of SARS-CoV-2 infection. Allows for semi-quantitative detection of Beta Coronavirus (Sarbeco) RNA in human oropharyngeal and nasopharyngeal swab specimens within 1 hour. The assay includes 2 steps. Initially, the samples are screened for E gene. Those testing Negative are considered as true negatives. All samples positive for E gene are subjected to confirmation by step 2 RdRP assay. Samples that test Positive in this confirmatory assay are considered as true positive. The collected swabs are placed in the viral transport medium (VTM) with virus lysis buffer to be provided along with the kit.

Manufacturer’s instructions have to be followed for interpretation of molecular tests. A robust Internal Quality Control mechanism should be in place to ensure release of accurate results.

**Antigen detection:**

Antigen based detection tests are available for diagnosing COVID-19. Provide for rapid testing of patients with suspected COVID-19 infection. Currently, one commercial kit which is based on immunochromatographic assay principle for qualitative antigen detection (Standard Q COVID-19 Ag detection kit, SD Biosensor) has been approved by ICMR. This test has relatively moderate sensitivity (50.6 - 84%) but has high specificity (99.3 - 100%). Nasopharyngeal swab is the acceptable specimen for this test. The swab after collection should be placed in the viral extraction buffer provided in the kit and should be processed by adding on to the test strip within 1 hour. Results are obtained within 15-30 mins and interpreted as Positive or Negative. Symptomatic individuals who test Negative should be tested sequentially by RT-PCR to rule out. ICMR recommendations should be followed to prioritize individuals for antigen testing. Few other antigen based kits are currently under the ICMR validation
process. The following testing algorithm issued by the Government of Karnataka should be followed while using COVID-19 antigen testing.

**Serology**
Includes testing for Immunoglobulin G (IgG) antibodies. This test is currently not recommended for making individual patient diagnosis. Should be used for conduct of serosurveys only. Enzyme-linked immunosorbent assay (ELISA) and chemiluminescence immunoassay (CLIA) based tests should be used for serological testing. Only ICMR approved and validated or USFDA approved IgG based ELISA or CLIA kits should be used. Individuals need to be prioritized for serosurveys as per ICMR recommendations.
### Types of diagnostic approaches in COVID-19

<table>
<thead>
<tr>
<th>Test</th>
<th>Mechanism of detection</th>
<th>Testing material</th>
<th>Availability for POC</th>
<th>Positive Test indicates</th>
<th>Use of tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nucleic acid amplification tests (NAAT)</strong></td>
<td>RT-PCR and NGS detection of genetic sequences of conserved regions for regions of the virus e.g. N, E, S and RdRP genes. Two independent sequences need to be detected</td>
<td>Ambulatory: nasopharyngeal swabs, sputum. In hospital: sputum, endotracheal aspirate, BAL blood, feces</td>
<td>No; Needs to be performed in the lab</td>
<td>Confirms current SARS-CoV2 infection</td>
<td>Individual testing</td>
</tr>
<tr>
<td><strong>Antibody based immunoassay</strong></td>
<td>ELISA detecting IgM or IgG anti-SARS-CoV-2 antibodies</td>
<td>Serum</td>
<td>Yes (depending on test design)</td>
<td>IgM+ 3-5 days post onset IgG: past infection</td>
<td>Overall infection/ immunity rates in a community</td>
</tr>
<tr>
<td><strong>Antigen based immunoassay</strong></td>
<td>ELISA detecting viral proteins e.g. S (spike protein) or N protein (nucleocapsid)</td>
<td>Nasopharyngeal swabs, sputum and other lower respiratory tract secretions, BAL blood, feces.</td>
<td>Yes (depending on test design)</td>
<td>Confirms current SARS-CoV2 infection</td>
<td>Individual testing</td>
</tr>
<tr>
<td><strong>Clinical tests</strong></td>
<td>Clinical symptoms (fever/cough)                              Epidemiological history Imaging (CT)</td>
<td>CT – detection of radiological features</td>
<td>Yes</td>
<td>Infection possible</td>
<td>Triage to identify candidates for further testing</td>
</tr>
</tbody>
</table>

### References:

OUT-PATIENT SAMPLE COLLECTION KIOSK
Walk-in Sample Collection Kiosk (WISK) for COVID-19 Sample Collection

Standard Operating Procedures

Dr. Shashikiran Umakanth, Professor $ HOD, Dept. of Medicine, and Nodal Officer for COVID-19, Dr. T. M. A. Pai Hospital, Udupi

Collection of the throat and nasopharyngeal swab samples for the diagnosis of COVID-19 is challenging, as it exposes healthcare workers (HCW) to the risk of infection. Elaborate arrangements are required to prevent exposure to HCWs during sample collection. Such measures include the use of personal protective equipment (PPE) by everyone involved in the procedure (doctors, nurses and cleaning staff). Use of PPE adds to the cost of testing too.

South Korea started using sealed glass kiosks to overcome all the above problems. A healthcare worker wearing just a mask and gloves, sitting inside a sealed kiosk, collects samples from individuals on the outside without any exposure to potentially infective materials.

Many countries, including India, have started using this. This document provides the standard operating procedures for such walk-in sample collection kiosks (WISK).

A. The kiosk

The kiosk looks like a telephone booth. It is sealed from all directions and has an entry for HCW at the back and a glass wall with attached heavy-duty gloves in front (Figure 1). The handles for the door are foot-operated. The interior of the kiosk has a ceiling light, a ceiling fan and a chair, microphone and speakers for communicating with the patient outside.

Figure 1: The COVID-19 WISK installed at Dr TMA Pai Hospital, Udupi
B. Placing the kiosk

The kiosk should be ideally placed with the following specifications:

- placed on a firm level ground
- open area with proper ventilation and natural light
- convenient access to vehicles in which patients may arrive in (car, van, or ambulance)
- not exposed to rain and direct sunlight
- safe electrical supply for the light and fan

C. Operating instructions

a. Preparation for sample collection
   i. Patient details:
      1. All details about patient details for registration as well as Specimen Referral Form (SRF) should be collected by phone.
      2. Details required include name, age, gender, Aadhaar number, mobile phone number, occupation, history of travel, history of (unprotected) exposure to known COVID-19 positive patients, symptoms, and other specific details as required in the SRF.
      3. If the patient does not have the Aarogya Setu application installed in their smartphone, they should be recommended to install and activate it.
   ii. SRF and SRF ID
      1. SRF is completed on the government provided RT-PCR app. However, only one person per institution has access to that app. Required details should be made available to that person for completing the details.
      2. After completing the details on the app, a 13-digit SRF ID is generated. This SRF ID should be mentioned on the VTM vial.
   iii. Preparation of VTM vial
      1. VTM vial form the lab should be sent to the kiosk area.
      2. Two labels are needed on the VTM vial.
         a. Patient ID: Hospital ID sticker can be used
         b. SRF ID: the 13-digit SRF ID generated on the RT-PCR app should be written on a blank sticker and pasted on the vial.
         c. Both these stickers should be covered with transparent cellophane tapes before the sample collection begins.
         d. The prepared VTM vial must be placed near the patient area in front of the kiosk (Figure 2).
   iv. Swab collection probes
      1. Two probes, one each for the throat (white cover) and nasopharyngeal (blue cover) swabs, along with a tongue depressor, must be placed on the shelves in front of the kiosk (Figure 2 and Figure 3).
   v. Hand sanitizer
      1. A hand sanitizer must be placed near the patient area in front of the kiosk (Figure 2)
vi. Scissors
   1. Scissors should be placed near the patient area for cutting the probe stem before closing the VTM vial.

vii. Transport box
   1. A sample transportation box, usually made of thermocol, with dry ice inside, should be placed in a table about two meters away from the kiosk.
   2. Additional cellophane tapes must be placed on that table.

Figure 2: The patient side of the kiosk. Note the VTM vial, swab probes, tongue depressor and hand sanitizer.

Figure 3: Sample collection probes – White for throat and blue for Nasopharyngeal swab collection (the appearance of the swabs may be different, based on the supply)
b. Sample collection
   i. Instructions to patients: See Appendix 1
   ii. Instructions to healthcare workers: See Appendix 2
   iii. Sample collection procedure
      1. Healthcare worker enters the kiosk with a mask and gloves.
      2. Inserts gloved hands into the attached heavy-duty gloves of the kiosk.
      3. The patient performs hands hygiene, hands over the throat swab probe to the heavy-duty gloved hand of the HCW
      4. HCW collects the sample as per the KH HICC COVID-19 throat swab sample collection protocol
      5. The HCW discards the tongue depressor in the waste bin with the patient’s help.
      6. The HCW cuts the long swab stick and places the tip of the swab carefully into the VTM vial, and discards the cut stick into the waste bin with the patient’s help.
      7. The patient hands over the nasopharyngeal swab probe to the heavy-duty gloved hand of the HCW
      8. HCW collects the sample as per the KH HICC COVID-19 nasopharyngeal swab collection protocol
      9. The HCW cuts the long swab stick and places the tip of the swab carefully into the VTM vial, and discards the cut stick into the waste bin with the patient’s help.
     10. The patient closes the VTM vial cap and places it on the rack.
     11. The patient sprays hand sanitizer on the heavy-duty gloves, and the HCW performs the 5-step hand rub manoeuvres
     12. The patient performs hand hygiene, leaves the kiosk and returns to the vehicle and exits.
     13. After the patient has left the area, the housekeeping staff in PPE should seal the VTM cap with one layer of cellophane tape, place it in a cotton roll, and then put it inside a Zip-lock bag.
     14. The Zip-lock bag should be dropped into the thermocol box by the housekeeping staff without touching the box.
     15. The housekeeping staff should perform disinfection of the area as per instructions in Appendix 3.
     16. Another housekeeping staff with a triple layer mask and gloves should carry the thermocol box to the laboratory.
Appendix 1: Instructions to patients visiting the Walk-in Sample Collection Kiosk

1. A prior appointment is required to visit the COVID-19 sample collection kiosk.
2. You will receive two phone calls; please provide accurate details.
   a. The registration counter will call you to complete the registration process – you will need to give your details, including name, age, gender, address, Aadhaar number, and phone number.
   b. A doctor will call you to enquire about your symptoms, travel, contact and other medical details. They will also instruct you regarding the procedure of swab collection.
3. If you have not already installed, please download, install and activate the Aarogya Setu application on your mobile phone.
4. You must wear a face mask when coming for swab collection.
5. Reach about 5 minutes before the appointment time, in a car, van or ambulance. When called, the vehicle moves closer to the kiosk.
6. Stay in your vehicle and come out only after you are called to come out.
7. Approach the kiosk and sit on the stool. There will be some items in front of the kiosk, as in Figure 4.

*Figure 4: Arrangement of items in front of the kiosk. Please note all the labelled items.*
8. The procedure of swab collection:
   a. Please perform hand hygiene using the hand sanitizer.
   b. Open the throat swab probe & tongue depressor and give them to the doctor’s hand in the kiosk. Discard the covers of the probe and tongue depressor into the red bin.
   c. Remove your face mask, move closer to the kiosk and open your mouth widely, to allow the doctor to take a sample from your throat. You may feel slight discomfort; it is normal.
   d. Then, please help the doctor to place the swab inside the VTM vial (with pink liquid). The long swab stick may need to be cut with scissors. Help to discard the cut stick and the tongue depressor into the waste bin.
   e. Open the nose swab probe and give it to the doctor’s hand. Move closer to the kiosk and turn your face up, to allow the doctor to take a sample from your nose. This also may give you some discomfort, but it is normal.
   f. Then, please help the doctor to place the second swab inside the same VTM vial. The long swab stick may need to be cut with scissors. Help to discard the cut stick into the waste bin.
   g. Please close the cap of VTM vial and place the VTM vial on the rack.
9. After that, please spray hand sanitizer onto the orange heavy-duty gloves.
10. Wear your face mask, perform hand hygiene and go to your vehicle immediately.
11. Follow all quarantine procedures as advised by government authorities.
12. The report will be informed to you when it is ready.
13. In case of any emergency or worsening symptoms, please contact the Dr TMA Pai Hospital on 0820 2626501.

APPENDIX 2: Instructions to The Healthcare Workers

1. Please call the patient’s phone number at least 30 minutes earlier and collect all necessary details and complete the Specimen Referral Form (SRF).
2. Send the details to the person responsible for generating the 13-digit SRF ID. In Dr TMA Pai Hospital, please send the details by email to clab.tmaph@manipal.edu.
3. Before starting the procedure for a patient, please ensure the following:
   a. The 13-digit SRF ID is generated.
   b. VTM vial is prepared with patient details and the SRF ID
   c. VTM vial, tongue depressor, swab probes and hand sanitizer are placed on the shelves in front of the kiosk
   d. A thermocol box with dry ice is placed on the table about 2 meters away from the kiosk.
4. When all these are confirmed, enter the kiosk with a mask and gloves. Do not touch the kiosk door by hand; use your foot instead, to open and close.
5. Indicate to the patient to come out of the vehicle and be seated on the chair in front of the kiosk.
6. Insert your gloved hands into the heavy-duty gloves.
7. After performing hand hygiene, the patient should hand over the throat swab probe and a tongue depressor to you. Collect the throat swab as per the KH HICC protocol.
8. Discard the tongue depressor with the patient’s help into the waste bin.
9. Cut the long swab stick; place the swab tip carefully in the VTM vial. Discard the cut length of the swab stick with the patient’s help into the waste bin.
10. Now, the patient should hand over the nasopharyngeal swab probe. Collect the swab as per the KH HICC protocol.
11. Cut the long swab stick; place the swab tip carefully in the VTM vial. Discard the cut length of the swab stick with the patient’s help into the waste bin.
12. Indicate to the patient to spray hand sanitizer on to both the heavy-duty gloves and perform the 5-step hand hygiene manoeuvre with the gloves.
14. The patient leaves after performing hand hygiene.
15. Housekeeping staff performs disinfection procedures outside the kiosk.
16. You can either start the process for the next patient or leave the kiosk if all sample collections are completed.

APPENDIX 3: Instructions for The Housekeeping Staff

1. Before the patient comes to the kiosk area, please don the PPE as per KH HICC protocol.
2. Stay at least 2 meters away from the kiosk.
3. When a patient leaves the kiosk after sample collection, go to the kiosk and collect the VTM vial.
4. Walk to the table with the thermocol box. Place a single layer of cellophane tape to secure the cap of VTM vial.
5. Cover the VTM vial with cotton and place it in a Zip-lock bag.
6. Drop the Zip-lock bag into the thermocol box, without touching the box.
7. Perform disinfection of the kiosk, shelves, table and other surfaces as per KH HICC guidelines.
8. Stay away from the kiosk when the sample is collected from another patient.
9. Repeat the same procedure after every sample collection.
10. Once all samples are collected, perform safe doffing of your PPE as per KH HICC guidelines.
# TREATMENT PROTOCOLS IN COVID-19 ADULTS

*Dr Nitin Gupta, Assistant Professor, Department of Infectious Diseases*

*Dr Kavitha Saravu, Professor and Head, Department of Infectious Diseases*

## Table 1 - Treatment of patients with COVID-19

<table>
<thead>
<tr>
<th>Staging</th>
<th>Definition</th>
<th>Anti-coagulation</th>
<th>Antimicrobials</th>
<th>Steroids/Immunomodulators</th>
<th>Convalescent plasma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>No symptoms</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mild</td>
<td>Fever and constitutional symptoms without shortness of breath and Respiratory rate &lt; 24/min</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Moderate</td>
<td>Pneumonia, or hypoxia &amp; Respiratory Rate ≤ 30/min, SpO₂ &gt; 90% on room air</td>
<td>Prophylactic LMWH</td>
<td>Remdesivir</td>
<td>Yes (if on oxygen)</td>
<td>Yes (when available)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(if on oxygen)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Hydroxychloroquine</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(on a case to case basis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>Pneumonia &amp; Respiratory rate &gt; 30/min or SpO₂ &lt; 90% in room air</td>
<td>Prophylactic LMWH</td>
<td>Remdesivir</td>
<td>Steroids, Tocilizumab</td>
<td>Yes (when available)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hydroxychloroquine</td>
<td>(based on IL-6 values- on a case to case basis)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(on a case to case basis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical</td>
<td>ARDS, Hypotension, Worsening mental status, MODS</td>
<td>High prophylactic dose LMWH</td>
<td>Remdesivir</td>
<td>Steroids, Tocilizumab</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(based on IL-6 values- on a case to case basis)</td>
<td></td>
</tr>
</tbody>
</table>

*LMWH- Low Molecular Weight Heparin*
No role of empiric antibiotic therapy in patients with COVID-19 irrespective of severity. Antibiotics are to be used only if bacterial co-infection is suspected. Consent is required before administering convalescent plasma, tocilizumab and remdesivir. Remdesivir, tocilizumab and convalescent plasma have been approved for emergency use in patients with COVID-19.

**Table 2- Drugs used in treatment of patients with COVID-19**

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Dosing</th>
<th>Indication</th>
<th>Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroxychloroquine (HCQ)</td>
<td>400 mg BD x 1-day f/b 200 mg BD x 4 days</td>
<td>Moderate and Severe (on a case to case basis)</td>
<td>QTc&gt;500ms in the female; &gt;480 in males Porphyria Myasthenia gravis Retinal pathology Epilepsy Hypokalemia K⁺&lt;3 meq/L</td>
</tr>
<tr>
<td>Remdesivir</td>
<td>200 mg IV on day-1, followed by 100 mg IV q24 h for 5-10 days</td>
<td>Moderate and Severe</td>
<td>Elevated transaminases (&gt;5 times the upper limit of normal) CrCl&lt;30 ml/minute</td>
</tr>
<tr>
<td>Tocilizumab</td>
<td>8 mg/kg (up to a maximum of 800mg per dose intravenously in100 mL NaCl 0.9% Infusion time: 60 min), one additional dose may be given if clinical symptoms worsen or show no improvement with an interval of 12 hours</td>
<td>Severe and life threatening with increased IL6 (atleast &gt;5 ULN)</td>
<td>Known severe allergic reactions Active tuberculosis (TB) infection Suspected active bacterial, fungal, viral infection Receipt of other monoclonal antibody in last three months Pregnant or breastfeeding Elevated transaminase (&gt;10 ULN Absolute neutrophil count (ANC) &lt; 1000/mL Platelet count &lt; 50,000/mL at screening</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>6mg/day for 7-10 days (Equivalent dose of Any patient requiring oxygen</td>
<td>Any patient requiring oxygen</td>
<td></td>
</tr>
</tbody>
</table>
Methylprednisolone can be used also (Moderate and Severe)

<table>
<thead>
<tr>
<th>Low molecular weight Heparin-enoxaparin</th>
<th>prophylactic dose-1mg/kg s/c once daily, therapeutic dose-1mg/kg s/c twice daily</th>
<th>Prophylactic for moderate and severe High prophylactic for life threatening</th>
<th>Bleeding tendencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convalescent plasma</td>
<td>500ml (250ml on 2 days)</td>
<td>Severe</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3: Investigations to be requested in a COVID 19 patient**

<table>
<thead>
<tr>
<th>Common tests for all hospitalized patients</th>
<th>Additional tests as required</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC (with NLR)</td>
<td>Procalcitonin (in moderate-severe cases)</td>
</tr>
<tr>
<td>RBS</td>
<td>Blood culture (if indicated)</td>
</tr>
<tr>
<td>HbA1C</td>
<td>Troponin (if indicated in moderate-severe cases)</td>
</tr>
<tr>
<td>RFT, LFT</td>
<td>Creatine phosphokinase (if indicated)</td>
</tr>
<tr>
<td>CRP, LDH</td>
<td>Ferritin (in moderate-severe cases)</td>
</tr>
<tr>
<td>CXR</td>
<td>Coagulation parameters (in moderate-severe cases)</td>
</tr>
<tr>
<td>ECG</td>
<td>D dimer (In moderate-severe cases)</td>
</tr>
<tr>
<td></td>
<td>ABG (as indicated in moderate-severe cases)</td>
</tr>
<tr>
<td></td>
<td>IL-6 (if indicated)</td>
</tr>
</tbody>
</table>

**Tests to be repeated**

<table>
<thead>
<tr>
<th>CBC, CRP after 3 days or as indicated</th>
<th>Ferritin, LDH, D- Dimer in moderate-severe cases after 72 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CXR after 72 hours</td>
</tr>
<tr>
<td></td>
<td>ECG To be monitored for patients on HCQ: baseline, end of Day1, 2, and 4</td>
</tr>
</tbody>
</table>
Table 4: Identification of High Risk Patient

<table>
<thead>
<tr>
<th>Comorbidities</th>
<th>Clinical Variables</th>
<th>Laboratory Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt;50 years</td>
<td>SpO2 &lt; 94% on room air</td>
<td>Lymphopenia with NLR &gt;17</td>
</tr>
<tr>
<td>Ischemic Heart Disease</td>
<td>Pulse rate &gt;100/min</td>
<td>CRP &gt;100mg/L</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>Respiratory Rate &gt; 30/min</td>
<td>Serum Ferritin &gt;300microg/L</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Systolic BP &lt;90 mmHg</td>
<td>LDH &gt;450 U/L</td>
</tr>
<tr>
<td>Lung Diseases (COPD/ Asthma/ Post TB Sequel)</td>
<td>Altered sensorium</td>
<td>D-Dimer &gt;1000ng/ml</td>
</tr>
<tr>
<td>Chronic Kidney Disease/ Chronic Liver Disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunosuppression /HIV/Malignancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOP for escalation of care of COVID-19 positive/ suspect patients**

This standard operating procedure (SOP) provides the policy for monitoring patients and escalate their level of care appropriately. Patients are assigned green, yellow or red flags based on their clinical status and managed as described below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>GREEN FLAG</th>
<th>YELLOW FLAG</th>
<th>RED FLAG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate (per min)</td>
<td>&lt; 24</td>
<td>24 – 30</td>
<td>&gt; 30</td>
</tr>
<tr>
<td>Pulse rate (bpm)</td>
<td>&lt; 100</td>
<td>100 - 120</td>
<td>&gt; 120</td>
</tr>
<tr>
<td>SpO2 (%)</td>
<td>&gt; 94% on room air</td>
<td>&lt; 94% on room air, but to maintain &gt;94% needs &lt; 5L/min O2</td>
<td>&lt; 94% on room air, but to maintain &gt;94% needs &gt; 5L/min O2</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>-</td>
<td>-</td>
<td>&lt; 100 requiring fluid resuscitation or vasopressors</td>
</tr>
</tbody>
</table>
### Mental status

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Confusion Altered mental status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental status</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Management

- Continue care in respective wards. Managed by Medicine + Infectious Disease teams.
- Inform ACE team about the status of the patient Managed by Medicine + Infectious Disease teams.
- Inform the inform ACE team in the appropriate ICU*. Shift the patient to appropriate ICU on oxygen and other necessary support. The Medicine + Infectious Disease team will take the call to shift, and the responsibility of shifting remains with them.

*PS: If a patient is very sick and cannot be shifted without intubation, give an emergency call to the ACE team in the appropriate ICU*, to consider intubation in the “intubation bay” of the patient’s floor itself, or in the patient’s room.

### Discharge criteria

<table>
<thead>
<tr>
<th>Severity of illness</th>
<th>Minimum number of days after resolution of fever and other clinical symptoms</th>
<th>Minimum number of days that the patient should maintain oxygen saturation</th>
<th>Minimum duration from the time of onset of symptoms/ date of first test</th>
<th>Repeat testing to show negativity</th>
<th>Home isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td></td>
<td></td>
<td></td>
<td>Not required</td>
<td>7 days</td>
</tr>
<tr>
<td>Mild</td>
<td>3 days</td>
<td></td>
<td>10 days</td>
<td>Not required</td>
<td>7 days</td>
</tr>
<tr>
<td>Moderate</td>
<td>3 days</td>
<td>4 days without oxygen</td>
<td>10 days</td>
<td>Not required</td>
<td>7 days</td>
</tr>
<tr>
<td>Severe/Critical</td>
<td></td>
<td></td>
<td></td>
<td>1 test required after clinical recovery</td>
<td>7 days</td>
</tr>
</tbody>
</table>

PS: If a patient is very sick and cannot be shifted without intubation, give an emergency call to the ACE team in the appropriate ICU*, to consider intubation in the “intubation bay” of the patient’s floor itself, or in the patient's room.
TREATMENT PROTOCOLS FOR PATIENTS REQUIRING ICU CARE
Cardiopulmonary resuscitation of in-hospital confirmed/suspected COVID patients with cardiac arrest. (In addition to AHA ACLS protocol)

Dr Vishal Shanbhag, Assistant Professor, Department of Critical Care Medicine
Dr. Sunil R, Assistant Professor, Department of Critical Care Medicine
Dr. Margi Bhatt, Senior Resident, Department of Critical Care Medicine

Cardiopulmonary resuscitation of in-hospital confirmed/suspected COVID patients with cardiac arrest (in addition to AHA ACLS protocol)

General principles
Cardiopulmonary Resuscitation in COVID-19 “Crashes” should be avoided by close monitoring and anticipation, aiming for an elective, unhurried intubation. The usual “code blue” should be replaced by a “PROTECTED CODE BLUE” to prevent unacceptable caregiver risk.

Futility should be assessed and do-not-attempt resuscitation (DNAR) decisions to be taken in time. Meaningful outcome in refractory critical illness and multiple organ failure is <5%.

CPR should be undertaken in airborne isolation with a minimal team, and never without full PPE

Prepare code equipment:
To limit transmission of virus while passing meds/supplies into the patient’s room from the code cart, consider creating Code Bags inside the E-Cart

1. It is packed with necessary code medications (Epinephrine, Bicarbonate, Calcium gluconate Magnesium Sulphate, Amiodarone, 50% dextrose Norepinephrine) 2 IV cannula & 1 central line set. 500 ml saline bag.
2. It should also contain Airway Bag & Difficult Airway (PLAN B) set
3. 4 sets of PPE kits, 2 transparent sheets.
4. 4 viral filters, ETCO₂ & Tube clamps. Adhesive Tapes
5. Defibrillation /AED pads & adhesive ECG leads.
Early goals of care conversations

To avoid unnecessary codes in patients with an irreversible underlying condition, patients who are at high-risk for acute decompensation should be identified early and appropriate steps should be taken to confirm code status and initiate early goals of care conversations with the patient and family.

Code Management - First responder BLS

1. **CONFIRM CARDIAC ARREST** - First responder should confirm loss of central pulse/unresponsiveness and immediately activate the CODE BLUE team.

   First responder should don necessary personal protection equipment before attending the patient (N95 mask, water resistant gown, eye and head cover, shoe cover and gloves).


   3. First responder should start **CHEST COMPRESSIONS ONLY CPR** as per ACLS protocol with emphasis on high quality CPR (chest compressions 100-120/min, allowing full recoil of the chest with minimal interruptions)

   4. Attach the **DEFIBRILLATOR**, confirm shockable/non shockable rhythm. Administer defibrillation as per ACLS protocol and continue with chest compression. **Please keep the face covered and put the oxygen flow off before delivering Shock and resume the oxygen flow thereafter.**

   5. **When code blue team arrives, PLEASE SAY PROTECTED CODE BLUE & get in the CODE BAGS.**
On arrival of the CODE BLUE TEAM, a brief and concise handover on the sequence of events to be given.

**Code Blue Team**

All Efforts should be made to minimize the total number of Code responders in the room to 4-5.
CLEARLY ALLOCATE ROLES BEFORE YOU ENTER THE ROOM

Code responders inside the patient’s room who SHOULD WEAR FULL PPE prior to entering the patient’s room:

Consider using mechanical CPR devices for adults and adolescents who meet height and weight criteria

Communicate COVID-19 status to any new providers entering the area.

**Code Team Structure & Roles**

**Structure -**

**Code Leader**- ensuring the proper conduct of the resuscitation process, ensuring closed loop communication. He can also document the ongoing events during the CPR process and keep a tab on time. (1)

**Code nurse**- taking care of IV medications and defibrillation (2)

**Respiratory Therapist** -assisting securing the airway, also alternating chest compressions (3)

**Airway expert** -Anesthesiologist/Critical care/Emergency medicine -trained in securing airway (4)

**Chest Compressor**- ACLS trained in CPR doing chest compressions. He can change hands with other team members every 2 minutes resting compressor holds femoral pulse (5)

If needed for surgical procedures, **Surgical Responder** (6)

**Code Help Team (Stationed Just Outside the Area)**

Code responders outside the patient’s room should not don PPE unless called upon in the room:

1. **NURSE IN CAHRGE** - One Nurse to have a closed loop communication with CODE TEAM (through SPEAKER ON TABLE )
2. Additional unit nurses (2-3) (to give supplies, medications from code cart 2)
3. On call physician - Doctor who will call for additional help & address the family (primary physician /surgeon)
4. Security in charge – will manage the crowd and help in creating FREE CORRIDOR for transfer of the patient safely to ICU after ROSC
5. Gate keeper /Buddy (for PPE observation) of anyone before entering the area.
Goals of Code Blue Team

1. **Circulation:** Until a definitive airway is obtained, compression-only CPR should be performed. Multiple studies have shown that compression-only CPR is non-inferior to standard CPR (Svensson et al, NEJM, 2010). If the patient has shockable rhythm (VF/VT), defibrillate as soon as possible.

2. **Airway:** Initial Airway Management, Prior to Intubation
   Prior to securing a definitive airway, **oxygen** should be applied via a non-rebreather mask at 15L/min without humidification.

   - If unavoidable, bag mask ventilation (with **Viral filter**) should be done with smaller tidal volumes looking at the chest excursion. Avoid suctioning.
   - If passive oxygen is not available, place a surgical facemask and a blanket over the patient’s face prior to chest compressions.
   If the patient **does not have a shockable rhythm**, proceed with Rapid Sequence Intubation as early as possible to limit aerosolization.

4. **Endotracheal Intubation:** Endotracheal intubation is the procedure that subjects the rescuer to the **HIGHEST RISK** of infection during resuscitation.
   - To maximize the success rate for intubation, airway interventions should be carried out by **MOST EXPERIENCED** individuals (confirmed with ETCO2). Chest compressions should be **STOPPED** during intubation (Cheung, Lancet Resp Med, 2020). Code responders should distance themselves from the head of the bed during the intubation procedure (**6 ft distance**).
   - This may deviate from usual cardiac arrest care leading to a pause in chest compressions, however this is acceptable to maintain the safety of code responders.
   - Chest compressions should **resume once the endotracheal tube (ETT) cuff is inflated** and the ETT is connected to the ventilator.
   - If the pause in chest compressions is excessive and endotracheal intubation does not seem likely, consider **LMA or other supraglottic** airway device.
   - Continuous **CAPNOGRAPHY** device should be used to monitor ventilation (Cheung, Lancet Resp Med, 2020).
   - Depending on institutional policies, **airway expert and respiratory therapist** may don **higher levels of PPE** than other members for the intubation procedure.

**Etiologies to Consider**

Data from a retrospective study in Wuhan (Ruan et al, Intensive Care Med, 2020) revealed cause of death to be: Respiratory failure (53%)- that’s why intubate early during CPR, Heart failure with respiratory failure (33%) Myocardial damage (7%) Unknown cause (7%) it is
always important to attempt to identify and treat reversible causes (H’s and T’s) before stopping the code.
**Terminating Resuscitative Efforts**

Avoid prolonged resuscitation if there is no easily reversible etiology identified.

No one factor alone, or in combination, is predictive of outcome during cardiac arrest, however it is reasonable to stop resuscitation efforts if return of spontaneous circulation (ROSC) has not been achieved within **30 minutes**.

In intubated patients, failure to achieve an **ETCO2 of greater than 10 mm Hg** by waveform capnography after **20 minutes** of CPR should be considered as one component of a multimodal approach to decide when to end resuscitative efforts (Mancini et al, Circulation, 2015)

**Post-Resuscitation Care**

On achieving the return of spontaneous circulation **ROSC**, inform the **intensive care unit** regarding the shifting process.

**Minimize disconnections** and reduce the number of people involved in the transport.

**COVER FULL BED** with bedsheet except for monitor and head during transport.

**Clamp the ET tube** before connecting the patient on ventilator.

Connect the ET tube to ventilator **before** unclamping the ET tube.

**Dispose** of, or clean, all equipment used during CPR. Any work surfaces used for airway/resuscitation equipment will also need to be cleaned.

After the resuscitation has ended adhere to **strict doffing** procedure to limit exposure. If ROSC is achieved, provide usual post-resuscitation care consistent with current recommended guidelines including **targeted temperature management** (Donnino et al, Circulation, 2015).
Cardiopulmonary Resuscitation in Special Situations

1. Cardiac arrest in Prone Ventilated patients

While the effectiveness of CPR in the prone position is not completely known, for those patients who are in the prone position with an advanced airway, avoid turning the patient to the supine position unless able to do so without risk of equipment disconnections and aerosolization.

Instead, consider placing defibrillator pads in the anterior-posterior position

Provide CPR with the patient remaining prone with hands in the standard position over the T7/10 vertebral bodies.

(Interim Guidance for Basic and Advanced Life Support in Adults, Children, and Neonates with Suspected or Confirmed COVID-19: From the Emergency Cardiovascular Care Committee and Get with the Guidelines®-Resuscitation Adult and Pediatric Task Forces of the American Heart Association)
2. Intubated patients at the time of cardiac arrest

Consider leaving the patient on a mechanical ventilator with HEPA filter to maintain a closed circuit and reduce aerosolization. **DO NOT DISCONNECT**

Adjust the ventilator settings to allow for asynchronous ventilation. Adjust the **trigger to off** to prevent the ventilator from auto-triggering with chest compressions and possibly prevent hyperventilation and air trapping.

Adjust **Respiratory Rate to 10/min** for adults Increase the **FIO2 to 1.0**.

Change mode to **Pressure Control Ventilation (Assist Control)** and limit pressure as needed to generate **adequate chest rise** (6 mL/kg ideal body weight is often targeted).

Assess the need to adjust **positive end-expiratory pressure** level to balance lung volumes and venous return.

Ensure **endotracheal tube/tracheostomy** and ventilator circuit **is tied security** to prevent unplanned extubation.

If return of spontaneous circulation **ROSC** is achieved, set ventilator settings as appropriate to patients’ clinical condition

3. Maternal cardiac arrest
• The tenets of maternal cardiac arrest are **unchanged** for women with suspected or confirmed COVID-19.
• The cardiopulmonary physiological changes of pregnancy may increase the risk of **acute decompensation** in critically ill pregnant patients with COVID-19.
• Remember **TO MANUALLY DISPLACE** the gravid Uterus / Place a pillow under the Hip.
• Simultaneously activate **OBSTETRICS & NEONATAL CODE TEAM**.
• **Preparation for perimortem delivery**, to occur after 4 minutes of resuscitation, should be initiated early in the resuscitation algorithm.
• Allow the assembly of **obstetrical and neonatal teams** with **PPE** even if ROSC is achieved and perimortem delivery is not required for further decision making and troubleshooting.
4 STEP approach

a. Donning of PPE
b. Equipments and preparation
c. Rapid sequence intubation
d. Doffing

Donning PPE

It is required that the person securing the airway/ healthcare personnel assisting the procedure should don the personal protective equipment before carrying out the procedure.

Don the following PPE.

Disposable hair bouffant or cap.
Eye protection (face shield only / face shield AND protective eyewear)
N95 + hood for neck protection
Fluid resistant gowns (blue impermeable)
Double long sleeved gloves
Leg protection (boot covers) to below the knee
Cover the patient with transparent sheet till abdomen as per protocol with connection to Mask with Filter.

2nd Intubator or Runner will be standby with N95 and Face shield but will not enter the area unless plan B is activated

**Equipments & preparation:**

Each 3 will **Perform** a “pre-induction” **CHECKLIST** prior to starting:

a. **RT/Respiratory Nurse prepares equipment, (checklist 1)**
   1. A Non rebreathing mask /Nasal cannula
   2. Ambu Bag with reservoir bag & peep valve, Mask with Viral filter and catheter mount
   3. Yauker’s suction, suction catheter size 12/14,
   4. Catheter mount with HME/HEPA filter and ETCO2 monitor connected to ventilator circuit to be kept ready
   5. 3-4 Ziplock bags for equipment disposal.
   6. Plastic sheet with mask fixed tightly through a hole, with attached bacterial viral filter.
   7. Functioning laryngoscopes with size 3-4 blades.
   8. ET tube size 7 – 7.5 for females, 8-8.5 for males, ET clamp
   9. Gum elastic bougie with stylet, Video laryngoscope if available
   10. LMA size 3-4/ I GEL adult size
   11. Surgical airway kit (for FONA) Scalpel blade 10 size and curved artery (Kelly) forceps 6 6.5 ETT with cuff 10 cc syringe ,Gum elastic bougie
(last 2 items to be kept as Difficult Airway /PLAN B kit to be kept outside intubating zone and brought In only for Plan B)

b. Nurse: Prepares drugs (checklist 2)
   1. Fentanyl 100mcg loaded in 5ml syringe labelled.
   2. Midazolam/Propofol/etomidate/Ketamine as per orders.
   3. Rocuronium 50 mg in 5ml syringe/Succinylcholine 100mg in 5ml syringe.
   4. Adrenaline 1amp, Atropine 1 amp, Mephentermine 30 mg
   5. flush syringes prefilled 4 no.
   6. 500 ml saline bag for resuscitation.
   7. Two syringe pumps one with Fentanyl 500 mcg in 50 ml NS and Norepinephrine 4 mg in 50ml saline

c. Intubator (checklist 3)
   1. Monitoring: ECG, non-invasive blood pressure, spo2 monitoring.
   2. Suction working (Yankauer preferred) Audible pulse oximetry
   3. NIBP cycling set at every 3-5 minutes
   4. Ventilator setup and ready with quantitative EtCO2 monitor in-line and ready
   5. Free flowing IV access with saline bag
   6. Post-intubation sedation ready
   7. Medications ready -Induction + Noradrenaline 4mg in 50 ml
   8. Non-rebreather, flow “OFF” until ready to preoxygenate
   9. If no ventilator is available, ambu bag with Filter (only for crash intubation)
   10. Emergency cart /CPR Cart ready to be opened just Outside Intubation Zone

One Runner /2 nd Intubator ready with N95 mask and shield who is ready with Plan B kit. Except for the video laryngoscope, DO NOT take these boxes to the bedside -only remove what you may need, and discard materials taken into the room after intubation even if not used.

Rapid Sequence Intubation:

3-person team is the preferred method : (4th person / 2nd Intubator out of Intubating zone)

1. Intubator - most senior provider, will manipulate airway only at head end
2. Critical care Nurse attaches monitors, administer medications, chart and take note of vitals – position left hand side of the patient
3. Respiratory therapist as assistant to intubator- position right hand side of the intubator with Intubation tray
Personnel | Responsibility | Position
---|---|---
Intubator- Most senior provider | Manipulates airway | Head end of the patient
Critical Care Nurse | • Attaches monitors  
• Administre medication-  
Responsible for the injection trolley  
• Charts the procedure  
• Take note of vital signs | Left hand side of the patient
Respiratory Therapist | Assistant to the intubator-  
Responsible for the ventilator and suction | Right hand side of the patient

**Preoxygenate:**

**Ways of preoxygenation**

Option 1: 3-5 minutes of tidal breathing 1.0 FiO2 on non-rebreather at 15L/min flow

Option 2: facemask attached to AMBUbag with HEPA filter (2 hand technique to maintain seal)

Option 3: if patient already on BiPAP then maintain BiPAP with tight seal until ready to intubate (turn “OFF” BiPAP flow prior to removing mask) 1. After intubation, cuff will be inflated and ETT will be connected to the ventilator without making any attempts to ventilate the patient with bag and mask.

Option 4: We can also preoxygenate using the ventilator Mask with filter by keeping CPAP of 2-3cmH2O.

**Intubation:**

Critical care nurse will push RSI medications once preoxygenation is complete.

- Once the patient is asleep, suxamethonium 1.5 mg/kg or rocuronium 1.2 mg/kg is administered for muscle relaxation. Ensure adequate muscle relaxation before attempts at laryngoscopy

- It is important to get it right the first time; failed attempts are associated with increased risks of transmission of infection to staff. Intubate with a 7.0- or 7.5-mm ID endotracheal tube in female patients and 8.0 or 8.5 mm ID endotracheal tube in male patients. (PLAN A)
(If plan A failed attempt) Avoid hand ventilation if possible. If hand ventilation needed, intubating provider to maintain 2-hand mask and respiratory therapist will touch bag/APL valve)

In case the patient is obese or if the patient seems to be having a difficult airway, the second intubator should be little more prepared to assist. Along with wearing an N95 mask and visor, he should also be wearing a gown and hood should be immediately available.

**Plan B**

Inform Runner / 2nd intubator to enter the area with **PLAN B KIT**

Use 2nd attempt with Bougie (Kings Vision optional)

3rd attempt with Bougie+ Kings vision (Mandatory)

**If mask ventilation becomes necessary: / difficult Intubation / severe hypoxia**

- use 2-hand technique with oral airway to create tight seal

--use AMBU bag with HEPA filter in-line with high frequency/low tidal volume

Do not remove mask for 2nd attempt intubation until end exhalation

**PLAN C**

If can’t Intubate but can Oxygenate - Use Supraglottic Airway Device SAD (LMA / i GEL) with Filter & call for help

Continue rescue oxygenation with SAD

Meanwhile wake up the patient while waiting for expert

Prepare FONA kit / fibreoptic

**PLAN D**

If can’t Intubate Can’t Oxygenate situation - cricothyrotomy / FONA

(3rd expert for Front of neck approach)
After successful intubation

1. **Do not start ventilation before cuff inflation**: this may cause a significant leak around the cuff and contamination.
2. Respiratory therapist **inflates the ET cuff** and tracheal position of ET tube is confirmed with **capnograph/chest raise**.
3. Intubator monitors for bilateral chest rise and “fogging” of ETT
   - Avoid listening to breath sounds as can cause contamination of providers
4. Respiratory therapist will take control of ETT while the intubating provider tapes and attaches closed suction system.
5. Perform **in-line suction** to prevent the spread of aerosol; do not perform open suctioning.
6. If necessary, **draw samples** for virology during suctioning. Use ET clamps before any disconnection of circuit.
7. Critical care nurse will **start the sedation & Vasopressor** (if needed) infusions as per protocol.
8. Follow up **chest X ray** and blood gas is taken **after 30 minutes** of mechanical ventilation.

DOFFING and decontamination

1. Any **equipment or material** handled by the intubator/RT/nurse should be **segregated or disposed off carefully** without keeping them on the bed or trolley
2. Ensure cleaning of the airway equipment with **sodium hypochlorite** solution
3. Correct doffing of the personal protective equipment done at the designated area.
   - Follow “read/do” instructions for doffing of PPE per hospital protocol
4. Clean the laryngoscope & Blades
5. Remove soiled gloves and replace with clean gloves
6. Clean the video laryngoscope and allow it to dry - 3 minutes
7. Take video laryngoscope out of room with clean gloves on
Clinical Guide Tool Flash Cards - Intubation Preparation

POSITION OF TEAM MEMBERS

INSIDE
- Monitor
- Drug and monitor
- Laryngoscope
- Suction equipment
- Airway equipment

OUTSIDE
- Runner

PREDICTING DIFFICULT AIRWAY

MACOCHA score

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mallampati 3 or 4</td>
<td>5</td>
</tr>
<tr>
<td>Obstructive sleep Apnoea</td>
<td>2</td>
</tr>
<tr>
<td>Cervical spine movement limited</td>
<td>1</td>
</tr>
<tr>
<td>Mouth Opening &lt; 3 cm</td>
<td>1</td>
</tr>
<tr>
<td>Coma</td>
<td>1</td>
</tr>
<tr>
<td>Hypoxemia (&lt; 90%)</td>
<td>1</td>
</tr>
<tr>
<td>Non-Anaesthetist intubation</td>
<td>1</td>
</tr>
</tbody>
</table>

MACOCHA score > 2 predicts difficult airway

Contact senior anaesthetist
Prepare for difficulty
Emergency tracheal intubation checklist COVID-19

**Personal Protective Equipment**
- [ ] PPE: Face shield, eye protection, surgical mask
- [ ] Gown
- [ ] Gloves, disposable
- [ ] Cap or hair net
- [ ] Mask
- [ ] Footwear and non-slip shoes
- [ ] Goggles
- [ ] Elastic examination gloves
- [ ] Mask
- [ ] Elastic examination gloves
- [ ] Face shield

**Prepare Equipment**
- [ ] Check intubation kit
- [ ] Set up anesthetic machine
- [ ] Connect power to anesthesia machine
- [ ] Attach oxygen source
- [ ] Connect suction
- [ ] Connect anesthesia machine
- [ ] Connect ventilator
- [ ] Connect endotracheal tube
- [ ] Connect mask
- [ ] Connect endotracheal tube
- [ ] Connect mask

**Prepare for Difficulty**
- [ ] Check airway
- [ ] Vascular access
- [ ] Check IV
- [ ] Check blood pressure
- [ ] Check ECG
- [ ] Check chest
- [ ] Check abdomen
- [ ] Check heart rate
- [ ] Check respiration
- [ ] Check oxygen saturation
- [ ] Check blood pressure

**In the Room**
- [ ] Intubation
- [ ] Tracheostomy
- [ ] Endotracheal intubation
- [ ] Video-assisted intubation
- [ ] Awake intubation
- [ ] Tracheostomy
- [ ] Endotracheal intubation
- [ ] Video-assisted intubation
- [ ] Awake intubation

**OUTSIDE ROOM**
- [ ] Check neck
- [ ] Notify medical team
- [ ] Notify nursing staff
- [ ] Notify other medical teams
- [ ] Notify family
- [ ] Notify police
- [ ] Notify fire department

**INSIDE ROOM**
- [ ] Check for air leaks
- [ ] Check for leaks
- [ ] Check for leaks
- [ ] Check for leaks
- [ ] Check for leaks
- [ ] Check for leaks
- [ ] Check for leaks
- [ ] Check for leaks
- [ ] Check for leaks

**AFTER AND LEAVING**
- [ ] Close door
- [ ] Close door
- [ ] Close door
- [ ] Close door
- [ ] Close door
- [ ] Close door
- [ ] Close door
- [ ] Close door
- [ ] Close door

**Figure 6** (a) Two-handed two-person bag-mask technique with the V-shaped position; the second person squashes the bag. (b) The C-shaped position, which should be avoided. Reproduced with permission of Dr A. Matic.
Tracheal intubation of critically ill adults
Adapted for COVID-19

Personnel and PPE
Staff must don full-checked PPE and share plan with first best appropriate airway manager to manage airway

Pre-oxygenation and checklist
Position head up if possible
Assess airway and identify cricothyroid membrane
Widowess’ apnoeas
Pre-oxygenate patient G: Anaesthesia circuit - N/HE
Open airway
Monitor
Prepare airway

Plan A: Tracheal intubation
Laryngoscopy
Maximum three attempts
Maintains oxygenation
• May use low flow, low pressure, 2 perc mask ventilation
Full neuromuscular block
Visualise laryngoscopy bougie or extub.
Examine laryngoscopy manoeuvre
Remove tracheal

First success

Conflict with apnoeas

Fail

Plan B/C: Rescue oxygenation
Secondegeneration supraglottic airway
Pass extension
• Two person
• Adjunct

Maximum of three attempts
Change device (s) /airway /position
Open airway

Fail

Plan D: Front of neck airway: FONA
Endotracheal
Scalpel cricothyroidotomy
Scalpel

Cannot Intubate, Cannot Oxygenate (CICO) in critically ill adults
Adapted for COVID-19

Call for help
Declare “cannot intubate, cannot oxygenate”

Plan D: Front of neck Airway: FONA
Extend neck
Ensure neuromuscular blockade
Exude oxygen from blocked circuit

Personnel and PPE
New staff must don full checked PPE
Best appropriate airway manager to perform FONA

Scalpel cricothyroidotomy
Equipment:
1. Scalpel wide blade e.g. number 15 or 20
2. Bougie (4-14 French gauge)
3. Tube (softuffed 5.0-6.0 mm OD)

Laryngeal handle to identify cricothyroid membrane
Papable cricothyroid membrane
“Transverse skin incision through cricothyroid membrane
“Turn blade through 90” (sharp edge towards the feet)
Slide Coudé tip of bougie along blade into trachea
Suction lubricated cuffed tube into trachea
Inflate cuff, ventilate and confirm position with roentgenography
Secure tube

Impermanent cricothyroid membrane
Make a large midline vertical incision
Blunt dissection with fingers to separate tissues
Identify and stabilise the larynx
Proceed with technique for papable cricothyroid membrane as above

Post-FONA care and follow up
• Closed head suction
• Reinforce mucous (thrombolytically active
• Chest X-Ray
• Monitor for complications
• Surgical review of FONA site
• Agree airway plan with senior clinicians
• Document and complete airway alert

Picture Credit: St. George Hospital, NHS, London
PROTOCOL FOR VENTILATOR INITIATION

Dr. Sagar Maddani S, Assistant Professor, Dept. of Critical Care Medicine
Dr. Vishwas, Assistant Professor, Dept. of Critical Care Medicine
Dr. Sirish Gaumi, Assistant Professor, Dept. of Critical Care Medicine

- Initiate sedation with infusion of fentanyl (50-100mcg/hour) or morphine+midazolam (2-4ml/hour) based on requirement and hemodynamic status
- Paralysis with atracurium infusion (30-50 mg/hour) may be required if patient having hypoxia and on high ventilatory support (High peep low Vt) / PRONE ventilation
- Target SpO2 is 92-96% and Pao2 is 65-70 mmHg and to achieve FiO2 below 60% at the earliest if feasible
- Calculate patient predicted body weight (PBW) PBW = Height in cm -100 in males/Height in cm -105 in females
- Volume controlled mode can be used, tidal volume of (4-8ml/kg), (Approx. 400 ml Tidal volume for average built patient) and target plateau pressures <30 cmH20
- Use of moderate PEEP is recommended (10-16 mmHg) based on oxygenation and hemodynamic status. (FiO2/PEEP table can be used)

**FiO2/PEEP table**

<table>
<thead>
<tr>
<th>FiO2</th>
<th>0.3</th>
<th>0.4</th>
<th>0.4</th>
<th>0.5</th>
<th>0.5</th>
<th>0.6</th>
<th>0.7</th>
<th>0.7</th>
<th>0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEEP</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>14</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FiO2</td>
<td>0.8</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEEP</td>
<td>14</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>18-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Respiratory rate (RR) is adjusted for PCO2 elimination, start with 20/min and maximum RR up to 35/min can be used. In spite of above measures, PCO2 retention is allowed as long as pH<7.20 (permissive hypercapnia)
- Repeat an ABG after 30 min of initiation of ventilation and titrate ventilator setting accordingly.
● Use closed suction catheter to limit frequent circuit disconnection and decrease aerosol generation
● Chest X-ray to confirm tube position

**Ventilator Maintenance Bundle**

● Head tilt of 30-45 degree in all patients Mouth care with chlorhexidine each shift
● Insert EJV/peripheral cannula for sedation infusion and insert radial arterial cannula, for monitoring and sampling
● Continue sedation SOS paralysis if ventilator support are high (PEEP>12 and FiO2>60%) 
● Continue with lung protective ventilation strategy ARDS NET protocol
● Prone ventilation, can be considered if persistent hypoxia even after sedation and paralysis
● Do ABG at least twice daily and adjust ventilator parameters accordingly
● If hypotension is present after fluid resuscitation, consider noradrenaline infusion (8mg/4 ampules in 42 ml NS) according to BP. Target MAP 65mmHg.
● Consider inserting central line if persistent hypotension requires vasopressors for more than 2 hours and increasing the dose requirement (IJV is preferred) insert arterial line in this situation.
● Daily sedation and paralysis break to be given if ventilator supports are not high
● Chest x-ray can be repeated, if worsening clinical condition
● Continue feeding (100-200mL, Q2H) and DVT prophylaxis (40mg Enoxaparin SC Q24H) if no contraindications
● Look for daily weaning opportunity if ventilator supports are reducing
● Continue VAP prevention bundles and central line care bundles as per HICC guidelines.
Identify Lung phenotype (goal is to improve ventilation)

FIRST KNOW THE TYPE OF LUNG WE ARE VENTILATING (STIFF / NORMAL) H / L

Patient should be well sedated and paralysed for short duration

- **L phenotype** – Lung compliance is good, hypoxia is predominantly due to Large shunt fraction, hence need high fio2 and lower peep. (*L for Low peep*)
  
  Most COViD patients have L phenotype to begin, X rays are not typical of ARDS.

- **H phenotype**- Lung compliance is poor; Hypoxia is due to collapsed alveoli need High peep for keeping lung units open. (*H for High peep*)
  
  Most COViD patients reach this stage in later part of disease or due to secondary infection or Cytokine storm syndrome situations. Evolve from L to H type is known.

**Step 1**- Start with VCV MODE TV 8ml/kg PBW, set PEEP 8 cm Fio2 100 % RR 15-20

**Step 2**- Measure Plateau pressure * P plat (inspiratory hold manoeuvre on constant flow)

**Step 3**- Measure Driving pressure (Pplat - PEEP = should be less than 15 cm H20)

**IF Driving pressure >15 cm** STIFF lungs H TYPE - Low Vt 4-6 ml/kg high Peep strategy
Up to 15 cm PEEP FIO2 to reduce to less than 0.6 as quick as possible

**IF Driving pressure < 15 cm** NORMAL lungs L TYPE- Vt 8ml/kg and Low peep strategy
(CAN ALLOW HIGH FIO2 TO IMPROVE HYPOXIA /EARLY PRONE POSITION)
Oxygenation Improvement Strategy

Consider for patients who have SPO2 <90% on fio2 >70% (goal is to improve oxygenation)

Step 1 - Neuromuscular blockade and increase peep by 2 cm steps up to 15cm H20

Step 2 - If no improvement, then measure Compliance again with tidal volume of 6 ml/kg.

Compliance = Tidal Volume / P plateau - PEEP (less than 40cm / more than 40 cm)

Step 3 - If Compliance is less than 40 ml/cm H2O
First option is to go for Recruitment Manoeuvres & optimal peep titration (high peep Low Vt)
Or Inverse ratio /Bilevel - APRV strategy of ventilation
Prone ventilation is second option for improvement of oxygenation

Step 4 - If Compliance is more than 40 ml/cm H2O, (hypoxia due to high Shunt fraction)
Then go for Early Prone Ventilation as first option. If hypoxia is refractory after 6 hours of Prone or Bilevel/APRV then revise goals of care / VV ECMO.
CLINICAL QUICK GUIDE TOOL FLASH CARD APPROACH TO DIFFICULT OXYGENATION

Ventilation strategy in COVID-19 (version 2.0)

Initial ventilator settings
- PEEP 8−10 cmH2O
- VT 6−8 mL/kg (predicted weight)
  - Driving pressure max 12−14 cmH2O
- Plateau pressure < 40 cmH2O
- Rate 20 breaths per minute (titrate to pH)
- H:1.1−2

Goals of Therapy
- Lowest effective PEEP and low driving pressure to achieve targets
- Minimize ventilation which leads to progression to ARDS and iatrogenic injury

Initial Physiological targets
- SpO2 90−96 %
- pH 7.35−7.45
- Consider permissive hypercapnia (pH > 7.2)

Ongoing Ventilatory Management
- General measures (suction, reposition, physiotherapy) and consider alternative causes of hypoxia (see last blue box)
- Assess for ventilator desynchrony and increase sedation if needed (RASS –3 to RASS –4)
- Assess compliance before establishing ventilator strategy

Compliance high > 40 mL/cmH2O
(or P ≤ 15 cm H2O to achieve target VT)
- Increase FiO2 and maintain initial targets
  - Traditional 'ARDSnet' ventilation may cause iatrogenic injury

Step 1
- Increase FiO2 and maintain initial targets
- Traditional 'ARDSnet' ventilation may cause iatrogenic injury

Step 2 (ongoing SpO2 <90% + FiO2 > 60%)
- Paralytics (bolus dose trial) if successful in achieving targets consider 48-hr infusion
- Prone ventilation early

Step 3 (ongoing SpO2 <90% + FiO2 > 70%)
- Call expert help & consider permissive hypoxia (e.g. SpO2 88−92%) and hypercapnia (pH >7.2)
- Consider a trial of higher PEEP
- Early ECMO referral (failure of above after 6-hours)

Refractory hypoxaemia (pO2<7 or SpO2<88% with FiO2 1.0)
- Call expert help and consider ECMO referral if not already undertaken
- Consider further recruitment manoeuvre using ventilator (various methods available – Consultant discussion)
- Focused echo to exclude cardiogenic cause requiring inotropy
- Focused echocardiographic failure to reduce PEEP, inotropy, inhaled NO
- Consider goals of therapy and discuss with family

Troubleshooting tidal volume, plateau pressure, respiratory rate and pH

Point >30 cmH2O:
- General measures (as above, consider stacking)
- Reduce VT by 1mL/kg and increase rate (max 30, watch for stacking) & consider permissive hypercapnia (pH > 7.2)

pH <7.35:
- Treat metabolic causes and consider control of fever
- Increase VT to max 8 mL/kg if rate change ineffective/unavailable and consider permissive hypercapnia (pH>7.2)
- Increase rate (max 30, maintain I:E ratio)
- Consider nitric oxide or ECMO

Picture Credit: St. George Hospital, NHS, London
PROTOCOL FOR PRONE POSITIONING IN SEVERE ARDS IN COVID -19 INTUBATED PATIENTS
Dr Vishal Shanbhag, Assistant Professor, Dept. of Critical Care Medicine
Dr Sunil R, Assistant Professor, Dept. of Critical Care Medicine
Dr Margi Bhatt, Senior Resident, Dept. of Critical Care Medicine

I. Rationale
1. Available evidence suggest that prone positioning must be considered early in the disease process of acute respiratory distress syndrome and provides absolute survival advantage of 10-17 percent. (1,2)
2. Improved Functional Residual Capacity due to shift of diaphragm and abdominal contents away from lung. (3)
3. **Improved V/Q matching** due to shift mediastinum and heart away from the lung surfaces and better positioning of dorsal diaphragm allowing for better aeration of dorsal areas and overall better congruence of lung and chest wall anatomy. (2,3)
4. Improved drainage of secretions and water content away from dorsal lung regions. (3)
5. Development of higher transpulmonary pressure in dorsal lung regions, leading to improved ventilation. (2)

II. Indication and inclusion criteria
1. Intubated and Mechanically Ventilated Patients with **L type** on evaluation with good Compliance >40 ml/cm H2O who are **hypoxic**
   - SPO2< 90 % ON FIO2 > 70% (large shunt fraction)
2. Intubated and mechanically ventilated patients with Severe ARDS (PaO2/FiO2 < 150 with FiO2 ≥ 0.9, PEEP ≥ 15 cm H2O, Vt = 6ml/kg PBW) **H type** of lung after failed recruitment methods. Or as an alternative to Bilevel /APRV (RESCUE THERAPY)
3. Ideally within 12-24 hours of meeting the above criteria
4. Prone position should be maintained for **16-20 hours** at one stretch

III. Contraindications
**Absolute contraindications:**
1. Significant hemodynamic instability with increasing vasopressors requirement
2. MORE THAN 15 ml/hr of Norepinephrine /dual inotropes with high risk of rapid deterioration (SUBJECTIVE TO EXPERT DECISION)
3. Severe Intracranial Hypertension
4. Recent facial surgery, tracheal surgery, sternotomy, cardiac surgery, ophthalmic surgery, major abdominal surgery
5. Maxillo facial polytrauma, unstable spine, femur or pelvic fractures, external fixation of fractures
6. Abdominal compartment syndrome
7. Second or third trimester of pregnancy with gravid Uterus.
8. Patients that have previously demonstrated a poor tolerance of prone positioning

Relative contraindications:
1. Massive haemoptysis, alveolar haemorrhage
2. Major haemorrhage
3. Major burn on ventral body surfaces
4. New tracheostomy < 24 hours
5. Uncontrolled seizures
6. Bronchopleural fistulas
7. Significant thoracic or spinal deformity
8. First trimester pregnancy
9. Extreme obesity, BMI ≥ 40 kg/m2
10. Acute arrhythmias requiring reassessment after reversal

IV. Preparation for prone ventilation

1. Equipment
   a. Two strong bed sheets, one of them already under the patient
   b. 3 pillows, for the chest, pelvis and knees
   c. Protective adhesive pads for pressure points
   d. Eye lubricants, occlusion eye pads
   e. Small pillows, gel pads, head ring / Gel pad

2. Personnel with full PPE
   a. ICU doctor
   b. Respiratory therapist,
   c. In charge Nurse,
   d. 4 staff nurses

This is the minimum requirement.
All the personnel involved in the procedure must wear full PPE and ensure compliance with help of Buddy check and leak test
3. Main responsibilities

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Role and position</th>
<th>Responsibility</th>
</tr>
</thead>
</table>
| ICU Doctor         | Team leader; Head end | ● Head and airway  
|                    |                     | ● Coordinating the manoeuvre                                                  |
| Respiratory Therapist | Next to the ventilator | ● Securing ETT  
|                    |                     | ● Managing ventilator and avoid disconnections  
|                    |                     | ● Preoxygenation  
|                    |                     | ● Emergency ventilation equipment  
|                    |                     | ● Aiding in airway management                                                  |
| In charge Nurse    | Foot end            | ● Ensures securing of lines, Tubes  
|                    |                     | ● Overall supervision of the manoeuvre                                          |
| Staff Nurses       | Equally distributed on either side | ● Turning the patient in coordination with the doctor at the head end |

V. Pre-procedure preparation with responsibilities in brackets  
(P – Physician, RT – Respiratory Therapist, N – Nurse)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Inform the relatives about indication, risks and expected outcomes prior to the procedure. Inform about significant but reversible facial oedema, pressure ulcer, major airway complications</td>
<td>P</td>
</tr>
<tr>
<td>2. Perform arterial blood gas analysis and document prior to procedure; CXR if time permits.</td>
<td>RT, N</td>
</tr>
<tr>
<td>3. Assess the patient’s sedation score and observe for pain. Administer the necessary boluses</td>
<td>P</td>
</tr>
<tr>
<td>4. Emergency ventilating equipment, Emergency airway trolley and suctioning equipment at patient’s bedside</td>
<td>RT</td>
</tr>
<tr>
<td>5. Central and arterial lines, pleural and peritoneal drainage catheters etc should be placed secured and confirmed before turning the patient</td>
<td>P, N</td>
</tr>
<tr>
<td>Step</td>
<td>Instruction</td>
</tr>
<tr>
<td>------</td>
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</tr>
<tr>
<td>6.</td>
<td><strong>Secure ETT</strong> with adhesive, instead of rigid tube holding devices. ETT should be secured at the <strong>corner of the mouth away from the ventilator</strong>. Check size of tube and length at patient lips. Double check the parts for potential disconnections and <strong>secure with adhesive tape</strong> appropriately.</td>
</tr>
<tr>
<td>7.</td>
<td>Remove any oropharyngeal airway devices. Provide mouth care before proning.</td>
</tr>
<tr>
<td>8.</td>
<td>Remove ECG electrodes from anterior chest and <strong>attach new electrodes on the back</strong> in the same order.</td>
</tr>
<tr>
<td>9.</td>
<td>Attach <strong>SpO2 probe</strong> on the limb away from the ventilator.</td>
</tr>
<tr>
<td>10.</td>
<td><strong>Discontinue non-essential infusions</strong> and cap unused infusion ports.</td>
</tr>
<tr>
<td>11.</td>
<td><strong>Ensure adequate length of infusion</strong> tubes and monitoring wires without tension. Attach multiport <strong>extension lines</strong> to Femoral central lines. <strong>Ensure wires and tubing run along the sides</strong> and not over the patient’s body.</td>
</tr>
<tr>
<td>12.</td>
<td>Ensure proper <strong>fixation</strong> of the vascular access devices, naso gastric tube, indwelling urinary catheters and any other drains.</td>
</tr>
<tr>
<td>13.</td>
<td>Any <strong>drainage bags should be kept at the patient’s side emptied</strong>. Urine bag to be kept in between patient’s legs. <strong>Pleural drains to be kept at patient’s feet, below the level of the thorax.</strong> Consider <strong>clamping chest drain</strong> during the turning procedure &amp; remove clamp after proning.</td>
</tr>
<tr>
<td>14.</td>
<td><strong>Lubricate eyes and maintain eye closure.</strong> Place pressure relieving <strong>pads on bony prominences</strong> (iliac crests, chin, and knees).</td>
</tr>
<tr>
<td>15.</td>
<td>For males, external <strong>genitalia</strong> should be positioned between the legs.</td>
</tr>
<tr>
<td>16.</td>
<td><strong>One hour of fasting</strong> before the procedure, if feasible. <strong>Suction and empty the stomach</strong> if feasible, disconnect and clamp the feeding tube.</td>
</tr>
<tr>
<td>17.</td>
<td><strong>Preoxygenate for 10 minutes with 100% oxygen</strong> and maintain FiO2 1.0 throughout the procedure.</td>
</tr>
<tr>
<td>18.</td>
<td>Assess and <strong>ensure adequate sedation and paralysis</strong>.</td>
</tr>
<tr>
<td>19.</td>
<td>Suction oral and endotracheal secretions. Consider need for Glycopyrrolate for managing secretions.</td>
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</tbody>
</table>
VI. Performing the prone positioning of the patient using the “Sandwich technique”

1. All steps should be performed with closed loop communication as per the direction of the team leader (ICU doctor).
2. Review the procedure amongst the team. The direction of turning should ideally be towards the ventilator.
3. The bed should be flat. Pull bottom sheet straight and taut. (Figure 1)
4. Place the patient’s arms along the sides and tuck the hands of the patient under the torso. (Figure 1)
5. Place pillows over the chest, pelvis and shin. (Figure 2)
6. Place a bed sheet over the patient's body, covering the whole body except the head. (Figure 3)
7. Roll the long edges of the top and bottom sheets tightly together close to the patient’s body to cocoon the patient firmly in between them (“The Cornish Pasty”). (Figure 4)
8. Pull the patient towards the side of the bed away from the intended direction of turn. (Figure 5)
9. Slowly position the patient in the lateral decubitus position, maintaining sheet integrity and security, facing towards the ventilator. (Figure 6)
10. Re-check airways, vital signs, ventilator readings, lines, drains. WATCH FOR DISCONNECTIONS
11. Then, turn the patient slowly completely prone onto the original top sheet, so that the chest and pelvis lie on the pillows. (Figure 7)
12. All team member slides the patient into a more central position of the bed.
13. The head should always be in line with the torso and be placed turned to one side.
14. The Charge nurse should ensure that during the 3 step procedure, the lines and tubes are free and not entangled or kinked and prevent ANY DISCONNECTION.
15. Doctor should auscultate chest to ensure equal bilateral air entry and RT should reassess cuff pressure and ETT for ANY kinks. (can’t be done with PPE but ensure adequate chest rise on the back and ventilation is adequate)
16. When prone position is established, quickly reconnect ECG electrodes on patient’s back if detached during the turn. Reconnect other monitoring devices.
17. The bed sheet under the patient should be rearranged. Place pillow under the shin, so that the toes do not touch the bed.
Step Wise Demonstration of Prone Positioning

Step 2-5 placing bedsheets and pillows at different positions
Step 6-7 making SANDWICH OR COCOONING the patient with two bedsheets and 3 pillow technique

Steps 8-10 pulling the patient to side away from ventilator and then lateral decubitus position
VII. Maintaining the patient in the prone position

1. **Transient hypoxia** immediately after prone positioning is common. It improves within a few minutes.

2. The arm to the side of the head should be kept **abducted less than 90 degrees at the shoulder, and the elbow should be at right angles, palm down.** The opposite arm should be straight along the body with palm facing upwards. The ipsilateral knee is kept slightly flexed. *(Swimmer’s position)*. (Figure 8)

3. Place the bed in **anti-Trendelenburg position** (15º-30º) if hemodynamically permissible.

4. **Frequent suctioning**, keeping the **head position** such that the secretions drain away from the dependent eye and ear, use of absorbent pads under oral and nasal cavity etc to deal with draining secretions.

5. Reposition the **head by turning sides every 4 hours (optional)**, changing the position of the upper limbs such that the patient faces towards the raised limb. The side to which the patient is facing should be tilted up with pillows/cushions/head ring gel.

6. Prevent overextension and compression of joints by proper positioning.

7. Ensure that the **chest and pelvis are well supported** by pillows and the **abdomen is free.**

8. More frequent assessment of **pressure points** and use of cushioning pads.

9. Enteral **feeding** as per ICU Nutrition protocol.
10. Ensure that the **joints** of the upper and lower limbs are at **neutral position** to minimise the risk of nerve injury.

11. **Lung protective ventilation** with VT ≤ 6ml/Kg IBW and Pplat ≤ 30 mm Hg, by control mode.

12. Continue **deep sedation** (RASS -4) +/- paralysis as indicated.

**VIII. Complications**

1. Worsening of oxygenation
2. **ETT dislodgement**, malpositioning, obstruction, endo-bronchial intubation
3. Dislodgement of **vascular access** devices and tubes
4. **Pressure sores** on face, chest, knees, toes, breasts, genitalia etc
5. **Edema** of the face, periorbital edema
6. **Nerve injury**, including brachial plexus injury, ulnar nerve injury, and common peroneal nerve injury
7. Poor flow in **haemodialysis** (**Its always better to secure HD catheter before prone positioning**)
8. Cardiac Arrest refer to **CPR protocol** for Prone Position Ventilation

**IX. Criteria of success of prone position (usually this is achieved in first 2 hours)**

1. Increase in PaO2/FiO2 by 20 (or by >15%)
2. Increase in PaO2 by 10 mm Hg

**X. Indication for Discontinuation of prone position**

1. **Hemodynamic instability**: Increase in vasopressor requirements, arrhythmias etc.
2. Worsening of oxygenation status, **not improving within up to 15-30 minutes** of prone positioning if SpO2 ≤ 85%
3. Cardiac arrest
4. In case of **non-responders**. Repeat blood gas done 30-60 minutes after proning, if revealing **carbon dioxide retention and hypoxemia by 20%** compared to the previous blood gas can be taken as non-responder

**XI. Return to supine position**

1. After at least 16 hours of continuous prone sessions are advisable
2. The same procedure in **reverse order** should be used to position the patient back to supine **SANDWICH TECHNIQUE**
Patient is first moved away from Ventilator — then to lateral decubitus — then supine — and then finally to centre of the bed

XII. Discontinuation the Prone Positioning Procedure

Once the following goals are achieved

\[
\frac{\text{PaO2}}{\text{FiO2}} > 150 \quad \text{with} \quad \text{FiO2} \leq 0.6,
\]

\[
\text{Requirement of PEEP} \leq 10 \text{ cm H2O}
\]

XIII. Management of some complications/events

1. **Cardiac arrest:** CPR can be effectively performed in the prone position. (7) However, if experienced team is available and the patient can be turned safely quickly, then turning the patient supine should immediately be achieved and then CPR continued according to protocol. Refer to CPR protocol in COVID patients -special situations

2. Worsening of oxygenation: **return to supine**

3. **Poor flow** in Haemodialysis catheter: Ensure catheter isn’t kinked and that the limb or neck is properly positioned. Trying to safely manipulate the catheter without dislodging it. If these measures are unsuccessful, **decision to postpone dialysis or turn the patient supine** should be taken according to clinical indications.

References


8. Joo Myung Lee, MD, MPH; Won Bae, MD; Yeon Joo Lee, MD; Young-Jae Cho, MD, MPH. The Efficacy and Safety of Prone Positional Ventilation in Acute Respiratory Distress Syndrome: Updated Study-Level Meta-Analysis of 11 Randomized Controlled Trials, www.ccmjournal.org, May 2016, Volume 42, Number 5

PROTOCOL FOR THE INITIATION OF AIRWAY PRESSURE RELEASE VENTILATION IN ARDS PATIENTS WITH REFRACTORY HYPOXEMIA

Dr Vishal Shanbhag, Assistant Professor, Dept. of Critical Care Medicine
Dr Sunil R, Assistant Professor, Dept. of Critical Care Medicine
Dr Margi Bhatt, Senior Resident, Dept. of Critical Care Medicine

Eligible patients:
No universally accepted indications

1. APRV can be tried initial mode of ventilation as an alternative to control/assist control modes with an aim to avoid ventilator induced diaphragmatic dysfunction/maintain spontaneous efforts of the patient.

2. Patients in ARDS with refractory hypoxemia (P/F ratios less than 60 mm Hg despite on FiO2 70% or more and after adequate optimization of PEEP, lung protective ventilation measures (low tidal volume ventilation, recruitment and use of neuromuscular blockade).

When not to consider APRV mode of ventilation?

1. APRV mode usually avoided in patients with severe ARDS in a background of chronic obstructive pulmonary disease
2. Patients with a background of neuromuscular diseases
3. Patients requiring deeper level of sedation (ex. cerebral edema with intracranial hypertension)

Initial setting in APRV mode:
RR/FREQUENCY - Usually started at 8-12 each cycle is about 5 to 8 seconds

$P_{\text{high}}$ - to be set at the PPlateau (or desired PMean + 3 cmH2O). If you are switching to APRV from a different mode, then $P_{\text{High}}$ can be set at the previous mean airway pressure. A good starting level would be 28 cmH2O. Higher transalveolar pressures recruit additional alveoli, but, try to keep $P_{\text{High}}$ below 35 cmH2O.

$T_{\text{High}}$ at 4.5-6.0 seconds. This is the inspiratory time. The respiratory rate should be 8 to 12 breaths per minute — never more.

$T_{\text{Low}}$ at 0.5-0.8 seconds. The expiratory time should be short enough to prevent derecruitment and long enough to obtain a suitable tidal volume. A tidal volume target is between 4 and
6ml/kg. If the tidal volume is inadequate, the expiratory time is lengthened; if it is too high (>6ml/kg) the the expiratory time is shortened.

(Initially set at 1 to 1.5-fold the expiratory time constant, EXPIRATORY TIME CONSTANT = COMPLIANCE x RESISTANCE and then adjusted to achieve a termination of peak expiratory flow rate (PEFR) of ≥50% of PEFR)

Automatic tube compensation (ATC) should be on if spontaneously breathing.

$P_{low}$ - at 0 cmH2O to optimize expiratory flow. The large pressure ramp allows for tidal ventilation in very short expiratory times

FiO2 – set to maintain SPO2 > 90% and Pao2 > 60 mm Hg

**APRV Flow-Time Waveforms**

It is important to observe the Flow-Time waveform to optimize the settings. During the pressure release phase, the patient will exhale passively. Adjust the TLow to cut off the expiratory flow during a release at about 50% (25-75%) of peak expiratory flow rate (PEFR).

Never allow the termination of expiratory flow to go <25% of PEFR. This intentional intrinsic PEEP allows PLow to be set at 0 cmH2O without causing derecruitment.
Generally, the TLow can be as short as 0.3 seconds (closer to 75% of PEFR) in restrictive disease and as long a 1.5 seconds (closer to 25% of the PEFR) in obstructive states.

**Adjusting the APRV Settings**

**Oxygenation Options**

1. When possible wean FiO2 to <50% for a SpO2 >90% or a PaO2 >60 torr.
2. To improve oxygenation via higher PMean:
   - Increase PHigh in increments of 2 cmH2O.
   - Decrease TLow to be closer to 75% PEFR.

**Respiratory Acidosis**

1. Increase PHigh (up to 40 cmH2O).
2. Increase THigh (if spontaneously breathing) in increments of 0.5 seconds up to 8 seconds. If PaCO2 increases with this change, it may reflect inadequate lung volume. If this is the case, try increasing PHigh to re-establish an adequate FRC.
3. Increase TLow to allow more time for alveolar emptying, but only if the expiratory flow of a release doesn’t drop below 25% of the PEFR.
4. If further increases in THigh fail to drop PaCO2, you may need to do the opposite: Decrease THigh to increase the rate of releases. This will decrease the PMean and oxygenation. This will then also increase PHigh to maintain the PMean. Maximize PHigh and release rate up to 30 (more like PC-IRV).
5. If unable to manage the acidosis with APRV, the mode may be changed to PCV attempting to maintain the same rate and PMean.
Respiratory Alkalosis

1. Decrease $P_{\text{High}}$ (SpO2 may decrease).
2. Increase $T_{\text{High}}$ to decrease the release state.
3. Turn ATC off if no spontaneous respirations.

Increased Respiratory Efforts

- If the patient is consistently inhaling forcefully with accessory muscles, they may need alveolar recruitment. Options are:
  - Increase $P_{\text{High}}$. This will elevate the $P_{\text{Mean}}$ and encourage recruitment.
  - Decrease $T_{\text{Low}}$ only if you can maintain the flow during the release phase <75% of PEFR and the PaCO2 and pH are acceptable.

Forceful expirations

- If the patient seems to be exhaling forcefully, over-inflation may be present. Options are:
  - Decrease the $P_{\text{High}}$ in 1-2 cmH2O increments and increase $T_{\text{High}}$ (to maintain the same $P_{\text{Mean}}$).
Increase the $T_{\text{Low}}$. Allowing more time to exhale only if you can maintain the flow during the release phase >25% of PEFR.

- CXR should be monitored for lung over-inflation.

**APRV Weaning strategy**

When FiO2 is titrated below 50%, recruitment is maximized and the patient is breathing spontaneously, a continuous gradual wean can begin by:

- Decreasing the $P_{\text{High}}$ by 1-2 cmH2O and increasing the $T_{\text{High}}$ by 0.5 seconds for every 1 cmH2O drop in $P_{\text{High}}$. This is referred to as the “drop and stretch”.

- “Drop and stretch” should be done every two hours or more if tolerated. As you “drop and stretch” the $P_{\text{Mean}}$ is gradually lowered, so you will need to monitor SpO2. Changing the CPAP or dropping $P_{\text{Mean}}$ too quickly will possibly de-recruit alveoli.

- Throughout the weaning process, the patient should be closely monitored for increasing work of breathing, tachypnea, or a drop in SpO2. If this occurs, return to the previous settings.

- When the $P_{\text{High}}$ reaches 10 cmH2O and the $T_{\text{High}}$ reaches 12-15 seconds, change the mode to CPAP with PEEP at 10 cmH2O and pressure support at 5-10 cmH2O. ATC should be off. Slowly wean CPAP was tolerated.

- The patient should be spontaneously breathing throughout this process; therefore, it is not necessary to do spontaneous breathing trials.
Monitoring patients on APRV mode of ventilation:

Analgesia and sedation: to maintain Critical-Care Pain Observational Tool (CPOT) score of 0–2, and the sedation goal was a Richmond Agitation Sedation Scale (RASS) score of –2 to 0.

(Using Fentanyl 1 mcg/kg/hour or Propofol 1 mg/kg/hour or Dexmedetomidine 0.2 – 0.7 mcg/kg/hour)

Blood gas and level of sedation to be assessed every 4 to 6 hourly.

Red flags
Carbon dioxide retention
Hemodynamic instability
Development of intrinsic PEEP
Ventilator patient asynchrony

References:
1. Early application of airway pressure release ventilation may reduce the duration of mechanical ventilation in acute respiratory distress syndrome Yongfang Zhou, Xiaodong Jin, Yinxia Lv, Peng Wang, Yunqing Yang, Guopeng Liang, Bo Wang and Yan Kang*
2. The time-controlled adaptive ventilation protocol: mechanistic approach to reducing ventilator-induced lung injury Michaela Kollisch-Singule 1, Penny Andrews2, Joshua Satalin1, Louis A. Gatto1,3, Gary F. Nieman1 and Nader M. Habashi
3. Principles and practices of mechanical ventilation – Tobin
Flash Card - Clinical Quick Guide for APRV Mode

Airway pressure release ventilation (APRV)

APRV is continuous high positive pressure with intermittent pressure release. It may provide method to recruit lung and improve oxygenation. Spontaneous ventilation is encouraged on top of APRV. It should only be used after prone ventilation failure. Consultant initiation only.

Targets:
- Pao2 85-95 mmHg
- PaO2 7.0-8.0 kPa
- pH > 7.2
- Vt 6 ml/kg max
- Pplat < 30 cmH2O

Initial ventilator settings:
- FiO2 to target SpO2 > 92%
- PEEP set to current plateau pressure (<30 cmH2O)
- PEEP set to 0 cmH2O
- Tinh 3s (range 3–8)
- Tins 0.5s (range 0.2–0.8)

- Target terminal expiratory flow at 75% of peak expiratory flow (see below). Maintain Vt 4–8 ml/kg
- Consider lower Tinh in restrictive and higher Tinh in obstructive lung disease
- Stop paralysis and reduce sedation to allow spontaneous ventilation

Trouble shooting:
- Tinh is set to allow CO2 clearance but maintain intrathoracic pressure
- Set at 0.5s and 'freeze' or record the ventilator display screen
- Rotating the ventilator dial will move a line along the time-flow graph and display flow
- Find the peak expiratory flow and calculate 75% of this
- Move the cursor to see the flow at the end of the expiratory phase
  - If this is > 75% peak expiratory flow, increase Tinh
  - If this is < 75% peak expiratory flow, decrease Tinh

In addition, ensure that tidal volume is maximum of 6 ml/kg and minimum 150 ml (anatomical dead space)
Tinh is usually 0.2–0.8s, if you are calculating outside this, seek advice from a critical care consultant

Management of ongoing hypoxaemia:
Increase PEEP by 2cmH2O or Tinh by 0.5–1s (If Tinh > 10s, consider reducing Tinh)
Remember to adjust Tinh to maintain 75% flow and max 6 ml/kg targets
Recruitment manoeuvre: PEEP 30 cmH2O for 30s and Tinh 30s for 2–5 mins then decremental PEEP to a trial level above previous setting & reset Tinh

Weaning:
Reduce FiO2 first (slowly to 0.4–0.5)
Reduce PEEP by 2 cmH2O every 30 mins at same FiO2 to 20 cmH2O. If SpO2 drops, increase PEEP by 4 cmH2O and wean more slowly
Next wean PEEP by 2 cmH2O every 30 minutes and increase Tinh by 1–2s. This will effectively wean the patient to CPAP.

Cautions
Sustained high pressures may compromise pulmonary perfusion and RV function. This may be result in a drop in systemic blood pressure, increase in CVP, reduced urine output or deranged biochemistry. Further evaluate with focused ECHO. Consider fluid challenge or alternative ventilation mode.

More detail can be found in Dr J Ball's excellent handbook. Note that in some circumstances (e.g. obesity), PEEP may need to be >30cmH2O, please seek expert help before setting PEEP above this level. Following initial setup, allow time for APRV settings to recruit lung, this may mean tolerating high FiO2 for a period.

(Picture Credit: St. George Hospital, NHS, London)
PROTOCOL FOR WEANING FROM VENTILATOR COVID CASES

Dr Megha Sharma, Assistant Professor, Dept. of Critical Care Medicine
Dr Vedghosh Amara, Assistant Professor, Dept. of Critical Care Medicine

General Principles

- Look daily for weaning opportunity by sedation vacation and SBT trial.
- Consider giving spontaneous breathing trial (SBT) if:
  a. The disease for which patient is intubated is resolving or under control.
  b. The ventilatory requirement is reducing (FiO2<50%, PEEP≤8cm, P/F>250)
     and pH>7.30
  c. Hemodynamics are stable (maintaining BP without vasopressors or minimal
dose of vasopressors)
  d. Neurologically awake, following commands with good cough & gag reflex
  e. Radiological improvement or no worsening (not essential criteria)

Spontaneous Breathing Trial

- Stop sedation on the day patient considered for weaning trial and keep patient NPO for
  2-4 hours only if planning to extubate after SBT trial
- If possible, achieve at least 500 ml negative fluid balance on the night before
  extubation.
- Consider patient for SBT on, Pressure Support (PSV) ventilation
  PEEP = 5 cmH2O and PS=5-8 cm H2O, FiO2=30-40% at least 30 minutes and If stable
  can continue for 2 hours.
- We can monitor Rapid shallow breathing Index (which should be below 100)
  RSBI (F/Vt = Respiratory rate / Tidal volume in litres) during this period
- Can repeat an ABG after 2 hours if needed

Successful Spontaneous Breathing Trial

SBT is considered SUCCESSFUL if following criteria are met at the end of trial

- If patient is tolerating PS ventilation for more than two hours with
  a. SpO2> 94% or P/F>200, Tidal volumes ≥ 350ml, RR<30/min
  b. Hemodynamics are stable without increasing dose of vasopressors
  c. Rapid shallow breathing Index RSBI (F/Vt = Respiratory rate / Tidal
     volume in litres) should be less than 104
  d. No signs of distress awake and following commands
-with good cough reflex.
-patient can hold & sustain neck
-raise the arms above shoulder level
If patients meet above criteria, they can be considered for extubation (go for extubation protocol)

- T piece trail can be AVOIDED as chances of aerosol generation are present
- Experts can use their CLINICAL EXPERIENCE to decide for extubation even if patient doesn’t meet all criteria described above
- If patient fails the SBT, they are put back on control mode and SBT is tried again the next day.
PROTOCOL FOR EXTUBATION OF SUSPECTED/CONFIRMED COVID CASE

Dr Vishal Shanbhag, Assistant Professor, Dept. of Critical Care Medicine

Dr Sunil R, Assistant Professor, Dept. of Critical Care Medicine

Dr Margi Bhatt, Senior Resident, Dept. of Critical Care Medicine

1. Don appropriate PPE via “read/do” checklist.
2. Only respiratory therapist and/or airway provider (anesthesiologist/intensivist) should be in the room/AREA.
3. Confirm patient will tolerate extubation. (subjective/objective criteria - blood gas/sensorium/hemodynamic stability/CXR/secretions)
4. Place patient on 1.0 FiO₂ and ensure non-rebreather mask ready with flow “OFF” over the forehead of the patient/ Connect nasal cannula with flow turned OFF.
5. Place bed Sheet or towel on patient’s chest and ensure yankauer suction ON readily available. Suction Ryle’s tube/Empty stomach.
6. Keep the ventilator on standby keep the Viral Filter connected to catheter mount and in line suction in situ. Use Yankauer suction to mouth before cuff deflation.
7. Suction oral cavity and ETT below the sheet and turn vent flows to “OFF”.
8. Respiratory therapist to cut tape holding ETT, and extubate patient from below the sheet/towel.
9. Immediately discard of ETT under the sheet and immediately place non-rebreather, then turn oxygen flow ON to 10-15L/min.
10. Ensure patient is oxygenating and ventilating then discard the sheet after 10-15 minutes.
11. All providers will sanitize/change gloves while maintaining base layer PPE.
PROTOCOL FOR THE INITIATION AND MAINTENANCE OF SEDATION IN MECHANICALLY VENTILATED CONFIRMED COVID CASES IN INTENSIVE CARE UNIT

Dr Vishal Shanbhag, Assistant Professor, Dept. of Critical Care Medicine

Dr Sunil R, Assistant Professor, Dept. of Critical Care Medicine

Purpose:

It provides adequate and apt evidence based guidelines regarding the management of Pain, Agitation and Delirium of a confirmed COVID patient in an intensive care unit, also emphasising on the methods of assessment and target driven protocol that can be managed by the ICU nurse at the bedside avoiding the need for daily sedation hold.

Definitions:

Management of pain, agitation and delirium is an integral part of modern intensive care. The basic assessment and management should be in the following order Pain, Agitation and followed by Delirium (PAD).

Scope of the protocol:

All staff including nurses and physicians involved in the management of confirmed adult COVID patients in intensive care unit.

Patient population:

Patients admitted under adult intensive care and are on analgesic and sedative medications.

ABCDE approach:

| A | Assess, Prevent, and Manage Pain and Agitation |
| B | Target score & Spontaneous Breathing Trials (SBT) |

Use CPOT/NRS tool for pain assessment and RASS for agitation. Only after pain control is satisfactory move to agitation and delirium assessment.
Aiming for a target score for CPOT & RASS avoids the need for daily sedation hold. SBT can be done without the need for sedation hold.

**C**
Choice of Analgesic and Sedative agent
Depending on medical condition and organ function

**D**
Delirium: Assess, Prevent and Manage

**E**
Early Mobility and Exercise

<table>
<thead>
<tr>
<th>PAD Bundle</th>
<th>Pain</th>
<th>Agitation</th>
<th>Delirium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess and Document Preferred Tools</td>
<td>Able to self-report → Numeric Rating Scale (0-10) (NRS) Unable to Self-Report → Critical Care Pain Observation Tool (0-8) (CPOT)</td>
<td>RASS (-5 to +4)</td>
<td>CAM ICU-modified (+ or -)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Interpretation</th>
<th>Patient is in significant pain if: NRS &gt; 4 CPOT &gt; 3</th>
<th>Sedation/agitation depth defined according to RASS scale Usual goal RASS is 0 to -1</th>
<th>Delirium present if: CAM-modified is positive</th>
</tr>
</thead>
</table>

**Assessment of Pain in ICU:**
Assessment of conscious non intubated patients can be done with Numeric rating scale (NRS)
Numeric Rating Scale (NRS):

The NRS is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of their pain. A numeric scale with 0 representing one pain extreme (e.g., “no pain”) and 10 representing the other pain extreme (e.g., “pain as bad as you can imagine” and “worst pain imaginable”). This can only be used in conscious awake patients. It can be done verbally by asking the patient to score his pain on the severity from 0 to 10.

Score
0 – No pain
1 to 3 – Mild pain
4 to 6 – Moderate pain
7 to 10 – Severe pain

Treatment of pain can be provided with the use of WHO pain ladder. It is a simple approach for treating pain in a step wise manner.

Oral administration of analgesics. The oral form of medication should be privileged whenever possible.

Analgesics should be given at regular intervals.

Analgesics should be prescribed according to pain intensity as evaluated by a scale of intensity of pain.

Aim for NRS score of less than 4
WHO Pain Ladder:

**Step 1**
Non-opioid (e.g., aspirin, paracetamol or NSAID) +/- adjuvant

**Step 2**
Weak opioid for mild to moderate pain (e.g., codeine) +/- non-opioid +/- adjuvant

**Step 3**
Strong opioid for moderate to severe pain (e.g., morphine) +/- non-opioid +/- adjuvant

Pain controlled
Assessment of unconscious or intubated patients can be done with Critical care pain observation tool (CPOT)

The range is from 0 to 8. Target score of 0 to 1 is acceptable. If the score range is from 0 to 1 patient is not in pain. This should be assessed first before checking for sedation score (RASS). Assessment should be done every hour and medication dose should be adjusted appropriately.

**Analgesics:**

The main opioids we use as infusion in ICU are fentanyl and morphine.
### Opiates infusion:

<table>
<thead>
<tr>
<th>Opiates</th>
<th>Onset (IV)</th>
<th>Elimination half life</th>
<th>Context Sensitive Half life</th>
<th>Metabolism</th>
<th>Intermittent Dosing</th>
<th>IV Infusion Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fentanyl</td>
<td>1–2 min</td>
<td>2–4 hrs.</td>
<td>200 min (6 hr. infusion)</td>
<td>Liver</td>
<td>0.35–0.5 μg/kg IV q0.5–1 hr.</td>
<td>0.7–10 μg/kg/hr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>300 min (12 hr. infusion)</td>
<td>N-dealkylation CYP3A4/5 substrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>5–10 min</td>
<td>3–4 hrs.</td>
<td>NA</td>
<td>Liver</td>
<td>2–4 mg IV Q1–2 hrs.</td>
<td>2–30 mg/hr.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Glucuronidation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Active metabolite 6- and 3-glucuronide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Metabolite accumulates renal failure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Non Opiates IV bolus:

<table>
<thead>
<tr>
<th>Non Opiates</th>
<th>Onset (IV)</th>
<th>Elimination half life</th>
<th>Metabolism</th>
<th>Active Metabolite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketamine (IV)</td>
<td>30 – 40 sec</td>
<td>2 – 3 hrs</td>
<td>N- demethylation</td>
<td>Norketamine</td>
</tr>
<tr>
<td>Paracetamol (IV)</td>
<td>5 – 10 min</td>
<td>2 hrs.</td>
<td>Glucuronidation, sulfonation</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>----------------</td>
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<td>------------------</td>
</tr>
<tr>
<td>Ketorolac (IV)</td>
<td>10 min</td>
<td>Hydroxylation, conjugation/ renal excretion</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.4 – 8.6 hrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tramadol (IV)</td>
<td>10 min</td>
<td>6 hrs</td>
<td>N-demethylation Liver enzyme CYP2D6</td>
<td>O-desmethyltramadol</td>
</tr>
</tbody>
</table>

There are other routes like rectal suppository, subcutaneous infusion transmucosal and transdermal these are rarely used in ICU settings.

Several other types of analgesics or pain-modulating medications, such as local and regional anesthetics (e.g., bupivacaine), nonsteroidal anti-inflammatory medications (e.g., diclofenac, ibuprofen), IV paracetamol and anticonvulsants, can be used as adjunctive pain medications to reduce opioid requirements.

**Agitation & Sedation:**
Agitation should only be assessed once pain is under control. Agitation and anxiety occur frequently in critically ill patients and are associated with adverse clinical outcomes.

**Assessment of Agitation:**
The Richmond Agitation-Sedation Scale (RASS) and Sedation-Agitation Scale (SAS) are the most valid and reliable agitation assessment tools for measuring quality and depth of agitation in adult ICU patients.
**RASS Score**

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>Overtly combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
<td>Frequent nonpurposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious but movements not aggressive or vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td>Not fully alert, but has sustained awakening (eye opening/eye contact) to voice (&gt;10 seconds)</td>
</tr>
<tr>
<td>−1</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to voice (&lt;10 seconds)</td>
</tr>
<tr>
<td>−2</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
</tr>
<tr>
<td>−3</td>
<td>Deep sedation</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>−4</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

**Procedure for RASS Assessment**

1. Observe patient.
2. If not alert, state patient’s name and say to open eyes and look at speaker.
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.

- **Score 0 to +4**
  - Patient is alert, restless, or agitated.
  - Patient awakens with sustained eye opening and eye contact.
  - Patient has any movement in response to voice but no eye contact.
  - Patient has any movement to physical stimulation.
  - Patient has no response to any stimulation.

- **Score −1**
  - Patient awakens with eye opening and eye contact.

- **Score −2**
  - Patient awakens with eye opening and eye contact, but not sustained.

- **Score −3**
  - Patient has any movement in response to voice but no eye contact.

- **Score −4**
  - Patient has any movement to physical stimulation.

- **Score −5**
  - Patient has no response to any stimulation.

Adapted with permission.²⁹

**Target sedation score on RASS 0 to -3**

**Deep sedation Target -4 to -5**

**Non pharmacological treatment of Anxiety:**

Prompt identification and treatment of possible underlying causes of agitation, such as pain, delirium, hypoxemia, hypoglycemia, hypotension, or withdrawal from alcohol and other drugs, are important.

Agitation is also brought about by continuous noise within ICU such as monitoring machines, telephones, pagers, other patients, medical and nursing staff.

**Sleep deprivation is a common occurrence in the critically ill and is often multifactorial.**

Before resorting to sedation, other measures to reduce sleep deprivation should be considered e.g., noise reduction, clustering interventions to avoid unnecessary disruptions, considering withdrawal symptoms from non-prescription drugs, controlling light exposure and ensuring temperature regulation.

Efforts to reduce anxiety and agitation, including maintenance of patient comfort, provision of adequate analgesia, frequent reorientation, and optimization of the environment to maintain normal sleep patterns, should be attempted before administering analgesic and sedatives.
Sedative Agents

Adopted from SCCM PAD guidelines 2013

The doctor should prescribe analgesic and sedative medication and dose according to protocol. Dose range and Target RASS score should be mentioned in the comments box. The ICU nurse will then be able to adjust the dose accordingly. Deep sedation will only be required in few cases like ARDS and raised ICP. For the rest RASS score of 0 to -2 will obviate the need for daily sedation hold.

Roles and Responsibilities:

Prescription:

The ICU doctor should prescribe the analgesic/sedative medication dose. Use NRS pain scale and WHO pain ladder for treatment in conscious patients. Aim for NRS less than 4. In patients who cannot verbalize, unconscious or intubated use CPOT for assessment and opioids infusion for treatment according to protocol. For sedative medications use RASS for assessment and titrate according to protocol.
Dose range and Target:
For opioid infusions CPOT score should be targeted as 0-1, prescribed by the ICU doctor. For sedation use RASS target score 0 to -3.

Maintenance:
The ICU nurse will then be able to adjust the dose according to protocol and able to maintain target score of CPOT/RASS as prescribed by the doctor.

During Cares:
When turning the patient or during suction anticipate more pain and need for increase in pain medications.

Frequency of observation:
CPOT/RASS assessment should be done every hour. During dose adjustment and in the initiation phase it should be done more frequently.

Caution:
Special circumstances with low GCS, vegetative state and presence of delirium should be assessed by ICU nurse & doctor and recommendations added in the comments box of the prescription. Patients requiring higher doses exceeding limits set in the protocol needs to be evaluated and prescribed by ICU doctor.

Delirium: CAM ICU assessment done only once every 24hrs or if there is a change in consciousness levels. Assessment can be done by the doctor or nurse and medications should be prescribed by the doctor.

Memory aid for delirium precipitants – think DELIRIUM
Drugs (withdrawal/toxicity, anticholinergics)/Dehydration
Electrolyte imbalance
Level of pain
Infection/Inflammation (post-surgery)
Respiratory failure (hypoxia, hypercapnia)
Impaction feces
Urinary retention
Metabolic disorder (liver/renal failure, hypoglycaemia/myocardial infarction)
Diagnosis
In those patients with clinical indicators of delirium, diagnosis should be confirmed using the Confusion Assessment Method (CAM). CAM should be used by a person competent in identifying delirium.

STEP WISE APPROACH
Step 1 Level of Consciousness: RASS
RASS should be above -3. Deep levels (-4 or -5) of sedation will prevent assessment for CAM-ICU scoring

**Step 2 Content of Consciousness: CAM-ICU**

![Diagram of CAM-ICU criteria]

Diagnosis of Delirium Requires point 1 and 2 and either 3 or 4

1) **Acute onset and fluctuating course**
2) **Inattention** (distractable, can’t focus, can’t follow a conversation, playing with bedclothes) and either
3) **Altered level of consciousness** (vigilant, lethargic / drowsy, stupor, coma)
4) **Disorganized thinking** (rambling, illogical flow of ideas, switching of subjects)
# CAM-ICU Worksheet

## Feature 1: Acute Onset or Fluctuating Course

<table>
<thead>
<tr>
<th>Score</th>
<th>Check here if Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Either question Yes</td>
<td>□</td>
</tr>
</tbody>
</table>

- Is the patient different than his/her baseline mental status? **OR**
- Has the patient had any fluctuation in mental status in the past 24 hours as evidenced by fluctuation on a sedation/level of consciousness scale (i.e., RASS/SAS), GCS, or previous delirium assessment?

## Feature 2: Inattention

**Letters Attention Test** (See training manual for alternate Pictures)

**Directions:** Say to the patient, "I am going to read you a series of 10 letters. Whenever you hear the letter 'A,' indicate by squeezing my hand." Read letters from the following letter list in a normal tone 3 seconds apart.

- SAVE AHAART or CASABLança or ABABADAAY

Errors are counted when patient fails to squeeze on the letter "A" and when the patient squeezes on any letter other than "A."

| Number of Errors >2 | □ |

## Feature 3: Altered Level of Consciousness

Present if the Actual RASS score is anything other than alert and calm (zero)

| RASS anything other than zero | □ |

## Feature 4: Disorganized Thinking

**Yes/No Questions** (See training manual for alternate set of questions)

1. Will a stone float on water?
2. Are there fish in the sea?
3. Does one pound weigh more than two pounds?
4. Can you use a hammer to pound a nail?

Errors are counted when the patient incorrectly answers a question.

**Command**

Say to patient: "Hold up this many fingers" (Hold 2 fingers in front of patient) "Now do the same thing with the other hand" (Do not repeat number of fingers) "If the patient is unable to move both arms, for 2nd part of command ask patient to "Add one more finger"

An error is counted if patient is unable to complete the entire command.

| Combined number of errors >1 | □ |

## Overall CAM-ICU

Feature 1 plus 2 and either 3 or 4 present = CAM-ICU positive

| Criteria Met | □ |
| Criteria Not Met | □ |

- CAM-ICU Positive (Delirium Present)
- CAM-ICU Negative (No Delirium)
Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Acute Change or Fluctuating Course of Mental Status:
   - Is there an acute change from mental status baseline? OR
   - Has the patient's mental status fluctuated during the past 24 hours?
   - **NO** → CAM-ICU negative NO DELIRIUM
   - **YES**

2. Inattention:
   - "Squeeze my hand when I say the letter 'A'!"
   - Read the following sequence of letters:
     * SAVEAHAART or CASABLANCA or ABABDADAAY
   - **0 - 2 Errors** → CAM-ICU negative NO DELIRIUM
   - **> 2 Errors** → 3. Altered Level of Consciousness

3. Altered Level of Consciousness
   - Current RASS level
   - **RASS = zero** → 4. Disorganized Thinking
   - **RASS other than zero** → CAM-ICU positive DELIRIUM Present

4. Disorganized Thinking:
   1. Will a stone float on water?
   2. Are there fish in the sea?
   3. Does one pound weigh more than two?
   4. Can you use a hammer to pound a nail?
   - Command: "Hold up this many fingers" (Hold up 2 fingers)
   - "Now do the same thing with the other hand" (Do not demonstrate)
   - OR "Add one more finger" (If patient unable to move both arms)
   - **0 - 1 Error** → CAM-ICU negative NO DELIRIUM
   - **> 1 Error** → CAM-ICU negative NO DELIRIUM
PREVENTION OF DELIRIUM IN ICU

The Do’s and Don’ts in delirium care for prevention

ALL MEMBERS OF THE MDT

<table>
<thead>
<tr>
<th>DO’s</th>
<th>DON’Ts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Observe the patient:</strong></td>
<td></td>
</tr>
</tbody>
</table>
  ● High risk of falls (do STRATIFY score).  
  ● Patients at high falls risk should be observed at arm’s length away from a nurse at all times.  
  ● Consider using a bed close to the nursing station. |
| Environment and Communication: |  
  ● Use calm speech and gentle manner.  
  ● Be courteous and polite even if the patient isn’t.  
  ● Acknowledge their feelings and show concern. |
| Orientate patient frequently: who and where they are and what your role is. |  
  ● Explain unfamiliar noises/equipment/personnel. |
| Provide easily visible clocks and calendars, good lighting and signage. |  
  ● Don’t insist on performing unnecessary tasks (washing/dressing/shaving etc.) |
| Facilitate visits from friends and family. |  
  ● Don’t argue and avoid commands: reasoning is usually impaired in delirium. |
| Use cognitively stimulating activities such as reminiscence. |  
  ● Don’t frequently change nurses, wards or bays. |
| Optimize any sensory deficit (provide hearing aids/spectacles). |  
  ● Don’t expose patient to disturbances such as sudden noise or bright lights at night. |
| Hydrate patients offer drinks. |  
  Don’t prevent sleep at night: |
| Consider nutrition by providing dentures |  
  Reduce loud bleeps/noises and bright lights. |
| Encourage early mobility, under supervision if required. |  
  ● Don’t ignore hospital bedrail policy; avoid bedrails if patient is able and likely to climb over them. |
Encourage all people, including those unable to walk, to carry out active range-of-motion exercises.

- Use interventions that are least restrictive to the patient.
  Let patients wander within a safe environment.
- Documentation:
  - Patient’s capacity if absent and how you acted in the patient’s best interest.
- Don’t physically restrain patients to the bed / chair. Wherever possible mobilize patient instead e.g. take for regular walks to toilet or for washing/shower.

Non Pharmacological Management of Delirium in ICU

**MEDICAL / NURSING STAFF**

<table>
<thead>
<tr>
<th>DO’s</th>
<th>DON’Ts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Management</strong>&lt;br&gt;Correct hypoxia (see oxygen prescription guidelines) and hypotension.</td>
<td><strong>Management</strong>&lt;br&gt;Don’t delay attendance – delirium has a high mortality.</td>
</tr>
<tr>
<td><strong>Remain vigilant for infection (e.g. urinalysis, bloods, and chest).</strong></td>
<td><strong>Don’t</strong> catheterize unnecessarily. Remove as soon as indicated.</td>
</tr>
<tr>
<td><strong>Correction dehydration (may need SC/IV if oral intake poor).</strong></td>
<td><strong>Don’t</strong> use IV lines unnecessarily and follow trust guidance in use of IV Cannulas.</td>
</tr>
<tr>
<td><strong>Monitor bowels and treat constipation.</strong>&lt;br&gt;Identify (including non-verbal signs) and treat pain.</td>
<td><strong>Don’t</strong> order unnecessary tests (CT, USG, EEG or frequent bloods).</td>
</tr>
<tr>
<td>- If delirium develops, follow a step by step approach</td>
<td><strong>Don’t disturb patient’s sleep with procedures and medication rounds if possible.</strong></td>
</tr>
<tr>
<td>- to identify and treat the causes</td>
<td>- Don’t use antipsychotics unless other interventions have failed.</td>
</tr>
<tr>
<td>- Explain diagnosis of delirium to family.</td>
<td>- Don’t use large amounts of antipsychotics, particularly in the elderly. General rule is use less more often.</td>
</tr>
<tr>
<td>- Ensure diagnosis is documented clearly in the notes and EDL.</td>
<td>- Don’t give antipsychotics to patients with a prolonged QTc, with Parkinsonism or with Lewy</td>
</tr>
<tr>
<td>- Consider security involvement</td>
<td></td>
</tr>
<tr>
<td>- Consider arm length observations at all times including contacting SNPs for extra staffing.</td>
<td></td>
</tr>
<tr>
<td>- Prescribing</td>
<td></td>
</tr>
<tr>
<td><strong>Review appropriateness of all medications (anticholinergic medication ought to be stopped).</strong></td>
<td></td>
</tr>
</tbody>
</table>
● Ascertain use of non-prescription/recreational drugs
● Consider medication for patients at risk to self/others or with distress or to enable essential investigations as per attached guidance, with maximum dose in 24 hours also clearly documented.
● Consider regular low dose haloperidol to treat delirium (usually 1/52 or less) if the patient requires frequent doses of haloperidol (consensus).

Pharmacological Management of Delirium

There is little robust evidence to support pharmacological treatments. They are used for symptom control and preventing harm. Ideally avoid or minimize the use of benzodiazepines during ICU stay. Dexmedetomidine use has lower incidence of delirium.

General Delirium

Mild Symptoms
- Haloperidol 2-5mg enterally three to four times daily, titrating to symptoms.
- Olanzapine 5mg enterally daily in patients unable to tolerate haloperidol (e.g. Parkinson’s Disease).
- Quetiapine 50mg every 12hrs dose can be gradually increased to Max of 200mg per day.

Moderate-Severe Symptoms
- Haloperidol 0.5mg-10mg intravenously (dose depending on clinical parameters). Double the dose if the patient remains unmanageable after 20-30 minutes with no adverse effects, repeating as necessary. Convert to a regular dosing schedule when control is established.
- Olanzapine 2.5-10mg intramuscular injection, repeated after 2 hours if necessary, in patients unable to tolerate haloperidol (e.g. Parkinson’s Disease).

Withdrawal Delirium

Benzodiazepines withdrawal
Start a benzodiazepine and titrate to the minimum effective dose given by an appropriate route of administration. Taper the dose over days to weeks. Long
acting benzodiazepines such as lorazepam can be utilized to facilitate tapering regimes.

**Opioids withdrawal**
Start an opioid and titrate to the minimum effective dose given by an appropriate route of administration. Taper the dose over days to weeks. Long acting opioids such as methadone can be utilized to facilitate tapering regimes. Clonidine has also been used, although side effects may limit usefulness.

**Antidepressants withdrawal**
Restart usual medication as soon as possible. Where this is not possible, consider using the intravenous, buccal or rectal routes if available. Treat symptomatically if no alternative route available.

**Ethanol withdrawal**
Use a benzodiazepine first line titrating to the minimum effective dose. Taper the dose over several days. Clonidine cannot be recommended, as there is weak evidence to support its use in alcohol withdrawal delirium.

**Nicotine withdrawal**
Weak evidence exists for the use of nicotine replacement therapy given as a patch where the patient has a history of heavy tobacco use. Enteral clonidine has some evidence base for treating nicotine withdrawal. Clonidine and nicotine replacement may be used together if the withdrawal reaction is particularly intense.
CLINICAL GUIDE TOOL FLASHCARDS - SEDATION PROTOCOL

PAIN

Monitoring

Upon admission

Minimum hourly as well as if required or any changes

Recording and documentation by Nurse

Patient conscious, responsive and cooperative

NRS

Target set by Physician

Target achieved? NRS ≤ 4, CPOT ≤ 2

Yes

Re-evaluation/Adjustment:
- Dose could be reduced?
- Change to PRN possible?
- Pain killer could be stopped?
- Prevent the pain:
  - Treat pain before sedation
  - Administer pre-procedural analgesia and/or non-pharmacologic interventions

No

Re-evaluation/Adjustment or non-pharmacologic treatment:
- To adjust the pain relieving position
- Mobilisation
- If needed warm or cold compress

Pharmacologic treatment as per WHO Pain Ladder

WHO Pain Ladder
Step I (Non-Opioid): e.g. Aspirin, Paracetamol, NSAID +/- adjuvant
Step II (Weak Opioid): e.g. Codeine, Tramadol +/- adjuvant
Step III (Strong Opioid): Morphine, Oxycodone, Hydromorphone, Fentanyl +/- adjuvant
Adjuvants: Antidepressants, Pregabalin, Carbamazepine, Desvenlafaxine, Lidocaine, Antihistamines

Note: Step II and Step III should not be combined

Patient unconscious, unresponsive or intubated

CPOT

Therapy order by Physician

* The Physician is responsible to consider the indication and side effects of all prescribed medications
ASSESSMENT AND MANAGEMENT OF ANALGESIA/SEDATION BY NURSE IN INTUBATED PATIENTS

MAINTENANCE PHASE
Assessment frequency: Every 1 hour

I- First ASSESS PAIN
Proceed to STEP II if CPOT 0-1

If CPOT = 0-1 and RASS < target (patient deeply sedated)
REMIFENTANI: Decrease infusion flow 0.01 mcg/kg/min every 5 min till RASS target.
FENTANYL: Decrease by 0.5 mcg/kg/hr every hour till RASS target.

If CPOT > 1
REMIFENTANI: Increase infusion flow 0.01 mcg/kg/min every 2 min till CPOT 0-1 (max dose 0.25mcg/kg/min)
FENTANYL: bolus of 25-50mcg every 5 min till CPOT 0-1 (max 200mcg) and increase by 0.5 mcg/kg/hr (max dose 5mcg/kg/hr)

II- Assess sedation RASS

RASS < target (patient deeply sedated)
Midazolam: Reduce by 0.1 mcg/kg/min every hour till target RASS achieved
Propofol: Reduce by 5 mcg/kg/min at least every hour till target RASS achieved.
Dexmedetomidine: reduce by 0.1mcg/kg/hr every 15 min till RASS target. (Max dose 1.5 mcg/kg/min)

RASS > target (patient agitated)
Midazolam: Bolus 2mg every 5 min (max of 10mg) till RASS target and increase infusion by 0.1mcg/kg/min (max dose 1.5mcg/kg/min)
Propofol: titrate with bolus of 20mg every 2 min (max 100mg) till RASS target and increase infusion by 5 mcg/kg/min (max dose 50mcg/kg/min)
Dexmedetomidine: increase infusion flow by 0.1mcg/kg/hr every 15 min till RASS target (max dose 1.5 mcg/kg/min)

Check ventilator for Apnoea during bolus doses
If Max doses achieved and still uncontrolled Pain/ Sedation call DOCTOR
Maintain hemodynamic stability (If MAP< 60 mm Hg and HR <50) call DOCTOR
ASSESSMENT AND MANAGEMENT OF ANALGESIA/SEDATION BY NURSE DURING CARE (TURNING, SHIFTING AND SUCTION)

During nursing care: If CPOT > 1
Stop the care
Double the flow of remifentanil (max 0.25 mcg/kg/min)
Or
Bolus of fentanyl 25-50mcg every 5 min (max 200mcg)
Look at ventilator for apnoea before continuing care

For patients on PSV:
- If RR < 10/min: switch to VAC (adapt pressure alarms)
- Return to initial flow of analgesic after the cares
- Switch back to PSV when patient ready

Then anticipate and adapt for the next care
Increase the flow of Remifentanil 3 to 5 min before care
Or
Bolus of fentanyl 5 min before care (repeat once if needed)

Check ventilator for Apnoea during bolus doses
If Max doses achieved and still uncontrolled Pain/ Sedation call DOCTOR
Maintain hemodynamic stability (If MAP < 60 mm Hg and HR < 50) call DOCTOR
MIST BUNDLE (MODIFIED INTUBATING SEQUENCE FOR TRANSMISSIBILITY BUNDLE) FOR INFECTIOUS DISEASES WITH AEROSOL HAZARD

Dr Jayaraj Mymbilly Balakrishnan, Professor, Department of Emergency Medicine
Dr Ramya, Assistant Professor, Department of Emergency Medicine

Background
There is a high chance of droplet spillage and infection for the healthcare workers of all category during airway management and mechanical ventilation of a case like COVID-19 or NIPAH, EBOLA etc. where droplet and fomites mediated infection is a high threat. This bundled approach of Endotracheal intubation can be used for infections like suspected COVID-19, H1N1, MDR TB, NIPAH VIRUS. This approach does not involve significant resource intensification but makes the practices bundled in such a way that the transmission of infection and spillage of droplets during intubation for health care workers is minimized to least.

Concepts
1. The airway management and mechanical ventilation may be adopted in these conditions are Rapid sequence intubation and invasive mechanical ventilation. There is no evidence to prove the benefit from NIPPV, and there is an increased risk of potential aerosol generation and infection spread. Hence NIPPV should be avoided.4,5,6
2. The care area will be divided as:
   a. Hot zone: At a 3-meter radius from the patient
   b. Warm zone: Area between hot and cold zone where decontamination takes place
   c. Cold zone: Outermost non-contaminated area
3. The Intubation team members are as follows: (Table 1)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Personnel</th>
<th>Stationed in</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Team leader (TL)</td>
<td>Hot Zone</td>
<td>Most experienced airway expert available</td>
</tr>
<tr>
<td>2</td>
<td>Registered Respiratory Therapist (RRT)</td>
<td>Hot Zone</td>
<td>Airway equipment in charge</td>
</tr>
<tr>
<td>3</td>
<td>Registered Nurse (RN)</td>
<td>Hot Zone</td>
<td>IV lines / Drug in charge</td>
</tr>
<tr>
<td>4</td>
<td>Infection Control nurse (ICN)</td>
<td>Warm Zone</td>
<td>Overseas procedure and protocols</td>
</tr>
</tbody>
</table>

TL, Team Leader; RRT, Registered Respiratory Therapist; RN, Registered Nurse; ICN, Infection Control Nurse.
4. Encourage closed-loop communication.

**Steps of Mist Bundle**

1) **Pre-assessment phase - Cold Zone**
   a. **Step a.** The team leader goes through all the available data and reassesses the benefits and risk of intubation and ventilation for the patient. The guiding principle will be optimal resource allocation in times where the demand far exceeds supply and maximum benefit to a maximum number of people and avoid unnecessary exposure by avoidable interventions. The final decision will be taken by the Team Leader in consultation with higher authorities if needed.
   b. **Step b.** The vital sign monitors and the presence of IV access will be ascertained
   c. **Step c.** The team Leader articulates the need for intubation and initiates the drill by saying “intubation Drill initiated.”

2) **Pre-briefing phase - Cold Zone**
   a. **Step a.** TL to debrief the intubation plan to the team to avoid unplanned and unarticulated actions. Any modification in the plan to be articulated by the TL to the team members
   b. **Step b.** The checklist will be provided to all team members.
   c. **Step c.** Any breach of protocol or infection control practice should be alerted by the ICN. ICN will ask to “Pause and reassess” in such a situation.
   d. **Step d.** Any doubts in the steps to be cleared before entering the hot zone

3) **Preparatory phase – Cold Zone**
   a. **Step a.** Use CPAP mode with NIV mask for pre-oxygenation. RRT to assemble the ventilator with its circuit; the NIV mask with a viral filter (Figure 1A) and check for possible leaks and disconnections. Ventilator settings: PS-0 cm H2O, PEEP- as per the requirement and FiO2 to 100%. Deselect the apnea setting.
   b. **Step b.** The Airway equipment (Table 2A) to be pre-checked and arranged on the intubation trolley by the RRT (Figure 1B).
   c. **Step c.** RN to load pre-calculated doses of drugs (Table 2B) in labelled syringes and mount three syringe pumps –loaded with a sedative, a paralytic and a vasopressor (if required) on the drug trolley, (Figure 1C)
   d. **Step d.** The assembly of the Endotracheal tube (ET) should be preset with a catheter mount containing a viral filter, an inflation syringe with an intubating bougie (Figure 1D).
Figure 1. The types of equipment used for MIST bundle.
A. The ventilator with circuit; viral filters at the inspiratory port, expiratory port and between the end of Y junction and NIV mask. Ideally, cover all part to prevent contamination.
B. Intubation trolley containing pieces of equipment for endotracheal intubation.
C. Drug trolley containing pieces of equipment for IV medication with labelled drugs.
D. Intubation unit

Table 2. List of types of equipment required in each trolley

<table>
<thead>
<tr>
<th>A. Airway equipments in Intubation trolley</th>
<th>B. Drug trolley and its requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment</strong></td>
<td><strong>Nos</strong></td>
</tr>
<tr>
<td>Intubation unit</td>
<td>1</td>
</tr>
<tr>
<td>i-gel® size 3 and 4 in Zip lock cover</td>
<td>1</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>1</td>
</tr>
<tr>
<td>Cuffed ET tube 7 size, OPA &amp; NPA</td>
<td>1</td>
</tr>
</tbody>
</table>
Sterile Gloves of different size | 1 | Tourniquets | 1  
Tube tie and tape | 2 | Cotton | 1 roll  
ET Tube fixator | 1 | Spirit swab | 2  
Lubricant gel | 1 | IV fluid with infusion set | 1  
Hand rub | 1 | Syringe pump with 60cc infusion syringe | 3  
Scissors | 1 | Physical restraints | 4  
Zip lock bags | 5 | ECG leads | 5  
| | Zip lock bags | 5  
| | Transparent bag to discard sharps | 1  

OPA, oropharyngeal airway; NPA, Nasopharyngeal airway; ECG, Electrocardiography.

1. Personal Protection Phase - Cold Zone
   a. **Step a.** The TL, RN, RRT who are going to hot zone are required to don the recommended personal protective equipment (PPE) and should exercise standard precautions. 7
   b. **Step b.** The PPE donning and intubation procedure will be overseen by the ICN.

2. Pre-Medication phase - Hot Zone
   a. **Step a.** Responsibilities of the registered nurse are to:
      a. Wheel in the drug trolley
      b. Attach standard monitors and ensure patent IV access. Proper disposal of the soiled waste including sharps.
      c. Assess the vitals periodically
   b. **Step b.** The patient should receive a pre-calculated dose of pre-medications before starting the pre-oxygenation (to avoid/reduce coughing and agitation).

**Table 3. List of drugs used in Intubation.**

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premedication</td>
<td></td>
</tr>
<tr>
<td>Inj. Glycopyrrolate Plus</td>
<td>0.1mg/kg IV</td>
</tr>
<tr>
<td>Inj. Fentanyl or</td>
<td>1mg/kg IV</td>
</tr>
</tbody>
</table>

<p>|</p>
<table>
<thead>
<tr>
<th>Inducing agent</th>
<th>Paralytic agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inj. Lignocaine</td>
<td>Inj. Rocuronium</td>
</tr>
<tr>
<td>1mg/kg IV</td>
<td>0.6-1.2mg/kg IV</td>
</tr>
<tr>
<td>or Inj. Etomidate</td>
<td></td>
</tr>
<tr>
<td>0.3mg/kg IV</td>
<td></td>
</tr>
<tr>
<td>or Inj. Ketamine</td>
<td></td>
</tr>
<tr>
<td>1-2mg/kg, IV</td>
<td></td>
</tr>
</tbody>
</table>

**Pre-Oxygenation Phase: Hot Zone**

**a. Step a.** The RRT is required to push (not pull) the mobile suction unit (Figure 2A) to the head end of the patient and ensure that it is properly connected. (Not required if there is a wall-mounted suction).

![Figure 2A Mobile suction unit with Yankauer suction attached. Ideally covered fully.](image1)

![Figure 2B PVC pipe (sealed at one end) filled with 1% sodium hypochlorite solution.](image2)

**b. Step b.** The intubation trolley and the ventilator needs to be pushed to the righthand side of the patient by the TL. The ventilator is to be connected onto the wall outlet as well as the power supply by the side of the patient with its preplanned settings on standby mode by the RRT.

c. **Step c.** TL to stand at the head end and place the NIV mask with the viral filter onto the patient and ensure proper sealing to avoid leak while the RRT “starts” the ventilator.

d. **Step d.** RN should reassess vitals, saturation and communicate it to the TL.
Peri Induction phase: Hot Zone

- **Step a**—RN to administer the pre-calculated dose of the induction agent followed by the paralytic agent to the patient.
- **Step b**. Saturation and hemodynamic stability to be monitored by the RN.

Peri-Intubation phase: Hot Zone

- **Step a**. The ventilator should be set on standby mode by the RRT after adequate paralysis and saturation is achieved.
- **Step b**. TL should subsequently remove the NIV mask, which is disconnected from the ventilator by the RRT and place it in a zip lock bag held by the RN.
- **Step c**. A quick atraumatic laryngoscopy should be performed by the TL, and the grade of laryngoscopy is to be articulated. During this time, RRT is required to change the settings of the ventilator to ACMV mode. Once the vocal cords are visualized, the RRT should hand over the intubating unit to the TL who should then proceed to pass the bougie between the cords under direct visualization. (Video laryngoscope is a preferred choice for intubation of such patients)
- **Step d**. The RRT is required to assist in railroading the ET over the bougie and should subsequently inflate the cuff with the pre-filled air syringe.
- **Step e**. The bougie should then be removed by the RRT and be disposed of in the preset disposition system (Figure 2B)
- **Step f**. The RRT should then proceed to connect the ET to the ventilator and convert the ventilator from standby to its preset settings. Simultaneously, the laryngoscope should be removed by the TL, which should be placed into a zip lock bag held by the RN.
- **Step g**. The position of the tube is to be confirmed by the RN with five-point auscultation following which the stethoscope should be disposed of in the zip lock bag. (EtCO2 confirmation is preferred)
- **Step h**. The RRT should then fix the tube at 22 cm for males and 20 cm for females with a tube fixator.
- **Step i**. Yankauer suction which is connected to the mobile suction unit or wall mount system should be made available but its usage should be judicious. The suction tip if used should be disposed of in a zip lock bag.

Post Intubation phase: Hot Zone

- **Step a**. Continue ventilation and monitor hemodynamic stability, saturation, and ventilator graphics.
- **Step b**. Initiate early sedation and paralysis at the pre-set rate. Titrate the FiO2 level.
- **Step c**. Ensure all disposables have been disposed of appropriately.

Post intubation doffing and decontamination phase: Warm Zone

- **Step a**. The order of doffing and decontamination should be TL, followed by the RN and then the RRT.
- **Step b**. This process should be separately overviewed and monitored by the ICN.
Conclusion
This sequence should guide healthcare professionals to minimize aerosol and droplet transmission during intubation and expedite patient care better.
Role of TL
- Determine the risk benefit ratio of intubation
- Allocation of roles to the team members
  - Team Leader (TL)- intubation
  - Registered Respiratory Therapist (RRT)- airway equipment in charge
  - Registered Nurse (RN)- drug in charge
  - Infection Control Nurse (ICN)- monitor if any breach of protocol and to ensure proper infection control practice
- Use of closed loop communication

Role of RRT
- Check the connection of ventilator tubings
- Pre-set the ventilator for pre-oxygenation
- Equipments in intubation trolley
  - Intubation unit
  - Macintosh laryngoscope with blade size 3 and 4 in a sterile tray
  - Stethoscope
  - Cuffed ET tube
  - ET Tube fixator
  - IV fluid with infusion set
  - Zip lock bags

Role of RN
- Preload drugs with labelled syringes
- Drugs
  - Inj Ethomidate (0.3mg/kg body wt) or Inj Ketamine (1 to 1.5mg/kg body wt)
  - Inj Rocuronium (1mg/kg body wt
  - Vasopressor (if required)
  - Sedation and paralysis
- PPE
**Role of TL**

Proper mask seal with NIV + Optimise position  
Adequate preoxygenation for 3 mins until saturation is >88%  
Remove NIV mask only after the ventilator is in standby mode  
Ensure visual passage of bougie throught the vocal cords  
Confirm tube position by five point auscultation or ETCO2 monitor  
Secure tube with tube fixator  
Place the laryngoscope with tray into a zip lock bag

**Role of RRT**

Ensure wall mounted suction  
Starts ventilator for pre-oxygenation after adequate mask seal  
Keep ventilator on standby mode after the pre-oxygenation  
Place the NIV mask in a zip lock bag  
Preset the ventilator to ACMV for ventilation after intubation  
Support the intubating unit while the TL passes the bougie through the vocal cord  
Inflate the cuff with a pre-filled air syringe immediately after tracheal intubation  
Remove the bougie and discard into pre-set disposition system  
Confirm the position of ET tube  
Start mechanical ventilation only after cuff inflation  
Ensure there is no leak

**Role of RN**

Ensure the patency of IV access  
Communicate the vitals periodically to the TL  
Administer the inducing and paralytic agent after the pre-oxygenation

**Careful equipment disposal**
Decontamination of reusable equipment  
Remove PPE  
Meticulous disposal  
Standard doffing procedure
TREATMENT PROTOCOLS FOR PEDIATRICS AND NEONATES
### Pediatric COVID-19 Protocol

**Triage: Early recognition of patients with COVID – 19**

The clinical spectrum of COVID-19 in children ranges from being asymptomatic to being in severe acute respiratory distress.

<table>
<thead>
<tr>
<th>Infection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>Absence of clinical signs and symptoms of the disease and normal chest X-ray or CT scan associated with a positive test for COVID 19</td>
</tr>
<tr>
<td>Mild infection</td>
<td>Upper airway symptoms such as fever, fatigue, myalgia, cough, sore throat, runny nose and sneezing. The pulmonary clinical exam is normal. Some cases may not have fever and others may experience Gastrointestinal symptoms such as nausea, vomiting, abdominal pain and diarrhoea. Child with non-severe pneumonia has cough or difficulty in breathing/ fast breathing: (fast breathing - in breaths/min): &lt;2 months, ≥60; 2–11 months, ≥50; 1–5 years, ≥40 and no signs of severe pneumonia.</td>
</tr>
<tr>
<td>Moderate infection</td>
<td>Clinical signs of pneumonia. Persistent fever, initially, dry cough, which becomes productive, may have wheezing, or crackles on pulmonary auscultation but shows no respiratory distress.</td>
</tr>
<tr>
<td>Severe infection</td>
<td>Initial respiratory symptoms may be associated with GI symptoms. The clinical deterioration occurs within a week with the development of dyspnea, and hypoxemia (blood oxygen saturation SaO2 &lt;94%) Child with cough or difficulty in breathing, plus at least one of the following: Central cyanosis or SpO2 &lt;90%; severe respiratory distress (e.g. grunting, chest in-drawing): signs of pneumonia with any of the following danger signs: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest in-drawing, fast breathing (in breaths/min): &lt;2 months ≥60; 2–11 months ≥50; 1–5 years ≥40. The diagnosis is clinical; chest imaging can exclude complications.</td>
</tr>
<tr>
<td>Critical infection</td>
<td>Children deteriorating quickly to Acute respiratory distress syndrome or respiratory failure and may present with shock, encephalopathy, Myocardial injury or heart failure, coagulopathy, acute kidney injury and multiple organ dysfunction.</td>
</tr>
<tr>
<td>Septic shock</td>
<td>Children: any hypotension (SBP &lt;5th centile or &gt;2 SD below normal for age) or 2-3 of the following: altered mental state; bradycardia or tachycardia (HR &lt;90 bpm or &gt;160 bpm in infants and HR &lt;70 bpm or &gt;150 bpm in children); prolonged</td>
</tr>
<tr>
<td>capillary refill (&gt;2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 Clinical case definition of pediatric COVID 19
Immediate implementation of appropriate IPC (Infection Prevention and Control) measures

Triage: Provide surgical mask to the patient and follow infection prevention and control measures for patients

Health Care Professional: Use surgical mask, gown (ideally disposable), gloves and protective goggles for the initial evaluation. Aerosol generating procedures (tracheal intubation, airway aspiration, respiratory secretion) use all the above but replace surgical facemask for N95 mask, and use surgical cap.

Severe Acute respiratory syndrome: RR> for given age* and sat O2 < 93% room air
Admit to isolation unit (ward/ICU)
Collect Naso/oropharyngeal swab
Case notification
Prescribe symptomatic relief

No Severe respiratory distress syndrome: RR< for given age, O2 sat>93% in room air
Prescribe symptomatic relief
Self isolation according to Health ministry guidelines
Monitor high risk patients
Notify and test depending on history

ICU:
No improvement of Sat O2 after O2 therapy
Hypotension
Prolonged Capillary refill time
Altered sensorium or comatose

Ward: (if no signs of distress are present)
Those with comorbidities and chronic underlying medical conditions
Immunosuppression

On Imaging on X ray or CT scans, consider admitting to hospital if >50% of lungs show alterations or imaging alterations in high risk patients.
Early supportive therapy and monitoring
- When dealing with a case of suspected COVID-19, the patient should be kept in a single room with all precautions according to hospital guidelines to prevent and control infections before laboratory confirmation.
- Mild cases should be treated with symptomatic relief medication, preferably paracetamol or dipyrone, to control fever.
- Antiviral agents, including oseltamivir, ribavirin, ganciclovir, remdesivir, lopinavir, and ritonavir, have been used to reduce the viral load to prevent potential respiratory complications but with no apparent benefits thus far.

Management of hypoxemic respiratory failure and ARDS
- Early tracheal intubation – rapid sequence intubation is the best practice in this situation. Preoxygenation should be performed using a flexible nasal cannula (up to flows of 4 L/min) or a reservoir mask with a lower flux to maintain a SaO2 493%. Positive pressure ventilation with a bag-valve-mask or other similar apparatus should be avoided to not generate aerosols. Sedation can be performed using fentanyl (1–2 mg/kg) or ketamine (1–2 mg/kg, if there is no contraindication such as pulmonary hypertension) and neuromuscular blocking with rocuronium (0.6–1.2 mg/kg), preferably. Video laryngoscopy should be utilized if available.
- Non-invasive ventilation (NIV) should be avoided because of the high risk of aerosol dispersion and contamination among health practitioners.
- Protective mechanical ventilation using a pressure-controlled or volume cycled, with a low tidal volume (around 6 mL/kg) and plateau pressure p30 cmH2O. The positive end-expiratory pressure (PEEP) should be titrated such that FiO2 is reduced (p50%), with PaO2 460 mmHg and SaO2 490–93%. The general recommendation is to start with PEEP at 5–6 cmH2O and increase progressively to 12–14 cmH2O if necessary. It is very important to maintain a driving pressure (plateau pressure – PEEP) 015 cmH2O and tolerate hypercapnia with pH 47.2 (permissive hypercapnia), except for patients with pulmonary hypertension.
- Prone positioning, especially if PaO2/FiO2 <150 mmHg. The patient should be maintained in this position at least 18 hours per day with oximetry and capnography monitoring.
- Closed tracheal aspiration systems should be used.
- Conservative fluid therapy, including volume restriction in patients with hemodynamic stability, starting with 50% of the normal recommendation based on the Holliday-Segar rule, and adjustments according to the fluid balance and hemodynamic clinical conditions.
**Prevention**

- A fever clinic for screening patients with a history of fever, runny nose and travel has been instituted outside the pediatric outpatient and children with positive history are immediately triaged as per the flu flow chart.
- The staff on the pediatric unit are divided into teams which serve the units on a weekly rotation basis. A backup team is always on call if any member of a team is deemed to be infected or has been in contact with a confirmed case. Treatment or quarantine guidelines as per the ministry of health are instituted respectively for the team member(s).
- All interns and postgraduates in respective units have been divided into similar teams and work on rotation. A resident is posted to the fever clinic who is involved in the screening process.
- All staff members including doctors, residents, interns and nurses are strictly required to adhere to personal protective measures like wearing masks, hand washing and sanitization and social distancing measures.

**Advice for breastfeeding mothers**

- There is no evidence of vertical transmission or transmission via breastfeeding.
- Practice respiratory hygiene, including during feeding. If you have respiratory symptoms such as being short of breath, use a medical mask when near your child.
- Wash your hands thoroughly with soap or sanitizer before and after contact with your child.
- Routinely clean and disinfect any surfaces you touch.
- If you are severely ill with COVID-19 or suffer from other complications that prevent you from caring for your infant or continuing direct breastfeeding, express milk to safely provide breastmilk to your infant.

If you are too unwell to breastfeed or express breastmilk, you should explore the possibility of re-lactation (restarting breastfeeding after a gap), wet nursing (another woman breastfeeding or caring for your child), or using donor human milk. Which approach to use will depend on cultural context, acceptability to you, and service availability.
GUIDELINES FOR MANAGEMENT OF NEONATES BORN TO COVID-19 SUSPECTED OR POSITIVE MOTHER

Dr Apurv Barche, Dr Jayashree P, Dr Sneha J, Dr Leslie Edward Lewis
Division of Neonatology, Department of Paediatric

Designated areas

For conducting delivery:
- Operating room # 10 for Caesarean delivery
- High dependency Delivery area for Normal vaginal delivery
  In both the locations, Resuscitation corner arranged 2 meters from the delivery area should contain Radiant warmer, suction, oxygen supply, and dedicated Neonatal COVID Resuscitation Kit.

Designated areas for management of Neonate
- Septic/Isolation room in the NICU (Totally 4 Babies can be managed, three babies with ventilation facility)

Definition:

Suspect Sars-COVID19:
- Symptomatic mother in the perinatal period with history of travel to affected countries or affected states/places in India or history of contact with persons travelled to affected countries or affected states/places in India during the 14 days prior to the onset of symptoms.
  OR
- Mother with fever, respiratory symptoms from designated Red zone/Orange Zone Districts
  OR
- Symptomatic antenatal mother when no other etiology explains her clinical presentation
  OR
- Any mother suspected by OBG department.

Definite SARS-COVID19:
Mother with positive RT-PCR for COVID-19 irrespective of clinical signs and symptoms

Aerosol generating procedures:
Throat swab collection, Intubation, Less invasive surfactant administration. Precautions include N95 Mask, Gloves (double), Gown (fluid resistant), Visor/ Goggles, Shoe cover, Full PPE.
Inborn Delivery

A. DELIVERY ROOM MANAGEMENT –
- Delivery room practices (OT/HDU)
  - PPE (N-95 Mask, goggles, impervious gown and Gloves) and resuscitation equipment dedicated to COVID-19 related deliveries including Bag and mask.
  - Two persons for less than 34 weeks of gestation / Emergency C section (APH, Fetal distress, Meconium, etc.,) / Antenatal diagnosis of congenital anomaly.
  - No Delayed cord clamping
  - No Mother-infant contact after delivery
  - Standard resuscitation as per NRP guidelines
    (Use Preterm/Term self-Inflating bag/avoid vigorous suctioning)
    Presence of staff for Preterm/High-risk COVID delivery.

B. POSTNATAL MANAGEMENT –
- Healthy term Neonate
  - Admission in Septic NICU
  - Lab tests: CBC/CRP/Blood culture/Sample for a throat swab (to be taken as per protocol for aerosol-generating procedure)
  - Feeding with expressed breast milk/Formula feeds every 2nd Hourly
  - Monitoring with PPE precautions
  - Can be shifted out once Throat swab is negative for two consecutive instances
- Preterm/Sick Neonate not requiring respiratory support
  - Admission in Septic NICU
  - Manage under radiant warmer/incubator
  - Lab investigations: CBC/CRP/Blood Culture/Throat swab (to be taken as per protocol for aerosol-generating procedure)/Chest X-ray
  - IV fluids/Tube feeds as per gestation
  - Monitoring with standard PPE precautions
  - Rooming-in if mother COVID-19 Negative, with N 95 mask.
  - Can be shifted out once Throat swab is negative for two consecutive instances
- Preterm/Sick neonate (requiring respiratory support)
  - Delivery room intubation as per NRP guidelines
  - Follow air-borne precautions while transporting and caring
  - Consider Less invasive surfactant administration)/INSURE as per ongoing standard unit protocol using precautions as per aerosol generation procedure.
  - Consider Non-invasive ventilation using CPAP for preterm neonates. HHHFNC for term neonates with respiratory distress of varied aetiology.
  - Conventional or High-frequency ventilation as per neonatal unit protocol
  - Follow standard PPE precautions for monitoring/investigation/Suctioning/IV line/Central line insertion.
  - Rooming-in if mother COVID-19 Negative, with N 95 mask.
Can be shifted out once Throat swab is negative for two consecutive instances

Maternal Covid-19 Status
- Mother is COVID-19 negative / she is stable and Newborn COVID-19 negative: neonate and mother can both be roomed-in with contact precautions and hand hygiene education for mother
- Mother is COVID-19 positive, and Newborn is COVID-19 negative: Isolate neonate from mother till her COVID-19 status is negative (two consecutive samples 24 hours apart). Mothers expressed breast milk /Formula feeding used for feeding purpose. A child can be discharged in care of family members, who have not been in maternal contact, as per family’s request.
- Mother is COVID-19 positive, and Newborn is COVID-19 positive: Isolate neonate till his, and the mother’s COVID-19 status is negative (two consecutive samples 24 hours apart). Mothers expressed breast milk /Formula feeding used for feeding purpose. Monitoring with PPE. Discharge only if asymptomatic and negative throat swab at day 15 of age.
- Mother was suspected during delivery, BUT NO SWAB WAS SENT – Discuss with ID team / No visitation by mother until cleared by ID team or swabs are negative.

Out-born Delivery
Postnatal Management
This includes newborn referred from outside facilities for postnatal management from the hospital of birth (patient has not been discharged after birth) –
1. If the referral is immediate and the cause is not attributable to COVID-19 like prematurity, birth asphyxia, a congenital anomaly – discuss with consultant and patient can be admitted to Main NICU.
2. If a referral is after 24 hours of life or information is unavailable – Consider admitting to NICU sepsis ward. Discuss with consultant / ID team regarding sending the swab.
3. Term or Preterm infant referred from orange or red zone hospitals for postnatal management:
   - Admit in NICU sepsis.
   - Precautions and management as per postnatal management mentioned above.

Admission after discharge from birth hospital
These include babies referred or came to KH (Less than 1 month of age or less than 3 kg weight) for issues developed after postnatal discharge or follow up issues –
- Discuss with Consultant / ID team PRIOR to admitting – NICU sepsis or other place. Consider NICU sepsis admission if unclear history.
- Precautions and management as per postnatal management mentioned above.
Follow Up Services
- The high risk follow-up services will follow hospital policy.
- Surgical or N 95 mask to be worn all the time by the staff
- Adequate distance to maintain while baby is being or about to be examined
- Waiting area for follow up services to be outside the NICU.

Visitation
- Mothers with Suspect/Positive COVID-19 should not visit infants requiring neonatal intensive care until Negative results of a molecular assay for detection of SARS-CoV-2 from at least two consecutive nasopharyngeal swab specimens collected ≥24 hours apart.
- Mother with suspected COVID-19 – Can visit the NICU after swabs are negative or cleared by ID team for visitation.
- Family members – Any member taking care of suspected/confirmed COVID – 19 mother, SHOULD NOT visit NICU.
TREATMENT PROTOCOLS FOR PREGNANT WOMEN
TREATMENT PROTOCOLS IN COVID-19 – PREGNANT WOMEN

Dr Muralidhar V Pai, Professor and Head, Department of Obstetrics & Gynecology
Dr Pranadeep Reddy, Assistant Professor, Dept. of Obstetrics & Gynecology

Effect of COVID-19 on Pregnancy

- Pregnant women do not appear more likely to contract the infection than the general population.
- Reported cases of COVID-19 pneumonia in pregnancy are milder and with good recovery.
- In other types of coronavirus infection (SARS, MERS), the risks to the mother appear to increase in particular during the last trimester of pregnancy. There are case reports of preterm birth in women with COVID-19, but it is unclear whether the preterm birth was always iatrogenic, or whether some were spontaneous.
- Pregnant women with heart disease are at the highest risk (congenital or acquired).
- The coronavirus epidemic increases the risk of perinatal anxiety and depression, as well as domestic violence. It is critically important that support for women and families is strengthened as far as possible; that women are asked about mental health at every contact.

Transmission

- At present, there are no recorded cases of vaginal secretions being tested positive for COVID-19.
- At present, there are no recorded cases of breast milk being tested positive for COVID-19.

Effect on Fetus

- There are currently no data suggesting an increased risk of miscarriage or early pregnancy loss in relation to COVID-19.
- There is no evidence currently that the virus is teratogenic. Long term data is awaited.
- COVID-19 infection is currently not an indication for Medical Termination of Pregnancy.

General Guidelines for Obstetric Health Care Providers

- Create a plan to address the possibility of a decreased health care workforce, potential shortage of personal protective equipment, limited isolation rooms, and should maximize the use of telehealth across as many aspects of prenatal care as possible.
- Pregnant women should be advised to increase their social distancing to reduce the risk of infection and practice hand hygiene.
- Intrapartum services should be provided in a way minimum staffing requirements and the ability to provide emergency obstetric, anaesthetic and neonatal care.
Medical History
For all pregnant women obtain the following information:

- A detailed travel history
- History of exposure to people with symptoms of COVID-19
- Symptoms of COVID-19
- Coming from hot spot area
- Immunocompromised conditions

Patient to be informed
- If you are infected with COVID-19 you are still most likely to have no symptoms or a mild illness from which you will make a full recovery.
- If you develop more severe symptoms or your recovery is delayed, this may be a sign that you are developing a more significant chest infection that requires enhanced care; you should contact your maternity care team immediately.
- There may be a need to reduce the number of antenatal visits you have.

Do’s and Don’ts for Obstetric care providers in COVID-19 Pandemic
- If a woman meets the criteria for COVID-19 testing, she should be tested. Until test results are available, she should be treated as though confirmed COVID-19.
- Do not delay obstetric management in order to test for COVID-19.
- Elective procedures like induction of labour for indications that are not strictly necessary, routine growth scans not for a strict guidance-based indication and routine investigations should be reduced to a minimum at the discretion of the care provider.
- Maintain a distance of at least 1 meter from patients and other healthcare workers.

Consent
In addition to routine consent taken at the time of admission, treatment procedures, delivery or surgery, it would be prudent to include aspects related to COVID-19 infection for the time of the pandemic. The points that should be included are the probable chances of COVID-19 infection while in the hospital and its consequences and the precautions to be taken to avoid the infection.
Pregnant women SARS-CoV-2-Exposure

Travelled to an affected country within the previous 14 days
Close contact with a confirmed case of COVID-19 (i.e., <1 metre for > 15 minutes, living together, direct contact with body fluids)

CLINICAL EXAMINATION + RT-PCR (SARA-CoV-2) on deep nasopharyngeal and oropharyngeal samples

ASYMPTOMATIC INFECTION
No isolation rooms

MONITORING at home
(T + Respiratory symptoms)

SARS-CoV2 NEGATIVE

Isolation at home for 14 days
If delivery
Breastfeeding as per guidelines
Mother isolated from new-born until viral shedding clears

SARS-CoV2 POSITIVE

Symptomatic
Fever > 38 C AND respiratory symptoms

Monitoring at hospital
Isolated room prefer with negative pressure (IRNP)
Protective gear for visitor / health personnel
Delivery and neonatal procedure equipment on site

SARS-CoV2 NEGATIVE

Isolation at home 14 days +clinical self-monitoring
If symptoms persist RETEST (possible false negative)

SARS-CoV2 POSITIVE

HOSPITALISATION IN A TERTIARY CENTER

Maternal Surveillance
+ T, HR, BP, RR (3-4x/day)
+ Chest imaging (high resolution CT-scan or X-ray)
Foetal
+ FHR (1x/day)
+ Foetal maturation by Betamethasone injection depending on maternal status (until 34 to 37 WG)
+ IV Antibiotics treatment (depending local protocol)

USG Foetal Surveillance
Growth + Doppler / 2 weeks

RECOVERY

DELIVERY
Before 24 WG
If severe maternal illness, consider MTP (if legal)
After 24 WG
On site /IRNP
Vaginal delivery (induction of labour + instrumental delivery when possible unless severe failure criteria)
Early clamping of umbilical cord and cleaning of newborn
New-born monitoring in IRNP
SARS-CoV-2 RT-PCR of the new-born
Breastfeeding with due precautions and considerations
Mother isolated from new-born until viral shedding resolves

INTENSIVE CARE UNIT ADMISSION (Quick SOFA Score) More than 1 following criteria
Systolic blood pressure < 100 mm Hg
Respiratory rate > 22
Glasglow conscience score < 15

SEVERE FAILURE CRITERIA (consider caesarean delivery)
SEPTIC SHOCK
ACUTE ORGAN FAILURE
FETAL DISTRESS

PROTECTIVE GEAR
Contact and Airborne additional measures; FFP2 or N95 mask, Gloves, Gown, Eye protection
Antenatal Care

● Women should be advised to attend routine antenatal care, tailored to a minimum, at the discretion of the maternal care provider at 12, 20, 28 and 36 weeks of gestation, unless they meet current self-isolation criteria.

● For women who have had symptoms, appointments can be deferred until 7 days after the start of symptoms, unless symptoms (aside from persistent cough) become severe. Fetal Kick count to be maintained.

● For women who are self-quarantined because someone in their household has possible symptoms of COVID-19, appointments should be deferred for 14 days.

● Even if a woman has previously tested negative for COVID-19, if she presents with symptoms again, COVID-19 should be suspected.

● Antenatal ultrasound services for foetal growth surveillance is recommended after 14 days following the resolution of acute illness.

● The service providers can assess the feasibility of isolation for the patient at home, especially if in slums/small households, else she could be admitted in the hospital or quarantine facility.

● Also, self-quarantine for close contacts of the pregnant patient tested positive for 14 days.

● Whether she has attended ANC clinic in the last 14 days before testing if so self-quarantine of the service providers.

● If a woman tests positive, she should be advised to deliver preferably in a tertiary facility anticipating the complications during delivery.

Intrapartum Care

Once settled in an isolation room, a full maternal and fetal assessment should be conducted to include:

● Assessment of the severity of COVID-19 symptoms by multi-disciplinary team approach including infectious diseases or medical specialist.

● Delivery should be preferably at a tertiary care centre.

● Maternal observations including temperature, respiratory rate & oxygen saturation.

● Confirmation of the onset of labour, as per standard care.

● Electronic fetal monitoring using cardiotocograph (CTG).

● Hourly oxygen saturation during labour.
TREATMENT PROTOCOLS IN COVID-19
MANAGEMENT OF WOMEN IN LABOUR

Dr Muralidhar V Pai, Professor and Head, Department of Obstetrics & Gynecology
Dr Pranadeep Reddy, Assistant Professor, Dept. of Obstetrics & Gynecology

Care in Labour
- Aim to keep oxygen saturation >94%, titrating oxygen therapy accordingly.
- If the woman has signs of sepsis, investigate and treat as per guidance on sepsis in pregnancy, but also consider active COVID-19 as a cause of sepsis and investigate according to guidance.
- Continuous electronic fetal monitoring in labour is recommended.
- There is currently no evidence to favour one mode of birth over another. Mode of birth should not be influenced by the presence of COVID-19 unless the woman’s respiratory condition demands urgent delivery.
- There is no evidence that epidural or spinal analgesia or anaesthesia is contraindicated in the presence of coronaviruses. Epidural analgesia should, therefore, be recommended in labour to women with suspected/confirmed COVID-19 to minimize the need for general anaesthesia if urgent delivery is needed.
- In case of deterioration in the woman’s symptoms, make an individual assessment regarding the risks and benefits of continuing the labour, versus emergency caesarean birth if this is likely to assist efforts to resuscitate the mother.
- Caesarean birth or other operative procedure is done after wearing PPE.
- An individualized decision should be made regarding shortening the length of the second stage of labour with elective instrumental birth in a symptomatic woman who is becoming exhausted or hypoxic.

Management of Patients with COVID-19 Admitted to Critical Care
- Hourly observations, monitoring both the absolute values and trends.
- Titrate oxygen to keep saturations >94%.
- Hourly respiratory rate looking for the rate and trends:
- Rise in the respiratory rate, even if the saturations are normal, may indicate deterioration in respiratory function and should be managed by starting or increasing oxygen.
- Radiographic investigations should be performed as for the non-pregnant adult; this includes chest X-ray and CT of the chest. Chest imaging, especially CT chest, is essential for the evaluation of the patient with COVID-19 and should be performed when indicated and not delayed due to foetal concerns. Abdominal shielding can be used to protect the foetus as per normal protocols.
● Consider additional investigations to rule out differential diagnoses, e.g. ECG, CTPA as appropriate, echocardiogram. Do not assume all pyrexia is due to COVID-19 and also perform full sepsis screening.

● Consider bacterial infection if the white blood cell count is raised (lymphocytes usually normal or low with COVID-19) and commence antibiotics.

● Apply caution with IV fluid management. Try boluses in volumes of 250-500mls and then assess for fluid overload before proceeding with further fluid resuscitation.

● The frequency and suitability of foetal heart rate monitoring should be considered on an individual basis, taking into consideration the gestational age of the foetus and the maternal condition. If urgent delivery is indicated for foetal reasons, birth should be expedited as normal, as long as the maternal condition is stable.

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Postnatal Management

● It is unknown whether newborns with COVID-19 are at increased risk for severe complications

● Transmission after birth via contact with infectious respiratory secretions is a concern.
Consider temporarily separating (e.g. separate rooms) the mother who has confirmed COVID-19 or is a PUI, from her baby until the mother’s transmission-based precautions are discontinued.

**Considerations below for temporary separation**

- The risks and benefits of temporary separation of the mother from her baby should be discussed with the mother by the healthcare team.
- A separate isolation room should be available for the infant while they remain a PUI.
- The decision to discontinue temporary separation of the mother from her baby should be made on a case-by-case basis in consultation with clinicians, infection prevention and control specialists, and public health officials. Decision should take into account disease severity, illness signs and symptoms, and results of laboratory testing for virus that causes COVID-19, SARS-CoV-2 of mother and neonate.
- **If colocation (sometimes referred to as “rooming in”)** of the new-born with his/her ill mother in the same hospital room occurs in accordance with the mother’s wishes or is unavoidable due to facility limitations, facilities should consider implementing measures to reduce exposure of the new-born to the virus that causes COVID-19.
- Consider using engineering controls like physical barriers (e.g., a curtain between the mother and new-born) and keeping the new-born ≥6 feet away from the ill mother.
- If no other healthy adult is present in the room to care for the new-born, a mother who has confirmed COVID-19 or is a PUI should put on a facemask and practice hand hygiene before each feeding or other close contact with her new-born. The facemask should remain in place during contact with the new-born. These practices should continue while the mother is on transmission-based precautions in a healthcare facility.

**Breastfeeding**

- During temporary separation, mothers who intend to breastfeed should be encouraged to express their breast milk to establish and maintain milk supply.
- If possible, a dedicated breast pump should be provided. Prior to expressing breast milk, mothers should practise hand hygiene. After each pumping session, all parts that come into contact with breast milk should be thoroughly washed, and the entire pump should be appropriately disinfected as per the manufacturer’s instructions.
- This expressed breast milk should be fed to the new-born by a healthy caregiver.
- If a mother and new-born do room-in and the mother wishes to feed at the breast, she should put on a facemask and practice hand hygiene before each feeding.

**Hospital Discharge**

- Discharge for postpartum women should follow recommendations described in the guidelines for discharge of Hospitalized Patients with COVID-19.
- The test should be negative, and maternal and foetal/neonatal condition should be stable.
General Advice for Obstetric/Emergency Gynecology Theatre

- Elective obstetric procedures (e.g. cervical cerclage or caesarean) should be scheduled at the end of the operating list.
- Non-elective procedures should be carried out in a second obstetric theatre, where available, allowing time for a full post-operative theatre clean-up as per national health protection guidance.
- The number of staff in the operating theatre should be kept to a minimum, and all must wear appropriate PPE.

Hand Hygiene

- Hand hygiene includes the use of alcohol-based hand sanitizer that contains 60% to 95% alcohol before and after all patient contact, contact with potentially infectious material, and before putting on and upon removal of PPE, including gloves.
- It can also be performed by washing with soap and water for at least 20 seconds.
- If hands are visibly soiled, use soap and water before returning to alcohol-based hand sanitizer.
TREATMENT PROTOCOLS FOR MANAGEMENT OF SURGICAL PATIENTS
ANESTHESIA MANAGEMENT IN EMERGENCY SURGERIES

Dr Krishna H M, Professor, Dept. of Anaesthesiology

Dr Manjunath Prabhu, Professor and Head, Department of Anaesthesiology

Education

Educational materials related to the disease and its anesthetic implications are continually shared among the faculty members and the residents of the department through social media group. One set of relevant PPE is provided in the department to practice donning and doffing. This set is used only for practice purpose and is cleaned with sanitizer after use. This is reused till wear and tear preclude the use. Soft copy and hard copy of a file with relevant documents and protocols are made readily available in the department.

Operation of the surgical theatres

The department works in liaison with the hospital administration to decide when to stop or restart the elective surgical cases. All essential and emergency surgeries and procedures will be provided with anesthesia services. All decisions with respect to administrative and medical management of the patient are taken by the consultant anesthesiologist.

Pre-anesthetic evaluation

Ward visit to evaluate the patient is generally avoided to minimize the risk of exposure. Preliminary collection of relevant data will be done telephonically, and necessary investigations and preoperative/pre-procedural instructions will be provided telephonically. The patient will be evaluated in-person only just before the emergency surgery/procedure. The instructions given over phone will then be validated on the document. The screening checklist used is given in section 3.1.
COVID 19 screening checklist

Section 1 - Patient details

a. Name
b. Age
c. Residential Address*
d. Proposed Surgical Procedure
e. History of any of the following:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes on Insulin</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Cardiac Disease</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Bronchial Asthma</td>
<td>Yes / No</td>
</tr>
<tr>
<td>COPD</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Renal Disease requiring dialysis</td>
<td>Yes / No</td>
</tr>
<tr>
<td>History of Organ Transplant</td>
<td>Yes / No</td>
</tr>
<tr>
<td>History of Steroid Intake</td>
<td>Yes / No</td>
</tr>
</tbody>
</table>

*Need to ask only the town/city name and not the full address.

Section 2 – Clinical history

In the last 14 days, do you have a history of?

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Sore Throat</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Cough</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Shortness of Breath</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Hospitalization reqring oxygen / ventilator</td>
<td>Yes / No</td>
</tr>
</tbody>
</table>

Section 3 – High-risk Exposure History

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a health care worker (Doctor/Nurse/Technician)</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Have you travelled internationally in the past 14 days</td>
<td>Yes / No</td>
</tr>
<tr>
<td>Have you had contact with confirmed COVID patient</td>
<td>Yes / No</td>
</tr>
</tbody>
</table>
**Section 4 – Probable exposure history**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you had any interstate travel (buses/ railways/aeroplanes) in the last 14 days</td>
<td></td>
</tr>
<tr>
<td>Have you visited a hospital with a confirmed case of COVID-19</td>
<td></td>
</tr>
<tr>
<td>Travel to or from the following places – Bengaluru, Mysuru, Kodagu, Kalaburgi, Chikkaballapur, Dakshina Kannada, any hot spot</td>
<td></td>
</tr>
</tbody>
</table>

If yes to ANY question in section 2 AND 3 – This patient is ‘**high risk**’ for COVID 19

<table>
<thead>
<tr>
<th>Requirement/Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for ICU Bed? If no bed available stop</td>
</tr>
<tr>
<td>Personnel- Anesthesia, Nursing, Surgical, additional</td>
</tr>
<tr>
<td>Confirm roles</td>
</tr>
<tr>
<td>Master coordinator</td>
</tr>
<tr>
<td>Runner</td>
</tr>
<tr>
<td>Estimated Case duration</td>
</tr>
<tr>
<td>PPE status of the team</td>
</tr>
<tr>
<td>If you are not trained you are not part of the team</td>
</tr>
<tr>
<td>Individual PPE plan- Aerosol or droplets</td>
</tr>
<tr>
<td>Airway plan</td>
</tr>
<tr>
<td>Drugs/ anesthetic equipment? Antibiotics</td>
</tr>
<tr>
<td>Surgical: site&amp; side, position, surgical plan</td>
</tr>
<tr>
<td>Side marked</td>
</tr>
<tr>
<td>Surgical equipment</td>
</tr>
<tr>
<td>Bed to bed transfer plan</td>
</tr>
<tr>
<td>Radiology</td>
</tr>
<tr>
<td>Risks/concerns</td>
</tr>
<tr>
<td>Extubation plan/disposition</td>
</tr>
<tr>
<td>Route of travel from ward</td>
</tr>
<tr>
<td>Suitable binsX3, laundry</td>
</tr>
<tr>
<td>Cleaning plan</td>
</tr>
<tr>
<td>Call for COVID19 porter</td>
</tr>
<tr>
<td>Nature Break</td>
</tr>
</tbody>
</table>
Alert higher-ups and the patient needs to be tested. IF emergency – assume to be positive patient and follow protocol.

- If yes to ANY question in section 2 AND 4 – This patient is ‘at risk’ for COVID 1

INFORM higher ups. Cancel any non-emergent surgery for 14 days and monitor for signs of severe acute respiratory illness. Emergency cases can be taken up after discussion with infectious diseases.

- If the patient is aged >65 or has Comorbidities listed in Section 1 Question E These patients are at risk of severe illness if contracted with COVID 19. Plan with surgeons and discuss all possible steps to limit in-hospital stay of patient.

**Patient Transfer**

Before commencing transfer of the patient from ward to theatre, please ensure all steps are complete

<table>
<thead>
<tr>
<th><strong>Equipment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove dirty sheets Blanquette from over patient (in room), and place clean sheet/Blanquette on bed immediate prior to transfer out of room</td>
</tr>
<tr>
<td>Ensure adequate oxygen supply</td>
</tr>
<tr>
<td>Ensure appropriate patient monitoring as guided by patients clinical severity</td>
</tr>
<tr>
<td>Patient file and appropriate paper work all present and not contact with patient</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Personal</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaesthetist present in full PPE (N95, Eye protection, hood gown and 2X gloves)</td>
</tr>
<tr>
<td>Theatre nurse present and in clean PPE (Level-2 mask, Eye protection, gown and gloves)</td>
</tr>
<tr>
<td>Porter present and in PPE (Level-2 same as theatre nurse)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Patient</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Have 2 identity bands (on non-operative limb) been checked</td>
</tr>
<tr>
<td>Is patient wearing surgical mask over nasal prongs or wearing a Hudson mask?</td>
</tr>
<tr>
<td>Is the patient posted for surgery?</td>
</tr>
<tr>
<td>Is the surgical sight marked?</td>
</tr>
<tr>
<td>Has anesthetic consent been completed? (verbal consent signed by anesthetist)</td>
</tr>
</tbody>
</table>
Route conformation

| Confirm with ward coordinator that no other patient is being transferred to ward on same route/elevator |
| Phone call to master coordinator to confirm departure from ward |
| Ensure porter and anesthetist remain with patient and do NOT make contact with hospital structures (including walls doors, handles, elevator buttons etc.) |

Anesthetic management – Precautions

The following Dos and Don’ts check list will be used to ensure adequate precautionary measures are taken

Do’s and Don’ts for COVID-19 patients (modified based on ASA and BJA guidelines)

Do’s for caring for COVID-19 patients

- Discuss during anesthesia timeout and also main time out
- Place the patient in airborne isolation room when possible
- Make sure a non-intubated patient wears face mask - e.g. MAC cases
- Follow airborne and contact precautions, including eye protection (See 5-9 below) N95 3G’s
- Wear PPE - fit-tested N95 mask
- Wear a face shield or goggles
- Wear a gown
- Wear gloves
- Hand hygiene before and after caring (See 5-9 above) --use alcohol hand rub or soap, hand wash for at least 20 sec
- Use extreme caution before removing and disposing worn PPE’s
- Plan ahead for respiratory support if possible
- Use intubation not CPAP and BIPAP (CPAP BIPAP increases spread)
- When possible perform procedures in airborne isolation room (negative pressure room)
- Use minimum number of healthcare workers to do a procedure on suspected COVID-19 patient
- Do the procedures at bedside if possible - limit transport and spread
- Post signs outside the OR for isolation
- For GA - use HEPA filter between Y piece and patient mask, ETT or LMA
- Favor intubation over LMA use
- In Pediatric cases – use HEPA at the expiratory limb before the expired gas enters the machine
- Gas sampling tube also protected with HEPA filter
- Call for help or call the Infectious disease expert locally if in doubt
- Keep as much time as possible between cases for decontamination
Do’s during Transporting COVID-19 patients: Only transport for essential procedures

- Consult local infection control expert prior to transport
- Use HEPA filter between the bag valve and mask breathing device
- Don’t wear gloves and gowns during transport unless direct contact with the patient or contaminated equipment is anticipated during transport
- Wear appropriate PPE during transport

During laryngoscopy:

- Use double gloves
- Use most experienced anesthesia personnel available for intubation
- Avoid awake FOB if possible
- Consider RSI
- Avoid touching face and hair after intubation
- Use a closed suction system if possible - available in ICU’s
- Use disposable covers for USG and other equipment
- After extubation - transfer to an airborne isolation room

Don’t’s:

- Do non-urgent surgical procedures
- Bring patients to holding or PACU

Airway management modifications

1.1 Equipment, intubation

- 2-handed vice-grip, with an assistant to squeeze the bag
- Minimize ventilation pressure by ramping patient and use of OPA and low tidal volumes
- Use collapsible bag and ETCO2 trace to rapidly identify leaks
- Do not ventilate prior to laryngoscopy unless for rescue oxygenation
- Use video-laryngoscope to maximize first intubation success
- Use video screen (indirect view) to view larynx to maximize the distance between operator and patient's airway
- Place in the sealed bag immediately after intubation for sterilization
- Inflate cuff prior to ventilation
- Use cuff manometer to minimize leak
- Vigilance to ensure the correct depth of ETT on the first pass to avoid manipulations
- Full PPE when manipulating ETT depth
- Do not use for pre-oxygenation or apneic oxygenation
- In CICO rescue, use scalpel-bougie to minimize aerosolization
- Airway topicalization is a high-risk procedure for aerosol transmission
- Once ETT in situ, all suction should be using an in-line apparatus
- Suctioning prior to extubation should be done in full PPE with the ETT cuff up.
1.2 Extubation

- Two staff members
- Full PPE
- Other personnel out
- Use additional measures to reduce coughing
- Optimize airway and oxygenation, through positioning and recruitment manoeuvres
- Suction with care not to contaminate oneself or others
- Be confident patient can be safely extubated onto a Hudson mask
- NIV and High Flow Nasal Oxygen, risk aerosol transmission and should avoided
- Remove ETT. Immediately replace with face mask and circle circuit
- Use 2-handed grip. Confirm airway patent
- Place the surgical mask on the patient + Hudson mask over the top
- Extreme care with all contaminated items for appropriate disposal
- OT quarantined for 30 min after application of Hudson mask with strict aerosol precaution. Cleaning to occur AFTER this time. Doff PPE as per protocol
- Always disconnect the circuit on the ventilator side of the viral filter.

(ADAPTED FROM SAFE AIRWAY SOCIETY GUIDELINES)

Protocol for anesthesia for known COVID patient scheduled for surgery

1. OR Preparation
   a. EQUIPMENT CHECK
      a. Machine check: Cover with plastic the machine table surface, ventilator screen, Monitor screen
      b. Airway equipment to be readied in a two-level trolley: Top to be used for fresh airway equipment, bottom to be used for used equipment
         Keep two sizes ETT ready, one open and checked, laryngoscope (regular Macintosh/McCoy), Stylet, Cuff syringe (Standby equipment: To be placed far away: Bougie, videolaryngoscope)
      c. Breathing system: HME at the patient end and machine end, face mask attached to HME
         The face mask must be covered with a plastic sheet with a hole in its centre to accommodate the connection for the breathing system.
      d. Suction: Yankauer suction ready (Keep closed suction system available at a distance in the reserve airway trolley if endotracheal suction is required)
      e. Monitors: NIBP, SpO₂, ECG (Arterial line transducer to be available as reserve)
      f. Defibrillator to be placed outside the OT, charged and in working condition – Check
   b. DRUG TRAY:
a. **Anesthetic drugs**: Induction agent – Propofol, Ketamine; Midazolam, fentanyl; Succinyl choline / Rocuronium

b. **Emergency / Vasoactive drugs**: Atropine (0.1 mg/cc), glycopyrrolate (0.2 mg), adrenaline (100 µg/cc), mephentermine (3 mg/cc), phenylephrine (100 µg/cc), preservative free lignocaine (5 ml of 2% loaded), esmolol (to be available).

2. **Pre-anesthetic Check**

**Do as much as possible over the phone**

**SAMPLE (Mnemonic):** S – Signs and symptoms, A – Allergies, M – Medications, P – Past medical history, E – Events and Evaluation of present condition (oxygenation, airway, any distress, hemodynamics, ventilator and cardiovascular supports, neurological condition, renal and any other relevant information)

**WHO CHECKLIST:** Blood requirement and availability, surgical plan (site, side, procedure)

**ANESTHETIC PLAN:** MAC / Regional / GA with endotracheal intubation?

Consider procedure bed-side, if possible.

3. **Personal Protection Equipment (Ppe)**

*Remember with COVID-19; there is never an emergency. Your protection is vital and NO MATTER WHAT HAPPENS, approach a COVID positive patient only after donning PPE.*

**DONNING:**

Sequence: Feet and leg covers, Hand hygiene, Inner glove, Gown, Mask, Visor/Goggles (whatever eye protection is provided), Outer glove. *(This PPE is for your personal protection, and need not be sterile before you handle the patient).*

4. **When Patient Arrives**

- An unintubated patient must wear at least a surgical mask and cover with hood or plastic throughout the transfer.
- If intubated, must be shifted **sedated** and with an HME connected to the endotracheal tube and then a Water’s circuit with oxygen flow.

**General Anesthesia:**

This is always with endotracheal intubation. No supra-glottic airway.

If not intubated, shift to OR.

Pre-oxygenate with < 5 L/min oxygen flow, with an anatomical facemask (previously prepared)
Rapid sequence induction

Induction: Propofol / Ketamine / Midazolam / Fentanyl; Do not check ventilation.

Paralysis: Succinyl choline / Rocuronium; Do not ventilate. Intubate after 60 s. Inflate cuff. Then only ventilate to check. Ensure no cuff leak with adequate cuff inflation.

Extubation: Plan to extubate (Be judicious with muscle relaxant – Use opioids to provide analgesia and facilitate extubation with less cough but be judicious with them - May not have a ventilator for postop ventilation).

Reverse neuromuscular blockade. Suction before extubation. Can give some lignocaine to reduce coughing.

Extubate when fully awake under cover of plastic sheet. Do not give positive pressure. Immediately, cover the patient’s face with a face mask and attach the HME immediately.

Cover with face mask, oxygen mask with a plastic cover to ward directly.

DOFFING: Remove PPE in the following order: Between every steps, use hand sanitizer.

Outer glove → Gown → Visor/Goggles → Mask → Inner glove → Hand hygiene with soap and water
The 2019 novel coronavirus disease (COVID-19) pandemic started in December 2019 and the infected are still increasing globally. India contributes to a significant global burden of the disease and the multiple lockdowns, may have only achieved a window period for sufficient preparation. We should be prepared for the long haul with the peak / spike in patients with COVID-19 not yet reached. Kasturba Hospital, Manipal is a tertiary care referral hospital providing medical, surgical and cancer care for adults, children and newborns of several adjoining districts, and neighboring states too. The affiliated Dr.TMA Pai Hospital in Udupi is one of the COVID-19 designated hospitals for Udupi District. All COVID-19 proven patients will be transferred from Kasturba Hospital to Dr.TMA Pai Hospital in Udupi for continued medical and surgical care.

The COVID-19 period has resulted in significant change in the health care environment. Surgical practice has also changed dramatically. The conventional unit based practice of medicine and surgery has been modified to a team based approach. Each department has been permitted to design the best model of operability within their field of service. Larger departments have opted to keep about 30 % of their faculty and PGs as reserve. The active teams rotate through OPD, IP, OT and Emergency services every few days to a maximum of 14 days rota. The team composition may change based on the availability of skill sets amongst the team members and as required for optimal delivery of services.

As health care personnel have a higher than population risk for contracting the disease and surgeons, anaesthetists, intensivists and EMD doctors in particular have the potential for a more severe form of the disease due to exposure to a high viral load, it is imperative that precautions and preventing measures should be proactively and aggressively pursued.

This document is an initiative from all the surgical disciplines of Kasturba Hospital to put forth a common minimum policy approach to a surgical patient during the COVID-19 pandemic and to a patient diagnosed to have COVID-19 and requiring a surgical procedure.

1. OPD services

1.1. All patients visiting the hospital will be pre-screened at the dedicated fever and COVID–19 counters established outside the OPD building. History of respiratory symptoms/ contact with COVID patients / travel / place of stay will be specifically obtained. If determined to have any of the above, these patients will be referred to the Infectious Disease Department (if COVID suspect) or to the Physician (if otherwise). The patient will be referred to the Surgery Departments only after such due process

1.2. Social distancing measures to be ensured at all patient (and accompanying relative) areas
1.3. Patients are requested not to be accompanied by children, pregnant women and elderly family members.

1.4. Specific to PDS OPD, there will be 2-3 attenders with one patient. It is expected that there will be difficulty to maintain the social distancing in the OPD by a single nurse. This can be mitigated if a security guard can be shared between PDS and Cardiology OPD, on OPD days.

1.5. An additional PRE can receive new patients, create files and issue token and see everybody is seated and called accordingly.

1.6. The nurse could handle the patients after the doctor’s consultation - advising on admissions, giving directions etc. She can also handle patients coming back after investigations and also attend procedures, supervise sanitation etc.

1.7. All patients and staff should wear standard triple layer surgical mask and hand hygiene should be strictly enforced.

1.8. N 95 masks will be provided to health care workers in the Surgery OPD and may be reused as prescribed in the HIC manual. Care should be taken that the masks are not interchanged between doctors by labelling them appropriately.

1.9. Surgical gloves are to be worn by the doctor during examination.

1.10. More frequent cleaning of high touch areas (Eg : door handles and seating arrangements) and common use items (Eg : computers and phones) should be implemented.

1.11. Hand rub should be available at convenient points, to facilitate optimal usage.

1.12. Use of DMRD and E-prescription should be the norm. Specific requests should be made by the PRE if physical files are to be sent to the OPD.

1.13. Patients with medical documents of prior treatment in another hospital may be asked to show the documents and turn the pages themselves if required rather than you touching the records. When copies are required to be filed, ensure WHO hand disinfection policy after handling the medical documents.

1.14. Doctors may avoid bringing jewelry, watches, bags and other non-essential items which will act as fomites. Wearing short sleeve dresses is encouraged to permit adequate hand hygiene usage. Hospital issue scrubs will be provided on request.

1.15. Ball point pens used in file documentation should be sanitized and may be retained in the OPD. Do not take them home. Do not share pens (not even for consent). Remove the gloves used during examination before handling any other device.

1.16. Unnecessary use of mobile phones by team members is discouraged during and between patient examinations. Phones may be kept safely tucked away in cupboards or pockets. If the mobile phone is to be used, clean it frequently before, during, and after patient care activities. Mobile phones may be kept in a Ziploc bag during work activities. The phone can be used while in the bag.

1.17. Precautions regarding touching the mask once donned and proper doffing of face shield / goggles should be followed as depicted in the HIC manual.

1.18. Only the patient (and only 1 per consultant) will be allowed into the OPD rooms at a particular time. No bystanders of patients will be allowed inside the outpatient department room (they will be seated in the adjacent waiting area) unless the patient is a minor or on trolley.
1.19. The receptionist will announce the name of the patient over the microphone to streamline the presence of only one/two patients inside the outpatient department room at any particular time. The receptionist will also ensure there is no unauthorized entry into the outpatient department rooms.

1.20. One examination cubicle will be used for a patient followed by appropriate cleaning and then another patient will be subsequently accommodated into the cubicle.

1.21. Sufficient number of cubicles depending on the type of patient (discharging wound / suture removal / trolley patient) may be opened as decided by the Team Lead / Unit Head.

1.22. When required, the relative will be called in to the OPD room for conveying the management plan.

1.23. The waiting area outside the OPD will also have social distancing norms enforced. This area requires more frequent cleaning practices as applicable to high touch areas.

1.24. Request for thoroughfare passes to district administration for these visits are issued.

1.25. Telemedicine services to be extended for all patients and implemented to reduce the number of hospital visits where feasible (Eg: titrating dose of insulin).

1.26. A floor plan suitable for each department’s functioning should be prepared. It should be shared with the KH operations team and any modification to the existing structure should be taken up on priority basis. An example of the floor plan is attached.

---

**Fig : General Surgery OPD Floor Plan for COVID-19 period**
(prepared by Dr. Kalyan Reddy)
2. **Inpatient services**

2.1 As much as is feasible, pre-surgical workup is to be completed as outpatient

2.2 Unnecessary admissions to be avoided

2.3 Security guards should ensure that there is no relaxation regarding allowing only one relative with one patient to OPD / ward / OT. Multiple relatives entering the premises in turns using the same pass should be curtailed. Restrictions such as a single day time / night time pass should be considered, particularly in General Wards

2.4 In the general and other shared bed categories (semi private and semi special wards) the gap between the beds needs to increase for social distancing. Alternate bed occupancy is the preferred method as it will avoid someone moving beds closer. Common use facilities like washbasins, bath rooms and toilets need more frequent cleansing as applicable to high touch areas

2.5 The duration of ward rounds may be reduced by utilizing a separate briefing room to review all laboratory data (LIS), imaging (PACS) and previous day’s doctors orders and prescription (Eg : Mayo Hall)

2.6 Ward rounds should include only those faculty and PGs who are directly involved in the care and review of the patient. One should desist from conducting rounds with large number of doctors and long duration teaching by the bedside

2.7 All patients should be asked to put on their mask (and ensure that it covers the mouth and nose even while they speak) during their stay as inpatient

2.8 All patient’s relatives should be asked to remain outside the ward when rounds are going on in the ward

2.9 Physical examination should be done by only one doctor and only with gloves on hand. Patient environs should not be touched. Physical handling of files should also be confined to a single individual. All patient files are to be placed in a separate trolley and should not be placed on the patient bed

2.10 Counseling of relatives of the patient should be done outside the ward, after completing the rounds

2.11 Inter-department consultations to be written more specifically with a brief summary of treatment undergone so far, preferably with a consultant to consultant telephonic briefing

2.12 At-risk ward procedure like RT insertion, nebulization, steam inhalation require Standard Recommended Precautions

2.13 Simple procedures in Pediatric Surgery like dressing, I and D, cannulation, central line insertion requires specific precautions as children seldom use mask and are hard to hold down during the procedure. Nursing staff and residents should be provided face shield/goggles in the ward if RT insertion is being done. Adequate number and trained nurses in pediatric cannulation will be required

2.14 Nebulization should probably be stopped or the box will have to sanitized/sterilized for reuse. Same goes with the pot for steam inhalation. Either separate pots or sterilized pots should be made available or stop altogether

2.15 The COVID virus is predominantly transmitted by droplets (5-10 microns); however, it can become aerosolized during Aerosol Generating Procedures (AGP)
2.16 AGPs such as microlaryngoscopy, bronchoscopy, upper GI endoscopy, colonoscopy, trans oesophageal Echo, tracheostomy, intercostal chest tube insertion, intubation/extubation will be carried out with Standard Recommended Precautions

2.17 Sputum induction, chest compressions, chest physiotherapy nebulization, high flow oxygen including nasal cannula at > 15 L, Venturi mask with cool aerosol humidification, non-invasive positive pressure ventilation (e.g. CPAP, BIPAP), oscillatory ventilation, manual ventilation (e.g. manual bag-mask ventilation, before intubation), ventilator circuit manipulation, disconnecting patient from ventilator, open suctioning of tracheostomy and tracheostomy change are all AGPs and requires Standard Recommended Precautions

2.18 A dedicated area should be made available for performing AGPs. This should not be the dressing room of the ward

2.19 Segregation of patients with respiratory symptoms should be enforced. Medical patients should not be admitted into surgical wards and surgical ICUs

2.20 It is the responsibility of the designated medical/surgical team lead to ensure that all patients are evaluated daily for symptoms suggestive of potential COVID-19 infection

3. **Anesthesia services**

3.1 The anesthesiologist will ensure adequate care during perioperative (pre, intra and post-operative) period. All invasive and AGPs (Intubation, extubation, transesophageal Echo) will be done with standard recommended precautions

3.2 OTs ideally need to have a negative pressure ventilation system with air being suctioned away. As this may not be available, the present flow system may be utilized for surgical procedures during the COVID-19 pandemic

3.3 The centralized multi OT complexes should ensure
   a) Air Changes Per Hour > 20
   b) Air Velocity of 25 - 35 feet per minute
   c) Positive Pressure of 2.5 Pascal (0.01 inches of water)
   d) The AHU (air handling unit) should use HEPA Filters
   e) Temperature & Humidity should be 21°C ± 3°C & 20 to 60% respectively

3.4 A dedicated OT (currently the septic OT and old trauma OT) is to be used for patients who are COVID suspect

3.5 Surgery should be started after 15 minutes wait time after the intubation is completed

3.6 All personnel should evacuate from the OT before extubation commences. Shifting of the patient out of the OT should commence only 15 minutes after extubation is completed

3.7 Minimum 1-hour time gap to be given between two procedures / surgeries

3.8 After the surgery is over the OT should be cleaned with PerOxyacetic acid / 0.5- 1% Sodium Hypochlorite / Glutaraldehyde / Benzalkonium chloride etc
4. Surgical services

4.1 In case you need to operate a COVID-19 positive patient in a designated centre, a multidisciplinary discussion to re-evaluate surgical indication, appropriate treatment and ICU availability is desirable.

4.2 Availability of adequate blood products should be confirmed prior to major surgeries. Shortage of blood and blood products is anticipated as camps cannot be conducted.

4.3 Plan for ICU bed and post-operative ventilation should be discussed and a bed booked for the purpose before the planned surgery commences. If the ICU bed is not available, the surgery should be deferred.

4.4 Use of pediatric pre-surgical COVID-19 like Adult pre-surgical COVID-19 questionnaire checklist (refer to HIC manual) for all elective and emergency cases would help to systematically categorize in to COVID and COVID suspect.

4.5 All surgeries may be classified into Emergency (perform surgery at the earliest), Emergent (perform surgery at the next available normal operating schedule), Elective Essential (deferring surgery for more than 3 weeks will result in adverse outcomes) and Elective Discretionary (surgery can be deferred for more than 3 months with no significant adverse outcomes) to prioritize surgical lists.

4.6 No elective surgery will be performed on a COVID positive patient.

4.7 Routine RT-PCR testing cannot be currently implemented for all surgical patients. IFD will be consulted if there is a COVID-19 suspect patient. Testing will be based on the recommendation of IFD. If testing guidelines are revised by Kasturba Hospital / national guidelines, the same will be adopted. RT-PCR has a sensitivity of 71% if done within 72 hours and the test will be negative during incubation period but the patient can still be infective. In addition, there is a reported 10% negativity due to procedural errors.

4.8 The routine use of CECT of the Chest also cannot be currently implemented as a screening for COVID-19, however, the treating consultant may use his / her discretion to use this in select patients based on risk categorization.

4.9 In COVID suspect patients, surgery may be deferred till the RT-PCR report is made available. This is applicable if there is no imminent threat to limb, organ or life by deferring surgery.

4.10 Emergency surgery may be performed on COVID suspect patients with Standard Recommended Precautions.

4.11 When surgery is being performed on a COVID positive patient, a HICC nurse / consultant may be designated as coordinator, who will be responsible to oversee the compliance in the ward, OT, ICU and back to the ward. An administrator (MoD) is also to be designated to ensure compliance to protocols.

4.12 Only those considered essential staff should be participating in the surgical case and unless there is an emergency, there should be no exchange of room staff. Blood and other surgical instruments should be supplied to the OT by runners who do not physically enter the OT. The floor nurse should not exit the OT.

4.13 All staff (surgeon, anesthetist, nurse, technician - surgical, technician - anesthetist, cleaners) must be specifically trained to don, doff, and dispose of personal protection equipment (PPE) including masks, eye protection, double non-sterile gloves, gowns,
suites, caps, and socks. Donning and Doffing of PPE to be performed as per HIC Manual.

4.14 Donning and Doffing of PPE should be in different areas / rooms. A place to perform hand hygiene should be available at both the areas / rooms.

Fig: OT Floor Plan for donning and doffing
(prepared by Dr. Badareesh L)
4.15 Full Universal protection with PPEs, including Face shields/ Goggles and N95 Masks should be available within the OT itself. As there are several providers / vendors of PPE, the priority indicated by the surgical consultant and anesthesia consultant should be procured. If their preferred kit goes out of stock there should be prior intimation sent to the team

4.16 Donning and doffing of PPE should be demonstrated to all staff, and should always be monitored by an observer

4.17 The removed PPE/Masks should be carefully discarded. The staff should be encouraged to take a body wash after doing positive/suspected case, before changing to their dress

4.18 Only once the surgical, anesthetist and nursing teams confirm the OT readiness, will the transfer team be informed to mobilize the patient from SARI-ICU/ward /trauma triage

4.19 The hospital security team should be informed about the transfer to and from the OT and the pathway should be cordoned off from the general public and other hospital staff. The lifts should not be used during the transfer

4.20 The patient should be wearing a triple layer mask and an appropriate disposable gown to reduce any surface contamination

4.21 In-transit surgical patients should proceed directly to the COVID-dedicated operating room, without being held for evaluation / verification at any room / space. This requires coordination between shifting staff, surgeons and anesthetist

4.22 A hand over lobby / buffer zone should be designated to ensure the ward staff / equipment / bed do not contaminate the OT staff / equipment / bed
4.23 Minimize duration of surgery

4.23.1 No surgical or nursing training during this period

4.23.2 Avoid multiple and complex procedures

4.24 Electrosurgery units should be set to the lowest possible settings for the desired effect. Use of monopolar electrosurgery, ultrasonic disectors, and advanced bipolar devices should be minimized, as these can lead to particle aerosolization. Surgical cautery plume should be minimized and suctioned off from the source

4.25 Other forms of AGPs like Gigli’s saw, drill, laser and microdebriders usage must be minimized. All airway surgeries (e.g., ENT, thoracic, trans sphenoidal surgeries) have the potential for aerosol generation and Standard Recommended Precautions should be taken.

4.26 Suction machine also generates aerosol in open procedure and modifications like sump suction may be required

4.27 Surgical equipment used during procedures with COVID-19 positive or COVID suspect patients should be cleaned separately from other surgical equipment

4.28 It is preferable to use absorbable skin sutures / sub cuticular techniques to prevent post-operative procedure contact with the patient
4.29 Video transmission may be utilized to obtain a second opinion and for teaching students.

4.30 The same surgical team will coordinate the transfer of the patient from the OT to the concerned ward/SARI-ICU. Another member of the surgical team (PG) may be ready to assist shifting the patient from the OT and be appropriately donned. If a ward boy is required for assisting in shifting, the surgical team lead will inform the surgical nursing team lead well in advance. The nursing team lead will communicate the need and arrange a person in consultation with KH operations.

4.31 Elective surgeries can be commenced in the hospitals once the curve of active cases shows continuous decline for 15 days.

4.32 Use of PPE during surgery, AGPs and ICU care will escalate cost and will depend on number of personnel required for the procedure and duration of hospital stay. Patients and their relatives need to be made aware about the increased cost.

4.33 Even after the RT-PCR swab turns negative, the potential for the patient to remain infective from other body fluids during the hospital stay exists.

4.34 The use of Hydroxychloroquine (HCQ) as chemoprophylaxis is currently recommended (MOHFW dated 22 May 2020) for all asymptomatic healthcare workers involved in containment and treatment of COVID-19 and asymptomatic healthcare workers working in non-COVID hospitals / non-COVID areas of COVID hospitals / blocks. Provision has been made for them to obtain them free from the hospital pharmacy against a prescription from designated consultants.

4.35 If in case the patient operated turns out to be COVID-19 serology positive at a later date, ensure that the appropriate authority is informed, self-isolate the personnel who were involved in the care of the patient for a period of time, as indicated in the HIC manual / in consultation with IFD. These actions should be reviewed only after a thorough assessment of all circumstances has been completed by the IFD team and all appropriate actions have been completed.
5. Laparoscopic procedures

5.1 Minimally invasive surgery provides superior patient outcomes and more rapid patient healing, however there seems to be increased risks to all personnel in the operating room.

5.2 When emergent surgery is required for untested or COVID-19 positive patients, laparotomy is indicated to minimize the risks to operating room personnel.

5.3 Technical aspects during Laparoscopy:

5.3.1 Incisions for ports should be as small as possible to allow for the passage of ports but not allow for leakage around ports.

5.3.2 Close the taps of ports before inserting them to avoid escape of gas during insertion.

5.3.3 Minimize leakage of CO$_2$ from trocars (check seals in reusable trocars or use disposable trocars).

5.3.4 Removal of caps on endoscopes could release fluid and/or air and should be avoided.

5.3.5 Minimise introduction and removal of instruments through the ports as much as possible.

5.3.6 For specimen retrieval such as in ectopic pregnancy, deflate the abdomen with a suction device before removing the specimen bag from the abdomen. Re-insert the port before turning CO$_2$ on again. Only once the abdomen is flat should the specimen bag be removed.

5.3.7 As the specimen is extracted, the surgeon should ask everyone to either be looking straight at the trocar or have back to field. The weakest part of protection from splatter is the side of shields, eyewear and masks; so either be looking straight on or completely away. The trocar is reinserted, and the abdomen can be re-inflated.
5.3.8 At the end of the procedure turn CO2 off, deflate the abdomen with a suction device and via the port with CO2 filter, before removal of the ports

5.4 During laparoscopic procedure CO2 insufflation pressure should be kept to a minimum and an ultra-filtration (smoke evacuation system or filtration) should be used.

5.5 If movement of the insufflating port is required, the port should be closed prior to disconnecting the tubing and the new port should be closed until the insufflator tubing is connected. The insufflator should be “on” before the new port valve is opened to prevent gas from back-flowing into the insufflator.

5.6 Special precautions like controlled release of air insufflation for reducing the aerosol generation should be adopted:

5.6.1 During desufflation, all escaping CO2 gas and smoke should be captured with an ultra-filtration system and desufflation mode should be used on the insufflator if available.

5.6.2 If the insufflator being used does not have a desufflation feature, be sure to close the valve on the working port that is being used for insufflation before the flow of CO2 on the insufflator is turned off. Without taking this precaution contaminated intra-abdominal CO2 can be pushed into the insufflator when the intra-abdominal pressure is higher than the pressure within the insufflator.

5.6.2.1 The patient should be flat and the least dependent port should be utilized for desufflation.

5.6.2.2 Specimens should be removed once all the CO2 gas and smoke is evacuated.

5.6.2.3 Surgical drains should be utilized only if absolutely necessary.

5.6.2.4 Suture closure devices that allow for leakage of insufflation should be avoided. The fascia should be closed after desufflation.

5.6.2.5 Hand-assisted surgery should be avoided as it can lead to significant leakage.

5.6.2.6 Wound protection devices used for specimen retrieval should only be placed after desufflation.

5.6.3 It is best to evacuate insufflated air with suction before removing the ports. Removal of port before desufflation will definitely release aerosol under pressure. A Smoke Evacuation System may be procured.

5.5.4 Procure and use a desufflation machine. The desufflation machine should have a filter, either HEPA or ULPA filter, in line to filter out the viruses. The filter will have to be changed with each patient.

5.5.5 If a desufflation machine is not possible, then evacuation of pneumoperitoneum should be through a tube connected to the side valve of the most dependent port. The evacuated air may then directed into a container of 4% Sodium Hypochlorite solution.
1.5.6 Spirit or savlon wet mop cover over the port before releasing may be of help if the above are not available

5.7 Once COVID density increases in our patient drainage areas, surgeons and anaesthetists should wear goggles or face shield for all surgeries +/- N95 mask

6. Surgery at the designated COVID hospital

6.1 Patients who are confirmed COVID positive will only be admitted and undergo surgical procedures at the Dr. TMA Pai Hospital at Udupi, the designated COVID hospital

6.2 The surgical team members may enter the Dr. TMA Pai Hospital premises through the dedicated entrance on the Ground Floor on the right side. Inform your arrival to the designated COVID nodal officer
6.3 Proceed to the first floor using the stairs. The team members are to collect hospital scrubs from Room 119. Room 104 to 108 are the designated male duty doctor rooms and Room 113 to 116 the designated female duty doctor rooms.

6.4 After changing to the hospital scrubs, you may proceed to the 6th floor using the Yellow lift.

6.5 Change your footwear at the entrance of the operation theatre complex. Proceed to don the PPE kit, as detailed in the HIC manual. PPE kits are made available in the male and female surgeons changing room.
6.6 Ensure that all required protective gear is appropriately donned before crossing over from the yellow zone to the buffer zone and then onto the red zone.

6.7 Of the 4 Operation Rooms available, Room 1 and 4 on the left side of the corridor have been designated as ICUs. Enter through Operation Room 3 on the right side and proceed to the surgical scrub area. After the surgical scrub process, don the sterile disposable gown and double gloves. Proceed to Operation Room 2 where the patient would have already been received through the red lift at the separate patient entry area.
6.8 After the operative procedure is completed, the inner sterile gown and outer sterile gloves are to be disposed off in the surgical scrub area in appropriate bins.

6.9 The patient is shifted out of the Operating Room to the post operative ICU in the red zone.
6.9 The surgical team members then proceed to the doffing area to dispose the PPE in appropriate bins.

6.10 After doffing, proceed to exit the operation theatre complex. Change to your personal clothes after a full body bath. Hand over report should be made to the designated surgical resident, nursing staff and the designated nodal officer.

6. Emergency and trauma services
The surgery department and allied specialties will work under the leadership of the EMD team. All protocols, as laid out by EMD for the COVID-19 period will be complied with by all the surgical disciplines. If there be any conflict with the earlier notified trauma protocol, the current EMD protocol will prevail.

8. Surgery for cancer afflicted
Cancer, as such, is a progressive disease and patients cannot wait for months for surgery. Hence these patients will have to be prioritized for surgery.

  8.1 Investigation appointments should be bundled to reduce hospital visits and waiting time.
  8.2 Team leads / Unit Chiefs should brief about the management plans so that they can plan hospital visits suitably and unnecessary visits are avoided.
  8.3 Tumor board presentations should be done virtually and decisions conveyed to the patient telephonically regarding the date for admission and commencing treatment.
  8.4 Any deviations from the Standard of Care management due to COVID-19 policies should be documented.

All statements indicated as “Standard Recommended Precautions” are in the domain of the department performing the procedure and departmental protocol, should be followed.

All changes in decisions will be notified with a version number and dated. Revisions will be taken up in the best interests of patients, health workers and society; as and when, the need arises. Emphasis will be given to treatment guidelines, institutional, administrative and governmental orders issued from time to time.
MANAGEMENT OF ORTHOPEDIC SURGERY PATIENT

Dr. Anil K. Bhat, Dr. Ashwath Acharya, Dr. Sandeep Vijayan, Dr. Nishanth,
Dr. Sourab Shetty, Dr. Madhava Pai, Dr. Nikhil Hegde, Dept. of Orthopedics

Theatre Practice to be followed in Old trauma OTs during surgery for Covid suspect patients

The following workflow protocol has been designed keeping in mind the theatre layout and infrastructure presently available to the operating team in old trauma OTs. A dry run of the following steps of the protocol has been done with the surgical, nursing, technician and anesthetic teams. The steps mentioned below are designed to protect each and every team from getting contaminated through any source of COVID infection during the entire surgical procedure.

- The HODs of the Department of Orthopedics and Anesthesia will supervise the planning of the case in co-ordination with the operating team. As soon as the orthopedic department/unit plans the posting of a suspected Covid-19 patient for surgical intervention, the HOD informs the concerned Unit Head, orthopedics and anesthesia duty consultants, postgraduates, nursing and other ancillary associated healthcare workers about the date and time of posting the case.
- Case is to be posted in OST-A only.
- The patient is stationed at the concerned ward/ICU with all ward protocols in place till the time the patient is shifted to old trauma OT.
- There will be three teams involved in such a patient care:

<table>
<thead>
<tr>
<th>TEAM 1</th>
<th>TEAM 2</th>
<th>TEAM 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthopedic Post Graduate resident trainee 1 (PGT 1)</td>
<td>Orthopedic staff</td>
<td>Anesthesia staff</td>
</tr>
<tr>
<td>Orthopedic post graduate resident trainee 2 (PGT 2)</td>
<td>Orthopedic staff</td>
<td>Anesthesia staff</td>
</tr>
<tr>
<td>Orthopedic Technician 1 (OTech 1)</td>
<td>Two nursing staff 1 and 2 (NS 1 - scrub nurse and NS 2 - floor nurse)</td>
<td>Anesthesia post graduate resident trainee</td>
</tr>
<tr>
<td>Orthopedic Technician 2 (OTech 2)</td>
<td>Orthopedic Technician</td>
<td>Anesthesia Technician</td>
</tr>
<tr>
<td>Housekeeping staff</td>
<td>Housekeeping staff</td>
<td>Housekeeping staff</td>
</tr>
</tbody>
</table>

This team will transfer the patient from the concerned ward/ICU/ambulance and transfer him/her back to the ward/ICU/ambulance. This team will be the surgical team. This team will be in charge of anesthesia for the patient. Shifting the patient in if patient is on ventilator.
SARI-ICU or wherever necessary after surgery. They will also prepare the patient before surgery in the OT.

Scrub nurse will arrange the sets before patient comes into OST A. Floor nurse will help the scrub nurse in arranging the sets and also help in draping the fluoroscopy machine. OTech 2 will keep the OT table attachments, drill attachments, tourniquet, slab materials ready and also drape the fluoroscopy machine.

Shifting the patient to SARI-ICU or wherever necessary after surgery.

**Requirements for Theatre personnel:**

<table>
<thead>
<tr>
<th>Personal Protection</th>
<th>Patient Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two regular theatre dress for all members</td>
<td>Disposable gowns (sterile), head cap and 3 ply surgical mask</td>
</tr>
<tr>
<td>Lead aprons: 8 (5 for Team-2; 3 for Team-3)</td>
<td></td>
</tr>
<tr>
<td>Head caps, N-95 mask, 3 ply surgical mask, plastic aprons, PPE with glove for all team members</td>
<td></td>
</tr>
<tr>
<td>Adequate surgical gloves (long and regular size)</td>
<td></td>
</tr>
<tr>
<td>3D printed head gear</td>
<td></td>
</tr>
<tr>
<td>Sterile OHP sheets with clips</td>
<td></td>
</tr>
<tr>
<td>Show covers</td>
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</tbody>
</table>

**Theatre layout**
Step 1: (Team 2 and 3 at work)

Team 2 (NS 1 and NS 2, OTech 2 and PGT2) will make preliminary arrangements in OST-A supervised by Ortho Staff in co-ordination with anesthesia technician from Team 3 for theatre set up. They will make the following arrangements before the patient is shifted to the OT.
1. Scrub nurse NS 1 will scrub routinely and come to theatre OST-A, wear sterile gown and gloves. He/She will be assisted by NS 2.

2. Scrub nurse NS 1: Readies the instrument/implant table with sets. Checks for backup sets (assisted by NS 2) including instruments, implants, suture materials, irrigation fluids, drills, sterile dressing materials: A check list must be taken and confirmed from orthopedic staff who will ensure the readiness for surgery.

3. NS 2 will also arrange preparation trolley / catheterization set (if needed) which will be done by PGT 1. One sterile gown and long gloves should be kept for PGT1 for patient preparation.

4. OTech 2 and PGT 2 will arrange for patient positioning (before patient comes into the theatre) - arranging fracture table/ spine table/ hand table/ arthroscopy table/ tourniquet/ table attachments/drill attachments as per the guidance of Orthopedic staff.

5. NS 1 covers the prepared table with sterile sheets and leaves the theatre with orthopedic staff and PGT 2 for scrubbing.

6. NS2 co-ordinates with OTech 2 for draping image intensifier/ arthroscopy set up.

7. OTech 2 will cling wrap all non-disposable multi-touch surfaces. (Monitors, keyboards, door handles etc.)

8. Anesthesia Technician: Checks the monitors, drug tray, emergency crash tray, anesthesia machine/circuit and anesthesia requirements in consultation with the anesthesia staff/PG.
Once the Team 2 and Team 3 confirms the OT readiness, Team 1 will be informed to mobilize the patient from SARI ICU/ ward/trauma triage as the case may be.

9. Team 1: who will be in the old trauma OT Postop area after donning the PPE will move out and transfer the patient from the Ward/ICU/ambulance following the hospital protocol. The same team will transfer the patient back to the concerned SARI- ICU post-op. The trolley used should be preferably from old trauma OT in order to reduce multiple people handling the patient while shifting inside OT.

10. Patient should be wearing a mask and suitable gown to reduce any surface contamination.

11. During the transfer, the hospital security team should be informed about the transfer to and from the OT and the region should be cordoned off for general public and other hospital staff. The same area should be fogged for sterilization after each time of transfer.

12. The anesthesia PG will bring the patient in case the patient is on ventilator from ICU wearing PPE and sterile gown for patient and himself/herself. This will be coordinated with team 1. Transport ventilator/ Mapleson B circuit with oxygen will be used for transfer. Bacterial/viral filter is attached to the ET tube all the time.

13. The anesthesia PG after handing over the airway responsibility of the patient to anesthesia staff will remove the sterile gown in the designated bin placed in the inner corridor. He will then wear a new sterile gown inside OST-A. (He will be in a PPE)
Step 2 (Team 2 at work):
1. Once the preliminary arrangement is being made in OST-A, the orthopedic staff and PGT2 and NS1 of Team 2 will scrub for the case and assemble in OST-B (Before the patient goes into OST-A). They should wear a lead apron and plastic apron over their OT dress before scrubbing.

2. NS 2 will also scrub and assist the Team 2 to don the PPE in OST-B. This will also include wearing the 3D printed visor under the hood and finally the sterile gown.

3. Once theatre and fluoroscopy/arthroscopy machines are kept ready, OTech 2 will sterilize his/her hands with alcohol hand rub and come to OST-B (before patient goes into OST-A).

4. NS 2 and OTech 2 will then help each other in wearing the PPE.

5. Surgeon, PG2, NS 1, NS 2 and OTech 2 will wait in OST-B till they are alerted by team 1 to move into OST-A.

**Requirement to be arranged in OST-B theatre:**

- PPE and Sterile gowns: 5 sets minimum
- 3D printed Visor head band: 5
- Paper clips (ETO autoclaved): 15
- Long gloves: 5 pairs
- Alcohol hand rub solution
- No. 22 Sterile surgical blade
- Shoe cover and lead aprons to be kept ready near scrub area
Step 3: (Team 3 at work)

- **Team 3** will don PPE and prepare for anesthesia: Anesthesia technician will wear PPE and help Anesthesia staff and PG to wear PPE in anesthesia faculty room and readies for anesthesia. Anesthesia staff/PG will scrub first if he/she plans for regional anesthesia.
- All wear PPE after wearing the lead apron as they have to stay in the theatre all the time during the surgery.
- If anesthesia PG was involved in shifting the patient who is already on a ventilator from ICU, he will be in a PPE already. He has to discard the sterile gown in the designated bin after shifting the patient and resume his work for anesthesia management as outlined in Step 1. **He also requires to wear the lead apron before wearing the sterile gown.** The PG/Staff can use the alcohol based hand rub on the gloves for sterilizing and wear a sterile glove over it before giving spinal / block.

Step 4: (Team 1 and 3 at work)

- **Team 1** will bring the patient to operation theatre who will then be taken over by **Team 3** for anesthesia. **Team 1** will help **Team 3** in shifting and positioning patient for anesthesia.
- **Team 3** will decide on the type of Anesthesia after evaluating the patient inside OST-A.
- **If Team 3 decides on General anesthesia (GA) the following protocol will be followed:**
  - The OTech 1 will secure the patient to the table well. Since the AC has to be kept on with maximum cycles (25/min), OTech 1 will inform the Central AC department and both PGT1 and OTech 1 will wait in OR office till the GA procedure is complete.
  - Suitable arrangements are to be done by anesthesia technician for minimizing aerosol contamination.
  - Once GA is accomplished, 20-30 minutes of waiting period is called for to ensure settlement of potential aerosol droplets.
  - **Team 1** will wait in OR office after guiding the housekeeping staff to perform surface cleaning in the corridor.

- **If Team 3 decides on regional anesthesia the following protocol is to be followed:**
  - Spinal /brachial block to be given in OST-A theatre.
  - Sterile protocol for USG.
  - OTech 1 may have to stay in the theatre for positioning the patient for spinal anesthesia if required.
  - **If OTech 1 is not required,** he will guide the house keeping staff for surface cleaning in the corridor.
  - The house keeping staff will wait in the OR office and will be called if any need arises like mopping the floor or cleaning the patient in case of soiling before the start of the case.
Once anesthesia is complete, after a minimum of 20 minutes, the Team 1 (either both or only PGT1 as the case may be) enters OST-A theatre for preparing the patient. PGT 1 and OTech 1 will check the table and limb position and tourniquet application. PGT 1 then wears the sterile gown, long gloves and prepares the patient. Special drapes with bilateral pouch to be used to avoid spillage during preparation. Once the preparation is done, the PGT 1 can leave the theatre after doffing the sterile gown in the inner corridor bin and wait in OR office. The OTech 1 will remain inside holding the limb. In case the patient requires surgery on upper and lower limbs, OTech 2 from Team 2 can help to hold the limb for preparation. *On the way, the PG1 will alert Team 2 that OST-A is ready for them to enter.*
Step 5: (Team 2 at work)

- Once **Team 2** enters Ost A, the draping will start. NS 1 will wear a sterile gown and remove the disposable sheets from the already prepared table. She will then give the disposable drapes to orthopaedic staff and PGT2.
- The OTech 1 who will be holding the limb will move out of Ost A once the limb is received by the operating team and wait in OR office along with PGT1. If part of a limb has to be held with sterile mop, the OTech 2 will take over the limb from OTech 1 once the necessary part is prepared. If full preparation of both limbs are needed, the PGT1 also may be needed in addition to OTech 1 and 2 to coordinate the process.
- NS 2 can stay near set room after draping is done. OTech 2 will co-ordinate with NS 2 who will stay on floor for providing instruments to NS 1
- Door 3 and 1 to stay shut. **Team 2** proceeds to operate on the patient.
- OTech 2 will inflate the tourniquet and oversee the lighting arrangements and operate the image intensifier and help to coordinate with the floor nurse NS2 for any requirements during surgery.
Once the plaster slab/dressing has been completed, all the members of the Team 2 leave the theatre after removing the outer sterile gown and outer gloves (in bins placed inside the Ost A itself) before the patient is extubated.

If regional anaesthesia is done, then Team 2 will call Team 1 and move out of theatre after disposing the sterile gown and outer glove.

Team 2 will come to the inner corridor between Ost A and B and dispose their Lead apron, Personal protective equipment completely along with long gloves, surgical mask

Requirements to be kept ready in OST-A before case starts:
Sterile gowns, extra PPE, long gloves and standard sterile gloves
Irrigation solution / suction apparatus (including back-up)
Cautery instruments (with back-up machine kept in set room)
Drills
Required instruments for concerned surgery
Part preparation set and medications
Suture materials / anchors/ Elastoplast / unsterile dressing materials
Tourniquet (with clamps if multiple limbs are being operated)
Sterile dressing materials / sterile cotton rolls and gauze bandages
Braces and slings if needed for the particular case
Plaster materials: slab to be kept ready beforehand (prepared by OTech2 before patient enters OST-A after consulting with orthopedic staff)
covering the N95 mask, and foot cover in the inner corridor and put them in a large closed bin with foot control. 3D printed face shield should be discarded in hypochlorite solution basin kept before exiting Door 6.

- The team will be still wearing their surgical cap, N95 mask, OT dress, and foot wear, all of which has to be discarded during the shower inside the surgeon’s or nurse’s room as applicable.
- OTech 2 and NS 2 will keep fumigation machines ready for OST A, OR office and corridor.

**Arrangements to be made at inner corridor:**

- Two large bins with foot control to dispose PPE
- Hypochlorite solution basin for disinfecting the visor head bands
- Alcohol hand rub solution
- Lead apron hanger

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**Step 6: (Team 3 and 2 at work)**

- **Team 3** will extubate the patient and call **Team 1 after 20 minutes**.
- **PGT 1 and anesthesia PG** will shift the patient to SARI- ICU. **Anesthesia staff and technician will follow the above doffing protocol in Step 5 and exit the theatre**
- Security team of the hospital will ensure smooth transfer to the ICU or wherever indicated. They will also co-ordinate sterilization of the pathway.
- PGT 1 and Anesthesia PG will doff their PPE in the room provided at SARI ICU.
- The house keeping staff on PPE will accompany the patient and PGs during shifting the patient out and will bring the trolley and the lead aprons back to the Old trauma theatre for fumigation. The fumigation will start once this is done.
- Ost A will be shut and fumigated. No attempt will be made to touch any of the instruments before fumigation which will be left as it is for one hour.
- OTech 1 and NS 2 will also fumigate the corridor and will be last to leave theatre after switching on the fumigation machines and doffing the PPE.
- After fumigation, nursing staff and housekeeping staff will enter Ost A theatre and dispose off the used instruments under sterile precautions and perform surface cleaning.
MANAGEMENT OF PATIENT IN OPHTHALMOLOGY

Dr Sulatha V Bhandary, Prof and HOD, Dept of Ophthalmology
Dr Yogish S Kamath, Prof and HOU, Dept of Ophthalmology

The ongoing pandemic caused by the SARS – CoV-2 virus (COVID-19) has created havoc in the ophthalmic practice. Ophthalmologists are at a higher risk of encountering the COVID-19.

In addition, there are reports of virus shedding in human tears. We are hereby outlining some of the salient guidelines in the ophthalmic practice based on the recommendations of the All India Society guidelines on ophthalmic preferred practice patterns published in Indian Journal of ophthalmology, on 20th April 2020. (Doi 10.4103/ijo.IJO_871_20) and Ophthalmic practice guidelines in the current context of COVID-19, 11th May 2020 and recommendations by HICC (hospital infection control committee) KH Manipal.

Here we are concentrating on the asymptomatic COVID-19 suspects or routine Outpatient care and OT management in Ophthalmic practice. Confirmed COVID-19 patients with an ocular emergency will be taken care of in COVID-19 specified hospitals with complete PPE.

The flow of Patients in Eye Department OPD area

- After initial screening in the hospital entry point, Patient comes to Ophthalmology OPD
- Second screening at the entrance of eye OPD manned by interns or ophthalmology Postgraduates

- He/she shall check that every patient visiting the OPD has covered their face with a mask.
- They shall ensure by visualising hand hygiene has been performed in a correct manner by the patient. (the patient shall use an alcohol rub before entering the opd.)
- The following questions shall be asked to every patient.
  a) History of respiratory symptoms such as cough/cold/change in smell/sneezing/fever/diarrhoea
  b) Travel history to any outside district (in the last one month) / travel from hotspot will be asked, any suspicious patient will be communicated to fever clinic 0820-2923742.
  c) Ask the patient the chief complaint.
  d) History of red-eye and those with non-COVID respiratory illness with ocular complaint / routine eye checkup will be noted on the file
- PG will be seated at 1 meter distance from the patient.
**PPE for screening postgraduate:** N95 mask and Glove

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**RECEPTION DESK**

Reception counter shall be cleaned every 3 hours with 1% hypochlorite solution.
Patients shall not touch the surfaces on the reception.
1-2 metre distance shall be maintained strictly.
Time period of exposure with a patient shall be minimized.
Patient with red eye shall be guided to red eye clinic.
It shall be ensured that there is no bystander and they shall be encouraged to have only one in case of elderly and children.
Patients with non-Covid related respiratory symptoms with eye complaints shall be seen by concerned doctor assigned to see the respiratory illness with eye complaints.
They shall make sure that the OPD sheet shall not be given to the patient. The OPD sheet should be handled only by hospital staff only.

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<table>
<thead>
<tr>
<th>RED eye counter</th>
<th>Non COVID respiratory illness with ocular complaints</th>
<th>Routine eye check up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manned by Ophthalmologist</td>
<td>Manned by Ophthalmologist</td>
<td>Manned by Ophthalmologist</td>
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**RED Eye and Respiratory illness with ocular complaints station:**
Two ophthalmologists, one for the red-eye station and other for respiratory illness with ocular complaints station, will examine the patient wearing an N95 mask and gloves. Basic vision assessment is done maintaining proper social distance.
The slit lamp will be having a breath shield [Figure 1] which will be cleaned along with the entire slit lamp with a 70% alcohol solution after every patient. The patient and the doctors are instructed to wear the masks without fail and hand hygiene to be maintained. Make sure the patient is not made to wait for long and minimize the tests and also revisits.

Figure 1

Rest of the faculty and the postgraduates will examine the routine ophthalmology cases using N 95 masks and gloves using a slit lamp with breath shield. As far as possible use non-mydriatic (without dilating the pupil) fundus camera for retinal examination. This avoids the waiting period and also the contact time between the doctors and the patients.

- Avoid aerosol-generating procedures like non-contact tonometry as far as possible.
- Avoid nasolacrimal duct syringing as far as possible.
- Investigations and procedures like computerized visual field analysis, OCT, angiogram, ERG, gonioscopy, UBM, lasers etc. that require close contact between patient and treating ophthalmologist may be deferred if not urgent, subject to the discretion of the treating Ophthalmologist.

**Refractionist**

- They shall ensure that the patients shall not handle the files.
- They shall ensure that they wear N95 masks and gloves
- The refractionist has to clean the hands with alcohol hand-rub after each patient.
- **Cleaning of trial frame has to be done thoroughly after using it on every patient with 70% ethyl alcohol.**
- At all times, try and maintain 1 meter distance between the patient and the refractionist.
- To ensure the patients and the attendants cover the mouth and nose all the time with mask (either triple-layer / cloth mask/hand kerchief) and maintain proper social distancing.
- **PPE: recommended -N 95 mask and Gloves (Face shield case to case basis)**
Nurses/OPD technicians

- They shall ensure that the patients shall not handle the files.
- They should use surgical triple layer masks and gloves in the OPD.
- The staff nurse has to clean the hands with alcohol hand-rub after each patient.
- Cleaning of slit lamp/door handles shall be done after each patient with 70% alcohol wipes/sprays.
- Nurses shall restrict the entry of patients in the OPD to a minimum and ensure the patients and the attendants cover the mouth and nose with mask (either triple-layer / cloth mask/hand kerchief) and maintain proper social distancing.
- PPE: Triple layer surgical masks/ face shield/ gloves.
- Technician in laser room (most of the ophthalmology procedure like retina/ glaucoma cornea diagnostics, cataract workup, lasers, field tests are performed in laser room)
  - They shall ensure that the patients shall not handle the files.
  - They shall ensure that they wear n95 masks and gloves.
  - They should ensure to do OCT (optical Coherence tomography) with proper cleaning of the instrument before and after use. Do not allow other than patient in the OCT room.
  - Ensure the patient wears the masks or covers the mouth and nose with mask (either triple-layer / cloth mask/hand kerchief). Patient needs to clean the hands before entering the OCT room.
  - The staff has to clean the hands with alcohol hand-rub after each patient.
  - At all the time and maintain proper social distancing
  - PPE: recommended: N95 mask, gloves, face shields

Precautions during OT procedures:

OPHTHALMIC SURGERY

All Cases:
Patient preparation: On arrival to the ward:

For the patients and bystanders:

- Alternate beds to be used in the ward for admitted patients.
- All windows in the ward should be kept open all the time.
- Patient’s head should be on the wall side.
- Only one patient’s attendant will be allowed to stay in the ward with the patient with minimum baggage.
- Patient and bystander should follow standard hygiene such as wearing mask all the time, washing or sanitizing hands frequently, maintain distancing, etc.
- For the purpose of hand washing, soap and sanitizer will be provided in the ward.
● The patient will be provided two masks/day by the hospital, however accompanying bystander will not be provided mask and has to get their own.

**Pre-Med room:**
- Temperature [Non-contact] to be checked. COVID screening form to be re-administered.
- Not more than two patients in one room [a distance of 2 m between 2 beds]
- Eyelash preparation may be deferred.
- Separate bottles of Dilatation eye drop for each case.
- Povidone-iodine to be instilled in the operating eye before shifting to OT, and again before block/drape.

**PPE for staff:** Surgical Mask, Head cap, Gloves while instilling eye drops

_All patients to wear surgical three-ply mask during Local anesthesia procedures/ during entry to OT for GA._

**Drape:**
- Disposable Oxygen nasal prongs if needed. But adequate drape around the face and eye to ensure no aerosol leak towards the surgeon.

**OT team:**
- _Minimal and only essential staff to be teamed. Surgeries to be preferably done by faculty/senior postgraduates, to prevent delay in procedure._
- _Topical/Local anesthesia and DAYCARE surgeries preferred._
- **PPE used for assisting sister:** N95 mask; Face shield/goggles; regular gown over surgical scrub with Double gloves
- **PPE used for the surgeon:** N95 mask; Face shield/goggles; water-resistant/ HIV kit gown over (for those procedures where there is a chance of fluid spill on the surgeon like Phaco/vitrectomy etc.,) regular gown and surgical scrub with Double gloves and shoe cover.
- _Equipment/ instruments/implants:_ To be kept ready prior to the start of the case, as per the surgical plan.
- _Etiquette:_ To avoid talking during the case: Movements, transfer of instruments to be deliberate and controlled. Team not to leave OTCASE ZONE marked. [Figure 2]
- _Intraoperative Protocols:_ Single batch surgical team for each case, with proper documentation of role in the case.
- Gown/gloves/cap/mask to be changed with scrubbing of hands to be repeated between each case.
- Restricted entry into OT during procedure. Dedicated Resident and floor nurse for each case outside the OT CASE “ZONE” marked around each OT table at a distance of 1 meter. Additional materials may be requested over the phone by the floor nurse, to the PRE-MED team outside, who would hand over the materials at OT door.
- Once the Surgeon and OT nurse assisting the case enter the OT CASE ZONE in full PPE, they shall not leave it till the completion of the procedure. In case they do, they should re-scrub before entering again.
- OT table to be positioned so as to avoid the blow of air from AC vent from the patient towards the surgeon. [Figure 2]
- OT table/microscope/ phaco hand piece/instrument tray to be cleaned/ sterilized between every case.

**COVID negative/ COVID suspect negative cases:**

**Emergency cases**
- Preferably performed in a separate operating room.
- Topical/Local anesthesia cases: COVID screening form used to again document history of febrile illness/ILI; travel to Containment/Red zones in the previous 2 weeks and seek Physicians advice if needed.
- General anesthesia cases: Anesthetic check-up and entry to OT only after patient is intubated. COVID screening form administered preoperatively.
- In case multiple specialities involved, ophthalmology component preferably done once other interventions have been completed, and OT entered only when Ophthalmology procedure starts.

**Elective cases**
- Urgent cases to be operated on priority
- Aerosol generating/ drilling procedures, including lacrimal sac syringing / Dacryocystorhinostomy (DCR)/ orbitotomy avoided.
- Topical/Local anesthesia cases: COVID screening form used to document the history of febrile illness/ILI; travel to Containment/Red zones in the previous two weeks and seek Physicians advice if needed.
- The number of cases to be restricted so as to facilitate adequate OT cleaning and air exchange between cases.

**COVID suspect cases:**
- Only Emergency cases to be done.
- Urgent electives may be done after observation for 2 weeks and/or Physician opinion.
- Non-urgent electives may be posted after a month.

**PPE as for COVID positive cases, but should be done last in the list in routine OT.** Use HIV Kit gown, shoe cover in addition the PE mentioned above.

**COVID positive cases:**
- Only in Emergency cases.
- All types of surgery preferably done in COVID dedicated theatre.
- Appropriate additional PPE [including Hood etc.] needed.
Environmental hygiene:
Ensure that cleaning and disinfection procedures are followed consistently and correctly.

- Freshly prepared 1% Sodium Hypochlorite or VIRKON (potassium Monopersulphate + potassium hydrogensulphate + potassium sulphate, Sodium C 10-13 alkyl benzene sulphonate, sodium chloride and buffers) solution can be used as a disinfectant for cleaning and disinfection for ophthalmic instruments between patients. Leaving the solution for a contact time of at least 10 minutes is recommended. Alcohol (e.g., isopropyl 70% or ethyl alcohol 70%) can be used to wipe down surfaces where the use of bleach is not suitable, e.g., metals. Fumigation of the OT to be done daily at night.
- The slit lamp contact surfaces should be cleaned after every patient.
- Disinfection of high touch surfaces like (doorknobs, telephone, call bells, bedrails, stair rails, light switches, wall areas around the toilet) should be done every 2 hours. For low-touch surfaces (walls, mirrors, etc.), mopping should be done with BKC + Sodium Hypochlorite solution every 4 hours.

Figure 2
- An open door, non-AC environment is followed.
- Avoid all outreach activities, including community screening camps.
- Techniques of donning and doffing PPE and disposal, and sensitize them in personal hygiene measures and physical distancing.

**Telemedicine**

a. Ophthalmologists should make use of telemedicine facilities for their patients wherever possible
b. The ophthalmologists should follow the AIOS guidelines and make sure they are aware of all the procedures to be followed when dealing with patients using telemedicine such as informed consent, prescription, sharing of photographs, and other aspects.
c. The doctors can make sure of facilities such as videoconferencing with other referring doctors and general practitioners
d. Telemedicine practice should be widely advertised on social media and other platforms so that it reaches to peers and patients.

**Eye banking:**
*(As per Guidelines for Functioning of Eye Care Facilities under NPCB & VI By Ministry of Health and Family Welfare 8th May 2020)*

- No eyeball retrieval from homes, however, HCRP can be continued in Non-COVID dead patients, for the need of corneas for therapeutic purposes only.

**Camps and community ophthalmological activities:**

Comprehensive camps need to be postponed for at least two months, even in the green zones. National Programme for control of blindness (NPCB) guidelines regarding camps are awaited.
Teaching activities at Hospitals [Clinics]

- Any teaching activity can be performed using online portals
- Bedside teaching and rounds must be strictly forbidden
- Residents and fellows must be encouraged to utilize the time during this pandemic to study theory and prepare for their future examinations, and focus on research activities that can be performed from home
- All residents and fellows must be advised to learn from online material and read from e-journals.
OPD Setup

Screening Cubicle and Reception Sop

1. Two designated team members (One Junior Resident and one intern) will man this screening zone. One receptionist will man the reception area. *(areas depicted above)*. The one in the outside screening will take the history of the new patients. The one inside will take a history of pts with prior treatment history using the EMR for reference.
2. The designated screening team members will wear an N95 mask and goggles mandatorily. The receptionist will wear an N95 mask, only mandatorily.
3. History of patients coming to the ENT outpatient department will be scrutinized.
4. Aerosol generating non-severe patients who do not require clinical examination will be prescribed medications at the screening zone after due consultation with the faculty. They will not be allowed to enter rooms in the outpatient department.
5. The medical documents of patients requiring clinical examination will be forwarded by the screening team to the reception.
6. Only one/two patients will be allowed inside the outpatient department at a particular time.
7. No bystanders of patients will be allowed inside the outpatient department unless the patient is a minor or on the trolley.
8. The receptionist will announce the name of the patient over the microphone to streamline the presence of only one/two patients inside the outpatient department at any particular time. The receptionist will also ensure there is no unauthorised entry into the outpatient department.
9. The screening team will ensure that the patients entering the OPD are wearing minimum mask required and will ensure hand sanitization of patients entering OPD. Patients are not allowed to touch the sanitizer bottle.
10. Avoid mobile phone use unless important. Phones to be kept safely tucked away in cupboards or pockets. Do not keep mobiles, bags, books or other material on the tables/chairs. Can be kept in the storage rooms or classroom.

**Examination Cubicle Sop**

1. Two examination cubicles identified as depicted in the image (E1 and E2).
2. Team of two members (One faculty and one Junior resident) will handle the examination of patient.
3. Currently, one examination cubicle will be open where a patient will be examined. With increasing patient load, the second examination cubicle will be opened as decided by the Department HOD or Unit Head.
4. The team members performing the examination of patients will change to hospital scrubs, plastic gowns, N95 masks, surgical caps and face shields/goggles on arrival to OPD in the changing room as depicted in the image. The regular dress will be kept in a bag which can be safely kept in the designated area in the outpatient department as depicted in the image. Following the completion of the OPD hours, the regular bags will be picked up by the team members. The hospital scrubs will be discarded in the designated bin with yellow plastic cover in the changing room, which will be further handled by the housekeeping staff taking similar biosafety precautions as mentioned above for sterilization at CSSD. The surgical caps and plastic gowns will be discarded in bins for disposal. The face shield and N95 mask to be placed in named open plastic containers/plastic cases and kept in a designated room (OPD classroom) in the outpatient department at one-metre distance between each team members bags for repeat use after sterilization **ONLY AFTER 5 DAYS.**
5. Surgical gloves to be worn during examination by the team members. The surgical gloves should be changed after every procedure, and WHO hand disinfection policy should be followed before the next procedure. Under emergency circumstances when a change of gloves is not possible, WHO disinfection policy of gloves may be followed.
6. Ballpoint pens used in file documentation should be sanitized after examination of every patient. Remove gloves before using pen esp if examined pt. Do Not share pens not even for consent.
7. Unnecessary use of mobile phones by team members is discouraged during and between patient examination. Phones to be kept safely tucked away in cupboards or pockets.
8. The patient may carry prior medical documents for production to the examination team. The examination team should ensure WHO hand disinfection policy has to be followed after handling the medical documents. Better if the pt shows the documents and turns the pages themselves if required rather than you touching the records.
9. Ensure you use hand disinfection steps before putting headlight and before removing headlight

PROCEDURE ROOM SOP

- Two procedure rooms have been identified as depicted in the image (the other two minor rooms should not be used for the procedures)
  - Microscopic examination of the ear, FNAC, Positional tests / manoeuvres (Room no. 6)
  - Upper and lower airway endoscopic examination (DNE, VDS, Flexible) (Room no. 8)
- Four dedicated team members per day – one technician, one nurse, one faculty and two junior residents.
- The team members for procedure rooms will change to hospital scrubs, plastic gowns, N95 masks, surgical caps, face shields and goggles on arrival to OPD in the changing room. The regular dress will be kept in a bag which can be safely kept in the designated area in the outpatient department. Following the completion of the OPD hours, the regular bags will be picked up by the team members. The hospital scrubs will be discarded in the designated bin with yellow plastic cover in changing room which will be further handled by the housekeeping staff taking similar biosafety precautions as mentioned above for sterilization at CSSD. The surgical caps and plastic gowns will be discarded in bins for disposal. The face shield, N95 mask and goggles to be placed in named open plastic containers/ plastic cases and kept in a designated room in the outpatient department at one-metre distance between each team members bags for repeat use after sterilization **ONLY AFTER 5 DAYS** (goggles to be kept safely will not be replaced).
- Patient consent forms will be placed on the table in the procedure rooms. The patient will pick up the consent form, sign, take an image of the signed consent form and send the image of it to a designated phone number (9845144015) / email as an attachment to ent.kmc@manipal.edu in image format for documentation purposes. The patient
will be asked to keep the document to be produced on further consultation if the need arises.

- Surgical gloves to be worn during every procedure by the team members. The surgical gloves should be changed after every procedure, and WHO hand disinfection policy should be followed before the next procedure. Under emergency circumstances when a change of gloves is not possible, WHO disinfection policy of gloves maybe followed.
- Ball point pens used in file documentation should be sanitized after examination of every patient.
- The procedure room table should be covered by disposable paper sheets before each procedure. The paper sheet should be rolled systematically to avoid touching patient contact areas and disposed in yellow bins.
- Kindly ensure patients wear a minimum of regular surgical masks before entering the procedure rooms.
- Unnecessary use of mobile phones by team members is discouraged in procedure rooms. Phones to be kept safely tucked away in cupboards or pockets.

**General guidelines for Faculty/ Residents/ Receptionists/ Clerk / Technicians:**

- Duty roster to be strictly followed as per the directive of the Head of the Department. Manpower to be kept to the minimum in the outpatient department during working hours of 8:30 AM to 1:00 PM.
- Duty resident should be in the OPD at 8:15 am
- Refer suspected cases of COVID to the COVID zone in the hospital.
- Kindly ensure proper hand wash / hand sanitization techniques as frequently as possible as depicted in the Annexure 1.
- Kindly follow proper donning and doffing of mask as mentioned in the document. Avoid touching the mask once donned. In case of inadvertent touching of mask, hand sanitization needs to be done as depicted in Annexure 2 and 3.
- Ensure proper doffing of face shield. Avoid touching the patient exposed areas of goggles / face shield in OPD and while doffing as depicted in Annexure 4.
- Avoid unnecessary use of mobile phones. Keep them safely tucked away in pockets or cupboards when not in use.
- Keys, valuables to be safely kept in a cupboard to avoid contamination.
- Ensure the mask is placed in a plastic container/ open plastic bag before exiting the OPD. Re-use of N95 mask should be done only after 5 days. The mask can be re-used maximum 5 times before discarding it and using a new one. Kindly enter log before issuing all protective equipment with the nurse in-charge.
- **AVOID USE OF PROTECTIVE EQUIPMENT** (N95 masks, face shields, goggles, plastic gowns, surgical scrubs, surgical caps) **IF NOT INVOLVED IN PATIENT CARE IN HOSPITAL. SURGICAL MASKS WILL SUFFICE IN SUCH CIRCUMSTANCES.**
- One Resident (as designated in duty roster) has to look after ward (checking investigations, consultations, medications), emergencies and other dept consultations.
- Other residents will be reserve on call / reserve for OT cases as required by the duty faculty / operating surgeon

**Operation theatre / ICU procedures:**

- Emergency and urgent cases (cancer, recurrent abscess).
- Avoid laser, drills and micro-debriders. Need good evacuators of aerosol in OT if they are used
- Avoid nasal, throat and airway procedures unless emergency / urgent. To start these procedures at a later date once the guidelines are certain. If done, adequate precautions with PPE. Minimum would be an N95 mask, goggles, face shield. High aerosol exposure procedures esp microlaryngoscopy, bronchoscopy, tracheostomy should be done with caution
- Emergency tracheostomy – do with PPE; limit number of personnel in the OT
- ICU tracheostomy – reaffirm the need for the procedure with the intensivist. The endotracheal tube has to be lower level ie just above carina. Do standard tracheostomy, avoid percutaneous tracheostomy. Before opening the trachea ensure ventilation is stopped. Deflate cuff and withdraw endotracheal tube just before inserting tracheostomy tube. Ventilation to start after tracheostomy tube cuff is inflated.
- Mastoid drilling generates aerosol, therefore should be avoided or done with adequate coverage of the area with extra plastic
- In facial trauma, nose and oral mucosal lacerations treatment should be done with adequate protection
TREATMENT PROTOCOLS FOR MANAGEMENT OF PATIENTS IN MEDICAL SPECIALITIES
MANAGEMENT OF PATIENTS IN CARDIOLOGY

Dr Tom Davasia, Professor and Head, Dept of Cardiology
Dr. Sudhakar, Assistant, Professor, Dept. of Cardiology

Out Patient Department

- All doctors and staff should use protective mask and non-sterile gloves while examining patients.
- The team of doctors including minimum number of consultant and cardiology PG to manage OPD patients with adequate social distancing.
- Adequate ventilation to be maintained in patient waiting and consulting area and avoid closed air space.
- Stethoscope should be disinfected between each patient using alcohol wipes
- All patients to cover their nose and mouth with mask, cloth or handkerchief before entering OPD
- Regular sanitization of chairs and other high touch surface to be maintained by housekeeping staff.
- Minimum number of consulting rooms/spaces to be used by the doctors.
- Mandatory use of hand rub between two patient’s examination.

Cardiology ICU

- All staff including doctors and sisters wear N95 mask.
- ICU patients may be managed by minimum number of doctors as required.
- Stethoscope to be disinfected with alcohol wipes between each patient used.
- Echo probe to be disinfected with alcohol wipes between each patient used.
- Stable patient may cover their nose and mouth with mask.
- Endotracheal intubation to be done by taking adequate precautions as needed.
- Medicine / Infectious disease unit consultation to be obtained in all patients with SARI and suspected COVID-19.
- Suspected COVID-19 patients to be isolated and managed appropriately along with medical team until reports come.
- Mandatory use of hand rub between two patient’s examination.

Catheterization Lab

- Critically ill patients who require emergency re-vascularization procedure to be undertaken after adequate protection including N95 mask and other personal protection equipment as per requirement.
- Minimum number of staff including consultant, cardiology PG, sister and Cath Lab technologist to attend the case.
- Cath Lab to be cleaned and disinfected after every emergency case.
- No elective cases to be undertaken until further instructions. Hemodynamically stable patients with suspected COVID-19 may be isolated and managed medically till reports come Negative OR treatment completed, till further invasive procedure are undertaken.
- Patients with early pulmonary edema related respiratory distress may be intubated and put on ventilator in emergency triage before shifting to Cath Lab.
H/o travel from containment area or international travel or contact with COVID positive patients
H/o fever with cough or Shortness of Breath
Respiratory distress SpO₂ <94% on room air and chest X-Ray showing bilateral infiltrates not suggestive of pulmonary edema

IF ANY OF 4 IS PRESENT THEN
- TREAT AS COVID SUSPECT
  - THROMBOLYSE IN TRAUMA/ SARI ICU
  - SEND SWAB
  - SEND TO COVID SUSPECTED ICU
  - IF THROMBOLYSIS SUCCESSFUL
    - MANAGEMENT AS USUAL PROTOCOL
  - IF SWAB NEGATIVE
  - REFER TO COVID HOSPITAL
  - RESCUE PCI

IF ALL ARE ABSENT THEN
- TREAT AS USUAL PROTOCOL
- IF THROMBOLYSIS INELIGIBLE/ CONTRAINDICATION
- IF PT IS HEMODYNAMICALLY UNSTABLE/ ELECTRICAL INSTABILITY OR HAS ONGOING CHEST PAIN
- TAKE FOR PRIMARY PCI WITH ALL PRECAUTIONS ASSUMING COVID POSITIVE STATUS
- IF PT IS HEMODYNAMICALLY UNSTABLE OR HAS ONGOING CHEST PAIN
  - RESCUE PCI WITH ADEQUATE PROTECTION
  - TAKE FOR RESCUE PCI WITH ALL PRECAUTIONS ASSUMING COVID POSITIVE STATUS

OUT OF WINDOW PERIOD >12 HRS
- IF NO FEATURE OF INSTABILITY
  - SEND SWAB
  - SEND TO COVID SUSPECTED ICU
  - COVID NEGATIVE
  - PCI AS USUAL PROTOCOL
  - COVID POSITIVE
  - PCI WITH ADEQUATE PROTECTION

COVID RESULT AWAITED
- COVID NEGATIVE
- COVID POSITIVE
Standard Operating Procedure – Haemodialysis Unit – Covid-19 Outbreak

Objectives:

1. To ensure the health and safety of haemodialysis patients, technicians, nursing staff, medical and non-medical personnel engaged in the haemodialysis unit during the COVID-19 outbreak.
2. To provide guidance regarding screening, identification of suspect and Covid cases, changes in haemodialysis unit practices for ensuring reduction in transmission of COVID-19 in the HD unit

Dialysis Unit – Preparedness

- Availability of Alcohol based sanitizers (at least 60% alcohol or Wash Basin with liquid soap dispenser) at waiting area & Treatment stations
- Dedicated screening area prior to entry to dialysis unit to be provided with Display Boards in Kannada and English on awareness for patients regarding symptoms of COVID-19 including fever, cough, running nose. All patients with symptoms or history of contact with COVID-19 positive patients or history of travel to red zone area report to dialysis unit prior to arrival (to be mentioned in dialysis unit display board).
- Personnel Protection Equipment Availability (PPE) shall be ensured by consulting the HICC authority – List to include Face masks, full body Gowns, Gloves, Eye protection goggles, Hazmat suits.
- Suspected COVID-19 patients to be hemodialysed in Isolation ward. If isolation ward is full, a designated bed in Hemodialysis unit to be earmarked within the dialysis Unit. To be stationed at least 6 feet away from the nearest non infected patient station.
- To use a Dedicated hemodialysis machine for SARI ICU and Isolation ward, the machine should be shifted in emergency after appropriate cleaning and disinfection as per HICC
- For COVID positive patient: The patient is to be dialyzed in our separate dialysis unit functioning at COVID hospital Udupi, with trained health care personnel including consultants, technicians, nursing staff and other support staff exclusively working for the unit.
- Continue to take Standard Universal precautions for each Hemodialysis session and machines should be disinfected after each procedure irrespective of the COVID status.
- All staff should strictly follow hand hygiene (seven steps) with soap and water for 20 second before handling any patient and in between two patients. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. If hands
are visibly soiled or dirty, they should be first washed with soap and water and then an alcoholic hand rub used. Avoid touching your eyes, nose, and mouth with unwashed hands.

- Area to be earmarked for safe disposal of infected materials
- Separating equipments like stethoscopes, thermometers, Oxygen saturation probes and blood pressure cuffs between patients with appropriate cleaning and disinfection should be done in between shifts.

Health care personnel – Preparedness

- All health care personnel including consultants, dialysis nurses, technicians and other support staff to be well versed with COVID-19 symptoms, Hand wash techniques, appropriate use of face mask and PPE (guidelines available on Manipal intranet by hospital infection control committee)
- The consultants, dialysis in-charge technician and nursing staff to be familiar with the triaging, testing and notification policies of the hospital which are based on the recommendations of Union Ministry of health and Family welfare and those by State Health Departments as well as District health authorities
- To identify a set of personnel who would be required to attend to suspected / confirmed COVID-19 cases in case the need arises and give them additional training for donning and doffing of Personal Protective Equipment (PPE) patients.
- Stethoscope diaphragms and tubing should be cleaned with an alcohol based disinfectants after use for each patient.
- All staff to report in case of any symptoms of COVID-19 and be on leave and self-isolation after consultation with Infectious Disease department compulsorily.
- Medical and support staff treating COVID 19 patients should be monitored for COVID infection at the dialysis facility and should take necessary action if found infected
- Healthcare workers shift duties should be arranged in a way that work of dialysis unit is not affected.
- Dialysis personnel/nurse /doctors should wear a three-layer surgical facemask while they are inside dialysis unit.
- Social distancing amongst dialysis team members (1 meter at least), remember talking loudly, forcefully or laughing is akin to aerosol generating procedure.

Instructions to be given for patients of the haemodialysis unit

- Not to miss any scheduled dialysis session and be compliant with medications, fluid restrictions to avoid any emergency visits to the hospital
- To wear facemasks at all times from the point of leaving the house, while in the hospital and also till the patients is back at home.
- To get acquainted with the symptoms and signs of COVID – 19, personal protection measures including hand wash techniques, maintenance of social distancing measures within the dialysis unit as well outside.
● All patients should come to hemodialysis unit through screening Area/fever clinic. No patient will be allowed to enter hemodialysis unit without screening.
● To ensure patients are screened for symptoms of any respiratory illness, check for temperature with thermal scanners prior to entry to the dialysis unit in the screening area
● Any patient with prior symptoms informed over phone or detected during screening to be sent to the flu – corner and managed as per protocols laid down and further actions regarding testing and dialysis to be taken by the consultants after discussion.
● Ensure all patients are wearing facemask and practice strict hand hygiene techniques prior to entry, during stay in HD unit and post dialysis. No accompanying patients with symptoms or contact history to be allowed in the HD unit and to be referred to Flu-corner for the needful
● All patients should wash with soap his/her hands prior to and before leaving the hemodialysis unit
● Patients should be told to inform the dialysis unit over phone / in the screening area of the following – symptoms suggestive of COVID-19, history of contact with covid-19 positive patient, travel history either outside district, state or country.
● To restrict accompanying people to nil (if feeling well), or to only 1 person (if needed for assistance) provided the accompanying person is healthy and adheres to all precautions including wearing mask and maintaining social distancing.
● Preferable not to take food/meals inside the dialysis unit
● To follow the instructions of the health care providers at all times even if it may be inconvenient or contrary to previously followed practices since it is for benefit of all

Dialysis for patients with suspected COVID / Non COVID respiratory illness- Non ICU

● Decision to dialyse patients with symptoms in the main HD unit to be taken only after referral to flu corner and discussion with consultants
● Patients to be preferably dialysed in Isolation ward room with dedicated machine (if available), with dedicated personnel (who will not be caring for other patients) with PPE
● If isolation ward is full, at least 6 feet gap (2 meter) to be maintained from the nearest HD station in HD unit and patient should be hemodialysed in main HD unit after consulting with the nephrologist in charge.
● No reuse of dialyzer, tubings for the patients to minimize risk of aerosol generation
● Dialysis machine, beds, linen to be disinfected after dialysis session as per standard protocol
● Separate area demarcated for collection and disposal of infected materials generated during the HD sessions
Dialysis for patients with suspected COVID / Non COVID respiratory illness (SARI ICU)

- Patients with suspected COVID-19 infection with SARI will be admitted in SARI ICU.
- Patients to be preferably with dedicated machine (if available), with dedicated personnel (who will not be caring for other patients) with PPE. If not the machine should be shifted out after proper disinfection as per standard protocol.
- No reuse of dialyzer, tubings for the patients to minimize risk of aerosol generation.

Dialysis for patients with confirmed COVID-19 – Non ICU

- Patients with confirmed COVID-19 infection shall be admitted to COVID hospital at Udupi.
- The patients shall be managed for COVID-19 infection as per guidelines laid down by the hospital in accordance with the Union health ministry recommendations.
- Dialysis shall be done by dedicated machines and trained personnel within the dedicated HD unit with use of full PPE.
- No reuse of dialyzer, tubings for the patients to minimize risk of aerosol generation.
- Personnel involved in care for confirmed COVID-19 positive patients shall not be posted for care of other patients and shall maintain social distancing from other staff and also at home.
- Contact tracing and isolation of contacts after informing health authorities.

Dialysis for patients with COVID-19 in the ICU

- All patients who are critically ill with COVID-19 requiring ICU and dialysis shall be admitted in COVID hospital, Udupi.
- Dialysis shall be done in the ICU, with portable RO units, dedicated machines and trained personnel with precautions followed for stable COVID-19 patients requiring dialysis.

Disinfection and Disposal Practices in the HD unit

- Bed linen should be changed between shifts and used linen and gowns be placed in a dedicated container for waste or linen before leaving the dialysis station. Disposable gowns should be discarded after use. Cloth gowns should be soaked in a 1% hypochlorite solution for 20 minutes before sluicing and then be transported for laundering after each use.
- Inside dialysis unit, clean and disinfect frequently touched surfaces at least thrice daily and after every shift. This includes bedside tables and lockers, dialysis machines, door.
knobs, light switches, counter tops, handles, desks, phones, keyboards, toilets, faucets, and sinks etc.

- Solutions for disinfection should be composed either of 1% hypochlorite or alcohol for disinfection of surfaces.
- The front of the HD machine should be cleaned with alcohol based solution
- It is recommended that solutions for disinfection be composed either of hypochlorite, alcohol, or glutaraldehyde for disinfection of surfaces in accordance with the manufacturer’s instructions.
- Trash can with yellow bag to be available next to patient’s bed.
- All surfaces to be cleaned with 1% hypochlorite (counters, tables, door handles, landline phone, light switches, weight measuring machine side handles), hand rests of wheel chairs, trolleys
- WEAR GLOVES (clean disposable gloves) while cleaning and disinfecting and then discard them in yellow bucket with yellow bag. Wash hands with soap and water thoroughly after degloving.
- **In between shifts:**
  - **Linen** to be put in red bucket which has 1% hypochlorite, let the linen soak for 20 minutes and then to send for laundry 12
  - **HD sets/trays** with instruments to be put in red bucket which has 1% hypochlorite, let the linen soak for 20 minutes and then to send to CSSD. **HD machines**: Hot disinfection to be done (with citrosil), **HD machine surface** to be cleaned with 1% hypochlorite followed by mopping with dry cloth.
  - **HD machine front screen** to be cleaned with alcohol-based sanitizer.
  - **Surface cleaning**: All surfaces to be cleaned with 1% hypochlorite (counters, tables, door handles, landline phone, light switches, weight measuring machine side handles/bars)
  - **Oxygen saturation probes and BP cuff** to be cleaned with alcohol **Beds**: Clean beds with 1% hypochlorite.
  - **Bins**: Clear all the bins
  - **Floor**: Mopping with 1% hypochlorite.

**Personal Protective Equipments (PPE):**

Personal protective equipment to be used while dialyzing suspected /COVID-19 positive patients.

These include:

- Shoe covers
- Gown
- Surgical cap or hood
- Goggles or eye shields
- Mask: N95
- Surgical gloves
The correct method of donning and doffing personal protective equipment’s (PPE) can be viewed on intranet of our Kasturba Hospital.

**Gloves use:**
- Wear gloves when patient or body fluid/secretion contact is anticipated
- Wear gloves while working on the HD machine
- Wear clean non-sterile gloves for environmental or machine cleaning purposes
- Sterile gloves should be used while performing invasive patient procedures
- Do not touch other parts of PPE with gloved hands
- Perform hand hygiene before and after removing gloves
- Remove gloves after contact with a patient or surrounding using proper technique to avoid hand contamination- the gloved hand must not touch clean body parts anytime during removal
- Reuse of gloves must not be done

**Eye protection:**
- Eye protection in the form of goggles or face shield is important to prevent transmission through eye.
- Snugly fitted goggles with anti-fog features to cover the corners of the eyes or face shield covering from crown to chin and to the point of ears on the sides should be used
- Face shields and goggles can be reused after proper disinfection
- Used devices should be disinfected with designated disinfectant like 70% alcohol, rinsed and allowed to dry before the next use
- Gloves are to be worn while disinfecting these devices
- Each HCW should be assigned his/her eye protection device
- A labelled container for used devices should be available with the HCW so that he/she disinfects and wash before reuse.

**Gowns:**
- Disposable impervious (body fluid/secretion resistant) gowns should be worn when fluid penetration is likely
- Reusable cotton gowns which are clean can be used for other activities, if impervious gown is not available, you can wear disposable plastic apron beneath the cloth gown.
- The torso should be covered and long sleeves should fit the wrists snugly

**References:**


CHECKLISTS HAEMODIALYSIS DURING COVID-19 OUTBREAK

HD unit- Preparedness

● Availability of dialysis consumables including alcohol based sanitizers, dialysate, dialyzers and tubings, catheters, fistula needles, heparin, disinfectants x 1 month stock
● Availability of PPE kit including N95 facemasks, gowns, goggles, Suits x 1 week
● Dedicated screening area identified and readied with non-contact thermometers, chairs for patients with adequate distancing, sign boards with COVID-19 related information and contact number
● All haemodialysis Unit patients have been briefed about the COVID-19 disease, new screening and reporting procedures, wearing of face mask, social distancing measures.
● Alcohol sanitizers / Soap with Basin available at entry, exit points and foot end of each bed.
● Dedicated areas / Waste Bins for disposal of infected consumables
● Identification of Isolation Unit / Cubicle done to dialyse suspect patients awaiting reports
● Designated HD unit for dialysing COVID-19 positive patients readied with all arrangements

Health Care Workers (HCW) – Preparedness

● HCWs have been given knowledge on COVID-19 including symptoms, signs, precautions to be taken including hand hygiene, use of alcohol sanitizers, universal precautions to be maintained for each patient, disinfection practices to be followed and to report illnesses
● HCWs have been trained in use of appropriate PPE including doffing and donning.
● HCWs are given information regarding protocols in triaging and referring patients with suspected or confirmed cases of COVID-19
● A duty roster for all HCWs including separate roster for those handling suspect and positive cases has been put out for the month with provision for standby.

HD UNIT CHECK LIST – (DAILY BY INCHARGE)

● Prior to start of HD sessions
  o All liquid soaps, alcohol based sanitizer bottles filled and ready to use
  o All staff wearing appropriate PPE, face masks
  o All staff for the day/session have been screened by thermal scanners and verbally for any symptoms and signs
  o All patients have been screened prior to arrival and are wearing face masks, have performed hand hygiene and adhering to social distancing measures
● At the end of each HD sessions
  o Bed linen, dialysis machines, tubings, BP apparatus have been disinfected / cleaned as per protocol
  o Appropriate disposal of consumables in designated area done

PATIENT CHECK LIST – HAEMODIALYSIS UNIT

Name:                                        Hospital No:                  Contact No:

Address:

● History of Travel Outside district / State / Country in the past 15 days (yes/no)
● History of Contact with any person with travel history as above, suffering from COVID-19 (yes/no)
● Received information regarding COVID-19 symptoms, dialysis unit protocols and guidelines regarding prevention of COVID-19 (Yes/No)
● History of the following symptoms in the past 2 weeks
  o Fever (yes/no)
  o Running nose (yes/no)
  o Cough (yes/no)
  o Breathlessness (yes /No)
● Wearing face mask (yes/no)
● Screened by thermal scanner (yes/no)
● Hand wash done prior to entry to the dialysis unit (yes/No)

Name / Signature                                                                                      Date
**Flow of patients in OPD**

1. At entry, the only patient is allowed to visit the OP suite. Personal masks are compulsory. Hand sanitation done at entry is made mandatory. Patient may be accompanied by one more person if patient is morbid, wheel-chair bound or physically or mentally deprived.
2. Only two rooms have been allocated for use, one for consultant and one for the registrar. Other rooms to be kept closed at all times. In the room, measures such as additional desks are kept to optimize physical distancing (~2 metres). For the purpose of examination, a separate examination area has been allocated and extra redundant surfaces and materials have been removed.
3. Examination must be done using disposable gloves, different for each patient (only if utmost important).
4. After the consultation with the physician, the patient will hand over the OP file at the reception desk and go for investigations and/or home if no further investigation is required.
5. The room should be disinfected with sodium hypochlorite solution as per guidelines by HICC.
6. OP procedures such as endoscopy as well as diagnostic and therapeutic abdominal paracentesis will be performed at the main endoscopy facility only.
7. It is mandatory for doctors to wear N95 masks at all times. Support staff must wear at least surgical mask and N95 if close contact is anticipated

**Related to Endoscopic Procedures**

**Scheduling of Endoscopic Procedures**
Endoscopy procedures can be divided into three categories based on their urgency as follows:

**Emergency endoscopic procedures:**
- Patients with acute upper GI or lower GI bleeding
- Removal of impacted foreign body
- Cholangitis

**Urgent endoscopic procedures:**
- Drainage of an infected pancreatic fluid collection
- Diagnosis and staging of GI cancers
- Placement of a naso-jejunal or percutaneous gastrostomy tube for nutritional support
- Drainage of malignant biliary obstruction
- Placement of a stent for malignant luminal obstruction of the esophagus, colon, or duodenum.
Routine endoscopic procedures:
- Routine referrals for diagnostic endoscopy procedures for screening of variceal status, evaluation of anemia, evaluation of chronic diarrhea, dyspepsia
- Plan is to defer endoscopy till 3 weeks unless patient has red-flag signs as assessed by clinician

Pre procedure Screening
- History of fever or respiratory symptoms, contact with a confirmed case of COVID-19
- Recent history of travel to or of living in an area with higher rate of transmission of COVID-19 disease will be obtained
- Body temperature should be measured as a routine
- Patients will thus be categorized as:

Low Risk
- No symptom suggestive of COVID-19 (cough, fever, breathlessness, or diarrhea)
- No history of travel to or stay in a high-risk area* in the past 14 days (*a “high-risk area” implies an area where more than 1,000 cases have been confirmed till date; this is changing over time)
- No contact with a COVID-19 patient

Intermediate Risk
- Symptoms present but no history of travel to or stay in a high-risk area during the past 14 days or of contact with a COVID-19 patient
- No symptom, but history of contact with a confirmed COVID-19 patient or stay in or travel to a high-risk area in the last 14 days

High Risk
- At least one symptom present; and either contact with a confirmed COVID-19 patient or of stay in a high-risk area
- For patients belonging to Intermediate and High Risk Group, the indication for the procedure will be re-assessed and the procedure will be delayed after notifying to the relevant health authority.

In the Procedure Room
- The number of staff members present in the endoscopy area during the procedure should be reduced to the minimum required
- All members of the team should wear appropriate personal protective equipment (PPE), such as gloves, N95 mask, eye shield/goggles, face shields, and gown, as appropriate
- For high-risk cases, ensure that appropriate PPE is available and worn by all members of the endoscopy team. In such cases, the sequence of wearing (donning) & removal (doffing) of PPE must follow the prescribed standard protocol
- Standard endoscopy room disinfection policy should be followed for non-COVID19 or low-risk patients undergoing endoscopy
For patients with intermediate or high risk of COVID-19 infection, noncritical environmental surfaces frequently touched by hand (e.g., bedside tables, bed rails, cell phones, computers) and endoscopy furniture and floor should be disinfected at the end of each procedure.

With a COVID-19 positive or very high-risk case with respiratory symptoms, the endoscopy may be performed in a negative-pressure room, if available.

**Post procedure Observation**
- During patient observation in the post-procedure area or a recovery room, adequate spacing between beds (at least 6 feet) should be ensured.
- Surgical masks should be provided for patients with respiratory symptoms.

**Related to Outpatient Clinics**
- Non-urgent consultations and outpatient visits may be postponed or rescheduled for 4 weeks later (unless change in symptoms or clinical situation warrants an earlier visit during the intervening period).
- The policy of having only one accompanying person per patient should be insisted on in consultation rooms, in waiting areas, and for inpatients to prevent crowding.
- Information about COVID-19 must be displayed in the outpatient and other patient waiting areas with visuals recommending the dos and the don'ts.
- An appointment system should be instituted and followed so that the patients do not have to wait for a long time or to crowd in the outpatient or endoscopy waiting area.
- The electronic means of communications or telemedicine (such as phone calls, text messaging, WhatsApp, or other video calling applications) can be used for resolving minor queries and may help obviate a visit to the hospital or clinic, thereby reducing the risk of transmission of infection.

**Actions in Case of Exposure to a Health Care Worker to COVID-19**
- If an HCW is exposed to a person at high risk of or a confirmed COVID-19 case, the hospital's infection control team will be informed immediately, and the guidelines set up by the MoHFW, Government of India, shall be followed.
- Such workers may need quarantine for 14 days with self-monitoring and/or supervised guidance based on the risk stratification of the exposure.
- For asymptomatic HCWs involved in the care of suspected or confirmed cases of COVID-19, prophylactic treatment with hydroxychloroquine may be considered, as per the guidelines put forward by the Indian Council of Medical Research. The recommended dosage for this purpose is 400 mg (taken with meals) twice a day on day 1 followed by 400 mg once weekly for the next 7 weeks.

**Patients with Preexisting Digestive Diseases**
- In patients with inflammatory bowel disease, there is no recommendation to pause the immunosuppressive treatment at the moment. Often, the risk of flare-up of the original...
disease may outweigh the chance of contracting COVID-19, necessitating the continuation of such drugs

- All such patients should follow the guidelines of the MoHFW, Government of India, for the general public, which are meant to minimize exposure to the coronavirus disease, especially social distancing and frequent handwashing
- Patients with cirrhosis (even Child A) and those with prior liver transplantation should be discouraged from visiting a clinic or hospital, unless absolutely essential
- Patients with decompensated cirrhosis should be considered for inpatient treatment only if there is a pressing indication for admission, such as acute GI bleed, hepatic encephalopathy, tense ascites causing respiratory distress, or liver cancer requiring locoregional therapy or liver transplantation
- Endoscopic variceal ligation as primary prophylaxis will be postponed till 4 to 6 weeks later or till the threat of COVID-19 infection has passed
- Liver transplant recipients with COVID-19 infection will be monitored for drug–drug interactions, if they are prescribed lopinavir/ritonavir antiviral therapy
PROCEDURAL GUIDELINES FOR NUCLEAR MEDICINE PRACTICES DURING COVID-19 PANDEMIC

Dr. Sumeet Suresh Malapure, Associate Professor, Incharge Head, Division of Nuclear Medicine

Scope

Applicable during COVID 19 Pandemic/similar epidemics

Procedures:

Protection of Staff: Responsibility: All Faculty/ staff Members

- All staffs to train and follow infection control committee practice guidelines, hand hygiene and proper donning and doffing of masks and PPE kits.
- Faculty/staff members to be divided into 2 small teams working on separate days. Each team to work for 7 consecutive days.
- Daily temperature assessment of all members
- Should wear N95/triple layer surgical masks at all time in the department.
- One should try to avoid physical contact and reduce the time spent with each patient.
- To wear triple head gear, use disposable gloves, head and shoe covers when checking vitals, cannulating and injecting the patient.
- To don PPE before addressing any suspected or proven case of COVID-19.
- Faculty/ Staff are required to dispose off gloves and sanitize hands using soap/sanitizer after coming in physical contact with any patient.
- Faculty/Staff members should avoid having beverages / food together. Any celebrations need to be avoided.
- To change clothes and take a bath immediately after reaching home to protect family members.
- Any staff member who develops fever, cough, headache, muscle ache, breathlessness should inform the infectious disease COVID-19 management team.

Patient scheduling: Responsibility – OPD nurse and PRE

- Appointments to be given over the phone when requested by another department. Other departments will be advised to call up the reception for appointments to avoid unnecessary patient movement.
- Only those scans or therapies which are deemed necessary (those which have an impact on further management of the patient/semi emergency/emergency cases) by the referring or nuclear medicine physician shall be given appointment.
- Scans to be scheduled with adequate interval time between scans to avoid crowding. Not more than 10 scans to be scheduled in a day.
- All patients and patient attenders coming inside need to sanitize their hands and wear masks.
- Any high risk patient/confirmed case of COVID 19 to be scheduled at the end of the day.
- For OPD – Only 2 patients with their attenders to be let in the department. One patient will be waiting in the patient waiting area while one is being seen by the Nuclear Medicine Physician.

**Screening:** Responsibility OPD nurse

- Detailed history and self-declaration by the patient to be taken by the nursing staff and a note to be made on the following points
- Travel history in the last 14 days.
- Contact history of any suspected/confirmed case.
- Any history of fever/sore throat/cough/cold/headache/muscle ache/breathlessness.
- Any healthcare worker working in high risk areas.

**Patient waiting area:** Responsibility – OPD nurse and PRE

- Patients and attenders coming in should be made to wash hands / sanitize using sanitizer.
- Triple layered masks to be provided for all the patients and attenders.
- Only those patients scheduled for the scan should be asked to wait in the patient waiting area with minimum 3-6 feet between them. Only attenders of those patients who need support or in case of minors shall be allowed to sit in the patient waiting area maintaining min 3-6 feet between them. Rest of them can sit in the general waiting area outside.

**Post injection waiting room:** Responsibility – Technologist and Scan nurse

- Asymptomatic patients can be made to sit with minimum distance of 3-6 feet apart.
- Symptomatic/suspected/proven cases should be alone in the patient waiting room who is scheduled next for the scan with an attender, if necessary, with proper protection.

**Scan procedure:** Responsibility - Technologist and Scan nurse

- Hospital gown to be given to each patient undergoing the scan.
- Patients must be advised to sanitize hands using sanitizer before and after scanning to avoid contamination of the scanner and scan room.
- Disposable sheets to be used on patient bed and changed after every scan. The used disposable sheets to be disposed as per hospital protocol.
- Technologists should wear masks and use gloves when handling the patients. After handling the patient, they should wash hand/ use sanitizers. Technologists are advised to practice hand washing / use sanitizers frequently throughout the day.
Disinfection and decontamination: Responsibility – Technologist, Scan nurse and ward nurse
- Parts of scanner that come in contact with the patient should be decontaminated after every scan.
- Scanner should be disinfected according to manufacturer’s advice using vendor recommended disinfectant. Spray or liquid should not be poured onto the system.
- Deep decontamination, as per manufacturer’s advice need to be done after imaging of a COVID-19 positive case.
- Computer, keyboard, mouse and other surfaces should be decontaminated using the disinfectant recommended by vendor and hospital infectious committee at regular intervals during the day and at the end of the day’s shift.
- All surfaces including reception desk, physician desk, acquisition counter, door handles, telephones etc to be disinfected periodically using 1% sodium hypochlorite solution and 70% alcohol every 3 hourly.

Imaging a COVID-19 patient: Responsibility – Nuclear medicine physician, Technologist and scan nurse.
- Preferable to postpone the study if the scan is not going to impact the management of the case in a significant way as deemed by the referring/ nuclear medicine physician.
- Before the arrival, all staff members should be informed about the COVID-19 status of the patient.
- Staff coming in contact with a proven case should wear PPE prior to the procedure.
- Patients should be made to wait in a room with air filters or with negative air pressure.
- Deep cleaning of the rooms (30 minutes of decontamination and 1 hour for passive air exchange) IS MANDATORY after the scan is done.
- Details of the staff present at the time of the scan to be logged.

Radionuclide therapies: Nuclear medicine physician, Ward nurse
- Thorough screening with/without COVID testing to be done prior to radionuclide therapy
- The isolation room beds need to be covered with disposable sheets and discarded as per hospital protocol
- Treatment of a proven COVID-19 case should be postponed or cancelled if not necessary.
- Those patients in whom therapy is necessary, full PPE is to be worn by the staff involved in the procedure
- Proper donning and doffing of PPE to be followed as per the hospital guidance.
- Details of the staff present at the time of the scan to be logged.
- After discharge, mandatory deep cleansing (30 minutes of decontamination and 1 hour for passive air exchange) of the room should be done.
MANAGEMENT OF PATIENTS IN NEUROLOGY

Dr. Aparna R Pai, Professor & HOD, Dept. of Neurology

- Please use masks provided and gloves while examining all patients especially in emergency situations.
- If examining a suspect/confirmed COVID-19 case use full PPE. Familiarize yourself with correct method of donning and doffing PPE available on hospital website.
- Comply with correct hand wash procedure.
- Enquire travel history, contact history, febrile illness or respiratory symptoms in all patients. Inpatients will have to be asked about fever, respiratory symptoms on a daily basis in view of contact with visitors or patient party.
- Ensure early triaging with adequate precautions in patients with fever / respiratory symptoms. Inform duty consultant about case details who can then coordinate with COVID team.
- Triage patients before admissions into low risk, intermediate risk and high risk based on residential area, travel history, contact history, history of fever, systemic and respiratory symptoms. High risk patient should be informed to Neurology consultant before admission and then to discussed with COVID team before admission.
- Be aware of correct intubation process with adequate precautions and ask expert anesthetist services if deemed necessary.
MANAGEMENT OF PATIENTS IN DERMATOLOGY

Dr Varsha M Shetty, Assistant Professor

Dr. Raghavendra Rao, Professor & HOD, Dept. of Dermatology

Outpatient clinics

- All doctors and staff should wear protective mask and non-sterile gloves while examining patients.
- The team of doctors including minimum number of consultant and dermatology residents to manage OPD patients with adequate social distancing.
- Adequate ventilation to be maintained in patient waiting and consulting area and avoid closed air space.
- Ensuring that all the patients entering the dermatology OPD are covering their nose and mouth with mask, cloth or hand kerchief.
- Travel history, contact history, history of febrile illness or respiratory symptoms shall be enquired in all patients presenting to dermatology OPD.
- All febrile patients shall be referred back to fever clinic for screening of SARS-COV-2 infection.
- Attenders of patients should not be allowed inside the consultation chambers unless it is absolutely necessary such as while treating children or elderly or wheel-chair bound patients.
- Mandatory use of hand rub between two patient’s examinations shall be ensured.
- As far as possible, a safe distance of one meter has to be maintained between patient and the doctor.
- Only limited number of patients shall be allowed inside the OPD (as per the availability of chairs).
- All furniture (tables, door handles) and other high touch surfaces shall be disinfected with hypochlorite solutions by the house-keeping staff once in 2-3 hours.
- The examination beds shall be covered with disposable spreads.
- All consultations from isolation ward/ ICU, needs to be discussed with the concerned staff before examining the patient. Bedside consultations should be done only after taking proper precautions that are applicable to that particular ward (to discuss with concerned in-charge nurse)

Minor OT & Laser Room Procedures

- Only those diagnostic/therapeutic procedures shall be done which are an absolute necessity for the patient care. The cosmetic procedures may be undertaken on a case to case basis as per the discretion of the treating doctor.
- Only limited number of LASER appointments shall be entertained.
• Only one procedure shall be done at a time in the minor OT/LASER room to avoid overcrowding.
• The treating doctor and the nursing staff shall wear a full protective wear including sterile disposable gown, N95 mask, sterile gloves and face shield during the procedure while ensuring that the patient being treated is wearing mask and his/her hands are sanitized before entering the minor OT. The protective wear shall be discarded after usage.
• The procedures such as CO2 laser, and cautery which results in the generation of plumes and tissue spatter shall be postponed until further notice.
• Appointments for phototherapy treatment shall be given such that there is adequate spacing between the two sessions. The technicians administering the phototherapy shall be wearing the protective masks, maintain hand hygiene with alcohol based hand-rubs and follow social distancing. The high touch surfaces shall be disinfected periodically.

**In-patient care**

• Only those patients who mandatorily require in-patient care shall be admitted to the ward.
• All the patients admitted shall be instructed to wear mask, practice hand hygiene and maintain social distancing.
• Inpatients will have to be asked about fever, respiratory symptoms on a daily basis in view of contact with visitors or patient party.
• The in-patient rounds shall be taken by minimum number of consultants and only one resident shall be posted to attend to the in-patients on a rotation basis.
• All the doctors and nurses attending to the in-patients shall wear protective mask and gloves with mandatory use of hand-rubs after examining every patient.
• Initiation or continuation of immunosuppressive agents and biological therapies (monoclonal antibodies) shall be discussed with all the stake holders and appropriate decision shall be taken on case to case basis by the treating consultants. Protocols that have been published in the reputed journals regarding these matters shall be referred to.
Why Palliative care in COVID-19 illness?

The coronavirus COVID-19 pandemic is defining global health and humanitarian crisis, causing significant morbidity and mortality. With millions affected, World Health Organization (WHO) is reporting an average death rate between 2% and 4%, with the death rate among elderly patients at 15% to 22%. Patients with severe life-limiting illnesses like advanced cancer, end-stage organ impairment, comorbidities, and the elderly are at increased risk of mortality from COVID-19. Triaging policies set according to local exigencies might triage these subsets of patients with severe COVID-19 related respiratory illness to receive only supportive care. Those with serious acute respiratory illness secondary to COVID-19 not receiving or not eligible to receive aggressive intensive care management should receive appropriate symptom management measures. As much as physical repercussions of the disease demand attention, the mental health issues also need to be addressed.

What is Palliative Care?

Palliative care, with a biopsychosocial spiritual model of care, focuses on improving the quality of life of patients suffering from serious life-limiting illness and their caregivers. It emphasizes on early identification of symptoms and its control, empathetic communication, psychosocial and spiritual support, end of life care and bereavement care.

Who should receive Palliative Care in a humanitarian crisis?

A subset of the population with COVID-19 will develop severe symptom burden and respiratory distress. Not all will be eligible for aggressive intensive care management due to their underlying conditions, especially those who are elderly with multiple comorbidities, end-organ impairment and advanced cancer. When the health care system is overwhelmed with COVID-19 patients, these patients may be triaged for supportive treatment only. This guideline addresses the symptom management and supportive care strategies in patients with serious COVID-19 illness where ventilation may not have a desirable outcome.

COVID-19 patients not suitable for ventilation are categorized as stable, unstable, and end of life. The categorization is based on the early warning parameters recommended by the National Health Service (NHS) and WHO. The parameters used in categorization are EWS (Early Warning Scores, respiratory rate (RR) and oxygen saturation. (Table 1, Table 2)
Table 1: Categorizing COVID-19 patients where ventilation may not have desirable outcome

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
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<tbody>
<tr>
<td><strong>Stable</strong></td>
<td>A. EWS ≤ 7</td>
</tr>
<tr>
<td></td>
<td>B. RR ≤ 25/min</td>
</tr>
<tr>
<td></td>
<td>C. O₂ Saturation &gt; 88% (On 60% venturi mask)</td>
</tr>
<tr>
<td><strong>Unstable</strong></td>
<td>A. EWS &gt;7</td>
</tr>
<tr>
<td></td>
<td>B. RR&gt;25/min</td>
</tr>
<tr>
<td></td>
<td>C. O₂ Saturation &lt; 88% (On 60% venturi mask)</td>
</tr>
<tr>
<td><strong>End of Life</strong></td>
<td>A. ARDS</td>
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<td></td>
<td>B. O₂ Saturation &lt; 70%</td>
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Table 2: Early warning Score:

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<td>36.1-38</td>
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<td>&gt;39</td>
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<td></td>
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<tr>
<td>Heart Rate</td>
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<td>41-50</td>
<td>51-90</td>
<td>91-110</td>
<td>111-130</td>
<td>&gt;130</td>
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<tr>
<td>(beats/min)</td>
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<tr>
<td>Systolic BP</td>
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<td>101-110</td>
<td>111-219</td>
<td>&gt;219</td>
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<td>(mm/Hg)</td>
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<td>Respiratory Rate</td>
<td>&lt;9</td>
<td>9-11</td>
<td>12-20</td>
<td>21-24</td>
<td>&gt;25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(breaths/min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxygen Saturation</td>
<td>&lt;92</td>
<td>92-93</td>
<td>94-95</td>
<td>&gt;96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxygen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNS response</td>
<td></td>
<td>GCS&gt;12</td>
<td>GCS&lt;12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Palliative care triaging in COVID-19 is classified into four categories (Table 3). In the patients with code Blue and Red, palliative care should be integrated with the acute services and disaster response team for rapid and emergency palliative care.
Table 3: Palliative Care Triaging in COVID-19 Situations

<table>
<thead>
<tr>
<th>Category</th>
<th>Colour Code</th>
<th>Description</th>
<th>Palliative Care Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>Red</td>
<td>Survival only possible with immediate treatment</td>
<td>Emergency Palliative Care integrated with active care and disaster response</td>
</tr>
<tr>
<td>Expectant</td>
<td>Blue</td>
<td>Survival not possible given the care available</td>
<td>Emergency Palliative Care integrated with active care and disaster response</td>
</tr>
<tr>
<td>Delayed</td>
<td>Yellow</td>
<td>Not in immediate danger of death but treatment needed</td>
<td>Palliative care as required for symptom management</td>
</tr>
<tr>
<td>Minimal</td>
<td>Green</td>
<td>Will need medical treatment sometime in the future</td>
<td>Palliative care may be required for relief of symptoms</td>
</tr>
</tbody>
</table>

(Adapted from the WHO Guidelines for Integrating Palliative Care and Symptom Relief into the response to Humanitarian Emergencies and Crises)

Assessment and Management of common symptoms in COVID-19 patients

COVID-19 patients with severe acute respiratory illness experience symptoms that needs assessment and management.

1. PHYSICAL SYMPTOM MANAGEMENT

The physical symptoms could be due to the direct effect of the illness and, side-effects of the treatment. It can be managed by proper assessment of symptoms and adequate treatment. Breathlessness, Delirium, Respiratory Secretions and Pain are the common symptoms that need immediate attention.

1.1 Dyspnea:
COVID 19 patients with Severe Acute Respiratory Symptoms (SARI) develop severe dyspnea, which can be refractory to medical management and high flow oxygen. The breathlessness can be assessed using a verbal descriptor scale (VDS) for dyspnea intensity.

Table 4: Management of dyspnea

<table>
<thead>
<tr>
<th>Mild Dyspnea (Visual Dyspnea scale score- 1-3)</th>
<th>Moderate Dyspnea (Visual Dyspnea scale score- 4-6)</th>
<th>Severe Dyspne (Visual Dyspnea scale score- 7-10)</th>
</tr>
</thead>
</table>
- Medical management
- High flow oxygen
- Positioning (upright, sitting, leaning forward)
- Cold flannel on the face

- Strategies used for Mild dyspnea +
  - Oral Morphine Immediate Release 2.5 mg BD-TDS + 2.5mg SOS. Slow upward titration by 2.5 mg daily up to 40-60 mg/day.
  - Oral Lorazepam 0.5 mg if anxiety is present. Increase by 0.5 mg daily up to 4mg/day.

- Strategies used for Mild dyspnea +
  - Inj Morphine 2 mg iv Q4H + Inj Midazolam 2 mg SC Q4H
  - Inj Morphine 10-15 mg + Inj Midazolam 10-15mg as a 24-hour infusion

### 1.2 Delirium:
Delirium is common in patients with acute and serious illness needing ICU care or at the end of life. In COVID-19 patients, delirium may be due to sepsis, metabolic disturbances, and cerebral hypoxia or due to medications. Most patients may have a hypoactive or mixed type of delirium with fluctuating levels of activation.

<table>
<thead>
<tr>
<th>Table 5: Management of Delirium and Agitation in Patients with Serious COVID-19 Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mild Delirium</strong></td>
</tr>
<tr>
<td>Non-pharmacological:</td>
</tr>
<tr>
<td>• Quiet room</td>
</tr>
<tr>
<td>• Less visual/auditory excitation</td>
</tr>
<tr>
<td>• Bed by the side of window</td>
</tr>
<tr>
<td>• Reorientation techniques</td>
</tr>
<tr>
<td>• Consistency of the nursing staff</td>
</tr>
<tr>
<td>• Avoiding physical restraints</td>
</tr>
<tr>
<td>Pharmacological:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
**1.3 Respiratory Secretions:**
Respiratory secretions are seen in 20-90% of patients in the last days or hours of life. Majority of these secretions are due to non-pathological accumulation bronchial secretions that can be seldom expectorated out. Although it may not cause any distress to the patients, the families are distressed by the noise of the secretions.

<table>
<thead>
<tr>
<th>Non-Pharmacological management</th>
<th>Pharmacological management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Optimizing hydration</td>
<td>Inj. Glycopyrrolate 0.2mg Q8H to Q6H IV If severe 0.8 to 1.4mg/24h in divided doses or as a continuous IV infusion over 24 hours</td>
</tr>
<tr>
<td>• Judicious use of parenteral hydration</td>
<td></td>
</tr>
<tr>
<td>• Avoiding oropharyngeal suctioning</td>
<td></td>
</tr>
<tr>
<td>• Preventing aspiration</td>
<td></td>
</tr>
<tr>
<td>• Lateral recumbent position head slightly raised</td>
<td></td>
</tr>
</tbody>
</table>

**1.4 Pain:**
The aetiology of pain in an ICU setting could be multifactorial and can be due to illness per se or due to medical procedures and invasive interventions. In a conscious patient with intact cognition and verbalizing a numerical rating scale can be used to assess pain intensity. While in patients with cognitive deterioration, altered sensorium or intubated patients, behavioural pain scale is used. World Health Organization suggests a step ladder approach for pain management.
## Table 7: Management of pain in patients with COVID-19

<table>
<thead>
<tr>
<th>Mild Pain (NRS: 1-3)</th>
<th>Moderate Pain (NRS: 4-6)</th>
<th>Severe Pain (NRS: 7-10)</th>
<th>Pain not amenable to palliative management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Oral Paracetamol 2-4gm/24h in four divided doses</td>
<td>• Strategies used for Mild Pain +</td>
<td>• Strategies used for Mild pain +</td>
<td>• Palliative Sedation for management of intractable symptom</td>
</tr>
<tr>
<td>• If the patient is not taking orally</td>
<td>• Oral Morphine Immediate Release 5mg Q4H and the breakthrough dose is 1/6th the 24-hour dose. Upward titration by 50% of dose every day</td>
<td>• Inj Morphine 2-2.5 mg iv Q4Hr/ Inj Morphine 10-15 mg as a 24-hour infusion</td>
<td></td>
</tr>
<tr>
<td>• Inj Paracetamol 2-4gm/24h in four divided doses</td>
<td>• If patient unable to take orally Inj Morphine 1-2mg IV every 4 hours</td>
<td>• Consider Fentanyl if the patient has renal failure. Fentanyl dose is 0.2-0.5mcg/kg/hr</td>
<td></td>
</tr>
<tr>
<td>• If neuropathic pain is present</td>
<td>• Consider Fentanyl if the patient has renal failure. Fentanyl dose is 0.2-0.5mcg/kg/hr</td>
<td>• Other strategies for managing constipation if the patient is unable to take oral Bisacodyl</td>
<td></td>
</tr>
<tr>
<td>• start Gabapentin 100mg HS and upward titration by 100-300mg/24h to a maximum of 2700-3600 mg/24h</td>
<td>• Other strategies for managing constipation if the patient is unable to take oral Bisacodyl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• AVOID NSAIDs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 1.5 Management of intractable symptoms:

There will be a subset of patients who may not have relief of symptoms with the above measures and can have serious distress. These patients are managed by administering medications to induce a state of decreased awareness to relieve the suffering caused by intractable symptoms. It is known as palliative sedation.

Before initiating palliative sedation, a thorough assessment is required to ascertain the reversibility of the clinical condition and the symptoms. Once irreversibility is established, families should be communicated about the refractoriness of illness, severity of symptoms and the lack of effective strategies to manage the symptom within a reasonable period of time. The need for initiating sedation should be discussed in a sensitive manner and family should be encouraged to participate in decision-making. Once the family is willing, consent has to be
obtained stating the clinical condition, prognostication of illness, the intractable nature of the symptoms, the proposed approach, the probable duration of sedation and any anticipated side effects

**Table 8: Stepwise approach of palliative sedation (20)**

<table>
<thead>
<tr>
<th>First-line</th>
<th>Second line</th>
<th>Third line</th>
</tr>
</thead>
</table>
| ● Midazolam 2 mg Stat  
● Midazolam 10-15 mg/24 h IV infusion  
● Midazolam dose can be incrementally increased by 30% of the initial dose until desired sedation is achieved.  
● If there is no response to incremental doses or severe distress persists at high doses of Midazolam (75-100 mg/24 h) second-line agent should be considered. | ● Phenobarbitone 100 mg stat IV  
● Phenobarbitone 400-800 mg/24 h as continuous IV infusion up to 1600 mg/24 h | ● On very rare occasions severe distressing symptoms not controlled by first and second-line agents to consider Propofol 0.5 mg/kg IV stat and maintenance of 1-4 mg/hr IV as a continuous infusion |

**1.6 End of Life Symptom Management of Serious COVID-19 patients not ventilated or discontinued ventilation:**

Patients who are not ventilated or discontinued from ventilation can develop severe breathlessness, delirium and moist breathing. A combination of medications either as a continuous infusion or intermittent dosing along with breakthrough medications, can be administered to such patients.

Inj Morphine 10-15 mg/24 h + Inj Midazolam 10-15 mg/24 h can be combined and administered as an infusion or Inj Morphine 2 mg + Inj Midazolam 2 mg every 4 hours if respiratory secretions are present Inj Glycopyrrolate 0.2 mg every 6-8 hours. The breakthrough medications are given SOS for symptoms, and breakthrough medications can be given in the intervals of one to two hours as required. The breakthrough doses are one-sixth of the 24-hour dose.

Patients with serious COVID-19 not on a ventilator can develop severe symptoms. These should be anticipated, and an anticipatory prescription should be provided for all the patients.

**Table 9: Anticipatory Prescription**

<table>
<thead>
<tr>
<th>Symptom Anticipated</th>
<th>Treatment Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Inj Morphine 1-2 mg IV</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>Inj Morphine 1-2 mg IV</td>
</tr>
</tbody>
</table>
Distress/Agitation | Inj Midazolam 1-2mg IV
---|---
Delirium | Inj Haloperidol 1-2 mg IV
Delirium with severe agitation | Inj Haloperidol 1-2 mg IV + Inj Midazolam 1-2mg IV
Respiratory secretions | Inj Glycopyrrolate 0.2 mg IV
Nausea and Vomiting | Inj Metoclopramide 20mg IV

2. PSYCHOSOCIAL SUPPORT:
Patients and their families diagnosed with COVID-19 undergo a great deal of suffering caused by the physical manifestation of the disease, the uncertainty, fear of illness and death, stigma, and the socio-economic hardships. Palliative care focuses on alleviating suffering, both physical and psychological. The various aspects of psychosocial distress among patients with COVID-19, their caregivers and healthcare providers are outlined below and recommendations provided for their management.

2.1 Communication tips for healthcare providers during COVID-19:
Many healthcare providers find communicating the diagnosis and prognosis in the setting of serious illnesses challenging, more so during the COVID-19 pandemic. The physical distancing norms, the PPE, the stigma, and lack of time and skill make these conversations extremely difficult.

Why communication is needed?
Healthcare providers need to communicate effectively to:
- To share information in a timely, clear, and precise manner with patients/families
- To treat patients nearing end-of-life and their families with dignity and compassion
- To promote collaboration between patients/families and healthcare providers and local bodies to ensure adherence to public health norms

2.1.1 Skills for communicating with patients affected by COVID-19 and their families

| Table 10: Communication skills |
|---------------|----------------------------------------------|
| Serial No.   | Steps                        | Sample sentences                                      |
| 1            | Ensure Comfort               | • Introduce yourself by name and role
|              |                               | • Address patient by name                            |
| 2            | Check Emotions               | ➢ “How are you feeling today?”
<p>|              |                               | ➢ “Given your situation, how are you doing?”         |
| 3            | Reassure                     | ➢ “We will do everything we can to help you”         |
|              |                               | ➢ “We will do our best to take care of you”         |
|              |                               | ➢ “You are not alone. We will be there with you”     |</p>
<table>
<thead>
<tr>
<th>4</th>
<th><strong>Assess need for information and Elicit Concerns</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Assess what is already known. Avoid assumptions. Clarify any misinformation patient/family may have</td>
</tr>
<tr>
<td>✓</td>
<td>“What have you been thinking about your COVID situation?”</td>
</tr>
<tr>
<td>✓</td>
<td>Find out what the patient/family want to know</td>
</tr>
<tr>
<td>✓</td>
<td>“What is it that you would like to know more about (COVID/risk to yourself/risk to your family)?”</td>
</tr>
<tr>
<td>✓</td>
<td>Find out who else can be involved in decision making</td>
</tr>
<tr>
<td>✓</td>
<td>“Is there someone you want me to discuss the treatment plan with? Or should I talk to you alone?”</td>
</tr>
<tr>
<td>✓</td>
<td>Active listening – Nodding, tone of voice, gestures, words</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th><strong>Deliver Information with Empathy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Use patient’s primary language. Keep the sentences short. Avoid medical jargons and clichés.</td>
</tr>
<tr>
<td>✓</td>
<td>State issues clearly and honestly that is relevant to the patient</td>
</tr>
<tr>
<td>✓</td>
<td>“Here is something that we need to be prepared for.”</td>
</tr>
<tr>
<td>✓</td>
<td>“Is there anything you want us to know if your COVID gets bad.”</td>
</tr>
<tr>
<td>✓</td>
<td>“Here is what our hospital is doing for this condition.”</td>
</tr>
<tr>
<td>✓</td>
<td>Be empathetic:</td>
</tr>
<tr>
<td>✓</td>
<td>“I am really sorry, despite our efforts your _____ is deteriorating, but we are doing our best to reduce her suffering.”</td>
</tr>
<tr>
<td>✓</td>
<td>“We can imagine how difficult this is for you.”</td>
</tr>
<tr>
<td>✓</td>
<td>“This can be hard for you.”</td>
</tr>
<tr>
<td>✓</td>
<td>Make recommendations</td>
</tr>
<tr>
<td>✓</td>
<td>“Based on my experience, I would recommend [this]”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th><strong>Acknowledge and Validate Emotions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>“It is fine to be scared.”</td>
</tr>
<tr>
<td>✓</td>
<td>“These decisions can be stressful.”</td>
</tr>
<tr>
<td>✓</td>
<td>“I can see how worried you are.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7</th>
<th><strong>Address Anger</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Ensure the conversation happens in a safe place</td>
</tr>
<tr>
<td>✓</td>
<td>Name the emotion</td>
</tr>
<tr>
<td>✓</td>
<td>“I can see that you are angry/upset/irritated.”</td>
</tr>
<tr>
<td>✓</td>
<td>“You look upset.”</td>
</tr>
<tr>
<td>✓</td>
<td>Explore the reason for anger – allow expression of feelings</td>
</tr>
<tr>
<td>✓</td>
<td>“Can we talk about what made you angry?”</td>
</tr>
<tr>
<td>✓</td>
<td>“Can you please tell me about it.”</td>
</tr>
<tr>
<td>✓</td>
<td>Do not defend yourself or the person who upset the patient. Instead, acknowledge the anger and be empathetic</td>
</tr>
<tr>
<td>✓</td>
<td>“I am extremely sorry that this is happening.”</td>
</tr>
<tr>
<td>✓</td>
<td>“What would you like me to do to help.”</td>
</tr>
</tbody>
</table>
“Here is what we can do to make things better.”

“Thank you for sharing your feelings.”

In the presence of aggressive/violent patient, or mob, or presence of weapons CALL FOR HELP.

2.1.2 Skills for communicating in times of crisis to discuss resource allocation:

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Steps</th>
<th>Sample sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Explain the ICMR guidelines for the management of COVID-19</td>
<td>“This is what the government/ICMR is doing for the patients with this condition.”</td>
</tr>
</tbody>
</table>
| 2          | Explain what this means to the patient | “In this condition, we will take care of your [relative] in the ward and do everything we can to make him/her feel better and fight the illness. But we will not transfer to ICU if he/she gets worse.”
Talk about what you will do first and then what you cannot do |
| 3          | Assert what care you will provide | “We will be doing all we can that will help, and we hope he/she will recover.” |
| 4          | Respond to emotion | “I can see how difficult this is for you.” |
| 5          | Reassure that same rules apply to everyone | “We are using the same rules for every other patient in the hospital/institution.” |

2.2 Loss, Grief and Bereavement:

Patients and families diagnosed with COVID-19 experience a profound sense of loss. Most of them are unprepared for the rapid deterioration in health. This is coupled with other losses like the sense of security, livelihood, financial security, personal freedom, and support systems. Grief is the response to the event of a loss. Bereavement is the loss experienced due to the death of a loved one. Family members who are unable to be at the bedside of their dying patients or see them one last time may experience feelings of guilt and remorse. Loss, grief and bereavement can be complicated in critically ill COVID-19 patients and their families. Attending to this distress in an important component of palliative care service provision.
Steps to handle grief and bereavement

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Steps</th>
<th>What to look for?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Recognize Distress</td>
<td>Patient/family member crying, anxious, fearful, having mood swings, withdrawn, having death wishes</td>
</tr>
<tr>
<td>2</td>
<td>Recognize Grief</td>
<td>Shock, denial, guilt, blaming, anger, bargaining with self or family or God or with health systems, searching/yearning for the loved ones, sadness, separation anxiety, recalling or reliving the dying experience</td>
</tr>
<tr>
<td>3</td>
<td>Rule out Complications</td>
<td>Rule of depression, assess risk of suicide (If clinical depression or risk of suicide refer to mental health experts)</td>
</tr>
</tbody>
</table>
| 4         | Grief interventions          | ● Supportive psychosocial interventions  
● Grief interventions include:  
  - Normalizing the grieving process  
  - Normalizing the talk about loss and death  
  - Facilitating bedside good-byes through video conferencing  
  - Facilitating virtual funerals via social media/teleconferencing  
  - Allowing families to recall and relive the experience  
  - Talking about the deceased, recalling the deceased, talking about the deceased in past tense  
  - Acknowledging and validating the experience  
  - Using support systems – family, community, faith |
| 5         | Refer                        | Referral to mental health experts in case of complicated/difficult grief          |

2.3 Psychosocial Distress:
Patients with COVID-19 and their families are likely to experience increased distress from the time of diagnosis, during quarantine/isolation, when the patient becomes symptomatic, or when the illness worsens and finally leads to death. The psychological morbidity can start immediately or can develop later. What is known is that the mental health effects of the pandemic extend beyond the period of the pandemic leading to short-term and long-term psychiatric morbidity. Patient/families seeking palliative care in this situation are likely to be in extreme distress and assessing and managing distress is an important part of palliative care service provision.

2.3.1 Managing of psychosocial issues in critically-ill patients with COVID-19 and their families:

<p>| Screen for Distress | All patients/families in the end-of-life care pathway to be screened for psychosocial distress using |</p>
<table>
<thead>
<tr>
<th>Explore current concerns</th>
<th>Therapeutic communication to foster trust and rapport and facilitate exploration of psychosocial problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate risks</td>
<td>Any past or family history of psychological morbidity, any self-harm or suicidal behaviour</td>
</tr>
</tbody>
</table>
| Assign risk stratification| - Mild Distress – score <4 on DT – only supportive counseling, psychoeducation, enhancing coping skills  
                           - Moderate Distress – >4 on DT – in addition to the above mentioned techniques may require pharmacotherapy and psychotherapy |

**Table 14: Warning signs that should trigger immediate referral to mental health experts:**

**Red Flag Signs:**

- Agitation: To alleviate the risk of harm to self or others.
- Confusion or Disorientation: Rule out reversible cause.
- Substance use and withdrawal syndromes
- Hallucination and delusions
- Suicidal ideation: Explore for suicidal ideations proactively. If there is a person expressing or seeking help, this indicates a risk and hence immediate referral is warranted if a person seeking help indicates wanting to end life either directly or indirectly, immediate

**Table 15: Techniques to address psychosocial distress:**

**Psychoeducation – General Steps**

- Give reliable information in small chunks
- Keep messages simple and accurate, with repetition, reiteration, and regular checking if needed
- Be honest. Give information that you are sure of. Quote the source of information for authenticity.
- Avoid false reassurances.
- Disclaimer: We are still learning about the virus. There are many things we do not know. Research is going on. Guidelines are updated regularly.
- Give information to groups of affected people, families, etc. so that everyone hears the same
Health care workers can become the target of the frustration and anger if people may feel their needs have not been heard or met. In these situations try to maintain calm behaviour and be empathetic

### Enhancing Coping by:

- Facilitating ventilation and validation of feelings
- Providing reassurance
- Helping patients and families maintain of daily routine and structure
- Ensuring adequate sleep, nutrition and hydration
- Promoting realistic hope and goal-setting
- By helping normalise anger and grief
- By exploring feelings of guilt, remorse, or shame
- By teaching problem solving approach

### Psychotherapeutic Techniques

- Cognitive restructuring
  - Identification of negative thinking & subsequent emotional/ behavioural response
  - Challenging unhelpful thinking through the use of problem solving & testing of negative thoughts
  - Coming up with alternative, constructive, more realistic & helpful thoughts to utilize instead
- Thought stopping- addressing negative thoughts, Distraction
- Relaxation techniques, yoga, mindfulness
- Problem solving therapy
- Social skills training

### Addressing spiritual distress by:

- Reestablish Connectedness
  - Be available,
  - Genuine concern and acceptance
  - Reengage with themselves (hobbies/self-care), with families (phone calls/FaceTime/albums), and with beliefs and faith (prayers/rituals)
- Therapies to foster meaning and purpose at end-of-life
  - Dignity conserving care and therapy
  - Meaning-centered psychotherapy
  - Acceptance and commitment therapy

### Pharmacological management: (Always with Supportive therapy)

- Only in the presence of psychiatric diagnosis
- Start at a low dose and titrate slowly as needed

Drugs of choice for anxiety/depression are:
Selective Serotonin Reuptake Inhibitors (SSRI’s):
- Escitalopram 10 – 20 mg/day
- Sertraline 50 – 200 mg/day
- Explain that the beneficial effect of medication might appear only in a few weeks

Noradrenergic and specific serotonergic antidepressants (NaSSA)
- Mirtazapine 15—45 mg/day

SIDE EFFECTS of SSRIs: Nausea, GI upset and headache. In some, SSRI can cause restlessness and insomnia and in the elderly – hyponatremia

Interactions: Fluoxetine, paroxetine can increase the toxicity of antivirals. Mirtazapine and TCA can interfere with antiviral metabolism. Escitalopram and sertraline have lesser drug interaction and side effects.

Medications when needed can be prescribed for a short duration (6-9 months) and then can be considered to be tapered off slowly.

Panic, anxiety, insomnia:
- In view of the respiratory symptoms of COVID-19, shorter-acting benzodiazepines like lorazepam, 1mg – 2mg can be prescribed. However, care should be taken to taper and stop the same once the patient is better, as benzodiazepines have addictive potential.
- Zolpidem 2.5—5mg can be used when benzodiazepine is contraindicated

Agitation, psychotic episodes and delirium could be managed with antipsychotic medications
- Low-dose haloperidol 2.5mg –5mg per day, or
- olanzapine 2.5mg –5 mg twice a day, or
- Quetiapine 25mg – 50mg once a day

SIDE EFFECTS: There is increased risk of QTc prolongation

Interactions: Antivirals can increase levels of haloperidol, olanzapine and Quetiapine. When combined with antivirals, hydroxychloroquine and azithromycin there is further risk of QTc prolongation.

References:
3. White DB, Lo B. A Framework for Rationing Ventilators and Critical Care Beds During the COVID-19 Pandemic. JAMA.


With the current Covid situation, several changes were required for clinical work, research and teaching. All faculty and postgraduates were sensitized towards the risks associated and strategies for mitigating them. Use of masks, social distancing, changes in work schedules were introduced in the department along with periodic cleaning as advised by the infection control committee.

**Changes in working schedule**

During the lockdown, all faculty and postgraduates worked in rotation as per the schedule prepared. The designated OPD days were managed by the respective units. One faculty and one postgraduate were posted in OPD, who were on call for that particular day. Another faculty and postgraduate managed inpatients and the consultations. As needed, extra postgraduates from the unit were deputed for ECTs, if any. Interns (one or two) were posted in OPD only. Once the lockdown was over, the unit system was restored as all three units provide specialized services. Community services were restricted during this period.

**Changes in OPD**

Screening of all patients attending OPD were being done outside the hospital. However, one intern was posted near the OPD entrance, to screen all incoming patients or attendants for any symptoms of cough, fever, sore throat, breathing difficulty, and travel history. Similarly, all postgraduates were instructed to include the same screening questions while examining the patients. If there is any suspicion of Covid or ILI or SARI, immediately they were sent to the kiosk outside the OPD area for further examination.

Sitting arrangements in OPD have been changed to have a minimum of 1 metre distance between the doctor and patients/attendants. There are designated rooms, one for the faculty and one for the PG. All those on duty should use the same room. The door of the room should be kept open, to minimize contact with door knobs. Also, every 3 hours the surfaces of these rooms will be cleaned using disinfectants as per hospital protocol.

**Management of violent patients**

Any violent patient in OPD should be triaged immediately, and appropriate measures to calm down the patient undertaken. Assessment of risk of violence takes precedence over other clinical assessments. In such situations, verbal de-escalation should be used, and if required pharmacological agents (benzodiazepines and antipsychotics) are to be used. Initially, oral medications may be offered, and sometimes parenteral medications may be required.
Use of personal protective equipment

Use of masks was mandatory for all while examining any patient in the hospital. According to the hospital guidelines, triple layered surgical masks were made available for most clinical work, and N95 masks were suggested for all high risk clinical encounters. These N95 masks need to be used for 3 clinical days, as supply of these will be limited. Any physical examination of patients warranted use of surgical gloves. Handwashing as per the protocol after examining each patient was mandatory. For high risk cases, appropriate PPEs as advised were used. However, under no circumstances the clinical care was compromised.

Follow ups through teleconsultations

As many patients could not come for their scheduled follow ups, many patients resorted to teleconsultations. Follow ups for old patients could be done using phone, e-mail, WhatsApp etc. This was further facilitated by the TeleOPD facility provided by our hospital, which were made available for free. Even prescriptions could be sent through this facility, which enabled most of the stable patients to refill their medications from local pharmacies. This was further validated by the changes in telemedicine guidelines by MCI. However, fresh consultations were not possible and were discouraged.

Changes in ECT schedule

During the current situation extra precautions need to be taken while administering ECTs. As ECT is given to patients with very specific indications, and is considered as an emergency treatment option, in most cases it cannot be avoided. Patients receiving maintenance ECT continued to receive ECT during the lockdown period. During all stages appropriate PPE needs to be used by all staff during the ECT procedure.

Changes in clinical supervision

To reduce contact, most teachings including academic programs were carried out online, using Microsoft Teams. During lockdown it was work from home for some faculty on a rotational basis, who were involved in clinical teaching. This involved innovations such as using case-based discussions. Feedback was taken from postgraduates and faculty and changes were made to the online teaching activities. Small group teaching was used more to facilitate clinical supervision, and at the same time to reduce contact.

Counselling for quarantined persons

Many persons were quarantined in Udupi district and required counselling services. Teams were formed to call those in quarantine and enquire about their symptoms, any emotional problems they faced, and appropriate counselling were done. Those exhibiting severe symptoms were advised to avail OPD services in hospital for further management.
Inpatient services (including rehabilitation center)

Those requiring admissions for acute exacerbation of illness were screened for possible contact with active cases, as it is likely to spread to others easily in overactive patients. Appropriate and timely sedation was used to calm agitated patients. All inpatients and their family members were instructed to wear masks during their stay in hospital. All consultations were seen by a separate team, which worked on rotations. Another team worked exclusively in Hombelaku, the psychiatric rehabilitation center, to reduce chances of infection to inmates.
STANDARD OPERATING PROCEDURE FOR DEAD BODY MANAGEMENT

Dr Vinod C Nayak, Professor and Head, Department of Forensic Medicine

In The Hospital (Isolation Area)

- The health worker attending to the dead body should perform hand hygiene, ensure proper use of PPE (water resistant apron, goggles, N95 mask, gloves)
- All tubes, drains and catheters on the dead body should be removed.
- Any puncture holes or wounds (resulting from removal of catheter, drains, tubes, or otherwise) should be disinfected with 1% hypochlorite and dressed with impermeable material
- Apply caution while handling sharps such as intravenous catheters and other sharp devices. They should be disposed into a sharps container.
- Plug Oral, nasal orifices of the dead body to prevent leakage of body fluids
- Place the dead body in leak-proof plastic body bag. The exterior of the body bag can be decontaminated with 1% hypochlorite.
- Communication regarding the same to be sent to the mortuary technician/incharge before transportation
- All used/ soiled linen should be handled with standard precautions, put in biohazard bag and the outer surface of the bag disinfected with hypochlorite solution.
- Used equipment should be autoclaved or decontaminated with disinfectant solutions in accordance with established infection prevention control practices.
- All medical waste must be handled and disposed of in accordance with Biomedical waste management rules.
- The health staff who handled the body will remove personal protective equipment and will perform hand hygiene.
- After shifting the body, all surfaces of the isolation area (floors, bed, railings, side tables, IV stand, etc.) should be wiped with 1% Sodium Hypochlorite solution; allow a contact time of 30 minutes, and then allowed to air dry.
- The treating doctor/nursing staff need to supervise the whole process of body transferring into the body bag and decontamination
- It is possible that there may be no relatives of the deceased at the time of death due to quarantine measures taken. Hence, in accordance with the decisions taken in other states, it is suggested that the body may be kept in the mortuary until the quarantine period of the relatives ends. OR any other decision as taken by the district authorities.
Transportation

- The dead body must be stored in the body bag at 4°C, only in the designated cold chambers for COVID 19 cases. (Chambers 11 to 14 in Mortuary, KMC, Manipal).
- The personnel need to leave the mortuary premises immediately after the body transfer and storage, without handling any other material/equipment/structure at the mortuary premises, in the same vehicle used for the transport of the body.
- The vehicle, after the transfer of the body to mortuary, must be driven back to the hospital immediately and the trolley tray and the vehicle cabins should be decontaminated with 1% Sodium Hypochlorite with contact time of 30 minutes before using the vehicle for any other purposes. (Preferably by the same staff involved in the transport)
- The personnel who handled the body should decontaminate themselves by discarding the clothes worn during the transport and taking bath in soap and water immediately.

At The Mortuary

- Embalming of dead body should not be allowed.
- Mortuary staff handling COVID dead body should observe standard precautions like mask and gloves when the dead bodies are inside the body bags.
- Dead bodies must not be removed from the body bag under any circumstances.
- The body must be handed over to the district authorities with an authorization letter.
- The mortuary must be kept clean. Environmental surfaces, instruments and transport trolleys should be properly disinfected with 1% Hypochlorite solution after coming in contact with any COVID case.
- After handing over of the body, the chamber door, handles and floor of the mortuary should be cleaned with sodium hypochlorite 1% solution
- The personnel who handled the body should decontaminate themselves by discarding the clothes worn during the handling and taking bath in soap and water immediately.
- A Register, mentioning the names of persons related to the deceased, who have visited the mortuary, to be maintained in the mortuary.
- The bodies of all suspected cases of COVID-19, must be treated as positive, until test results arrive. Hence, the relatives must be informed about the same in the hospital and social distancing measures to be employed as they may be shedding the virus. The same Protocol, as detailed above, must be followed.
MANAGEMENT OF HEALTHCARE WORKERS EXPOSED TO OR INFECTED WITH COVID-19

Dr Kavitha Saravu, Professor and Head, Department of Infectious Diseases

Introduction

Person-to-person transmission most often occurs during close contact with an individual infected with COVID-19. Healthcare workers (HCWs) are not only at higher risk of infection but can also amplify outbreaks within healthcare facilities if they become ill. Identifying and managing HCWs who have been exposed to a patient with COVID-19 is of great importance in preventing healthcare transmission and protecting staff and vulnerable patients in healthcare settings.

Objective

The goal of HCW risk assessment, work restriction, and monitoring is to:

- Allow for early identification of HCWs at high risk of exposure to COVID-19
- Reinforce the need for HCWs to self-monitor for fever and other symptoms and avoid work when ill
- Limit introduction of COVID-19 and spread within healthcare facilities by healthcare personnel

Definitions

Health Care Workers: all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or their infectious secretions and materials (e.g., doctors, nurses, laboratory workers, facility or maintenance workers, clinical trainees, volunteers)

High-risk exposures:

- Close contact with a person with COVID-19 in the community; OR
- Providing direct patient care for a patient with COVID-19 (e.g., physical exam, nursing care, performing aerosol-generating procedures, specimen collection, radiologic testing), without using proper personal protective equipment (PPE) or not performing appropriate hand hygiene after these interactions; OR
- Having contact with the infectious secretions from a patient with COVID-19 or contaminated patient care environment, without using proper personal protective equipment (PPE) or not performing appropriate hand hygiene

Low-risk exposures:

- Contact with a person with COVID-19 having not met criteria for high-risk exposure.

1. Risk Assessment, Work Restriction, and Monitoring

The accompanying flowchart describes possible scenarios for risk assessment of exposed HCWs. Any HCW exposed to a person with COVID-19 in a healthcare facility or in the community should be quickly identified and assessed for fever or symptoms of COVID-19. If found to be symptomatic, they should be immediately restricted from work until a medical evaluation can be completed and testing for COVID-19 considered. If the exposed worker is not symptomatic, an assessment can be done to determine the risk category of exposure, necessary work restriction, and monitoring for 14 days.
Flowchart for management of HCWs with exposure to a person with COVID-19

Contact with a person with COVID-19 in the last 14 days

Symptoms of COVID-19?
Yes
Restrict from work Test for COVID-19

No
Exposure Risk Level?

High Risk Exposure
Active monitoring; restrict from work for 14 days after last exposure

Low Risk Exposure
Self-monitoring for 14 days after last exposure; no restriction from work

Develops fever or symptoms?
Yes
Restrict from work Test for COVID-19

No
Negative & symptoms resolved

Test for COVID19

Positive

Case Management

Develops fever or symptoms (OR) once between Day 5 and Day 10 from last exposure?
HCWs who had a high-risk exposure should be restricted from work and remain quarantined with active monitoring for COVID-19 symptoms for 14 days after the date of last exposure. As per MoHFW, an asymptomatic health care worker with high-risk exposure should be tested once between day 5 and Day 10 of exposure.

Those who test negative should continue to be restricted from work, actively monitored and may return to work at the end of the monitoring period if symptoms are resolved. Those HCWs who remain asymptomatic over the monitoring period may likewise return to work after 14 days.

- HCQS prophylaxis may be offered in discussion with HCW who are already not on prophylaxis.

HCWs who had a low-risk exposure and are considered essential staff may continue to work during the 14 days after their last exposure to a COVID-19 patient. HCW should perform self-monitoring twice a day. If the worker is scheduled for a shift, they should take their temperature and self-evaluate for symptoms before reporting to work. Healthcare facilities can consider establishing protocols in which HCWs under self-monitoring report their temperature and symptom status to IPC staff, employee/occupational health, or a designated supervisor prior to beginning a shift. If the HCW develops fever or symptoms, they should:

- Not report to work (or should immediately stop patient care if symptoms begin during a work shift)
- Alert their designated point of contact (POC)
- Be restricted from work until medical evaluation and COVID-19 testing can be performed

If testing is negative and symptoms are resolved, they may return to work while observing standard precautions and continuing to self-monitor for the remainder of the 14 days.

HCW to wear a medical mask at all times in the facility to reduce the risk of asymptomatic or pre-symptomatic transmission.

2. Management Considerations of HCWs Infected with COVID-19

Return to work

HCWs infected with COVID-19 may return to work after

✔ Meets the discharge criteria as per MOHFW and
✔ All symptoms have resolved, and
✔ 14 days have passed since the onset of symptoms

After returning to work, HCWs should continue to adhere to hand hygiene, respiratory hygiene, and cough etiquette at all times, and continue to self-monitor for symptoms, seeking medical evaluation if fever or respiratory symptoms recur.

3. Discharge

Discharge of COVID-19 positive HCWs will be in accordance with the discharge policy.

Whom to Contact

In case of any possible exposure to COVID-19 patient without appropriate PPE/ any symptoms-

Dr Muralidhar Varma, Nodal Officer for KH for HCW exposure 9845069639
GUIDELINES ON THE PROPHYLACTIC USE OF HYDROXYCHLOROQUINE

Dr Rahul Sai Gangula, Senior Resident, Department of Medicine

Healthcare workers (HCWs) are at an elevated risk of contracting COVID-19. While intense occupational exposure associated with aerosol-generating procedures underlines the necessity of using personal protective equipment (PPE) by HCWs, high-transmission efficiency of the causative agent [severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)] could also lead to infections beyond such settings. Hydroxychloroquine (HCQ), a repurposed antimalarial drug, was empirically recommended as prophylaxis by the National COVID-19 Task Force in India to cover such added risk.

Safety Profile of HCQ

According to the study by ICMR (unpublished) the data on assessment of HCQ prophylaxis among 1323 HCWs indicated mild adverse effects such as nausea (8.9%), abdominal pain (7.3%), vomiting (1.5%), hypoglycemia (1.7%) and cardio-vascular effects (1.9%). However, as per the data from the Pharmacovigilance program of India, there have been 214 reported instances of adverse drug reactions associated with prophylactic HCQ use. Of these, 7 were serious individual case safety reports with prolongation of QT interval on ECG in 3 cases.

Eligibility criteria for HCQ prophylaxis

Prophylactic use of HCQ is recommended in the following categories:

- All asymptomatic healthcare workers involved in containment and treatment of COVID19 and asymptomatic healthcare workers working in non-COVID hospitals/non-COVID areas of COVID hospitals/blocks.
- Asymptomatic frontline workers, such as surveillance workers deployed in containment zones and paramilitary/police personnel involved in COVID-19 related activities.
- Asymptomatic household contacts of laboratory confirmed cases.

Exclusion/contraindications

The drug is contraindicated in persons with known case of:

- Retinopathy
- Hypersensitivity to HCQ or 4-aminoquinoline compounds
- G6PD deficiency
- Pre-existing cardiomyopathy and cardiac rhythm disorders
- Prolonged QTc
- Hypokalemia K+ <3meq/L

The drug is not recommended for prophylaxis in children under 15 years of age and in pregnancy and lactation.
Rarely the drug causes cardiovascular side effects such as cardiomyopathy and rhythm (heart rate) disorders. In that situation the drug needs to be discontinued. The drug can rarely cause visual disturbance including blurring of vision which usually self-is limiting and improves on discontinuation of the drug. For the above cited reasons, the drug has to be given under strict medical supervision with an informed consent.

**Dosage**

<table>
<thead>
<tr>
<th>Category of personnel</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Asymptomatic household contacts of laboratory confirmed cases</td>
<td>400 mg twice a day on Day 1, followed by 400 mg once weekly for next 3 weeks; to be taken with meals</td>
</tr>
<tr>
<td>2. All asymptomatic healthcare workers involved in containment and treatment of COVID-19 and asymptomatic healthcare workers working in non-COVID hospitals/non-COVID areas of COVID hospitals/blocks Asymptomatic frontline workers, such as surveillance workers deployed in containment zones and paramilitary/police personnel involved in COVID-19 related activities</td>
<td>400 mg twice a day on Day 1, followed by 400 mg once weekly for next 7 weeks; to be taken with meals</td>
</tr>
</tbody>
</table>

**Use of HCQ prophylaxis beyond 8 weeks [in categories 4 (2) above]**

With available evidence for its safety and beneficial effect as a prophylactic drug against SARS-COV-2 during the earlier recommended 8 weeks period, the experts further recommended for its use beyond 8 weeks on weekly dosage with strict monitoring of clinical and ECG parameters which would also ensure that the therapy is given under supervision.

**Monitoring**

- An ECG (with estimation of QT interval) may be done before prescribing HCQ prophylaxis.
● An ECG should be done in case any new cardiovascular symptoms occurs (e.g., palpitations, chest pain syncope) during the course of prophylaxis.
● An ECG (with estimation of QT interval) may be done in those who are already on HCQ prophylaxis before continuing it beyond 8 weeks.
● One ECG should be done anytime during the course of prophylaxis.

Key considerations
While following above recommendations, it should be noted that:
● The drug has to be given under strict medical supervision with an informed consent.
● The drug has to be given only on the prescription of a registered medical practitioner.
● Advised to consult with a physician for any adverse event or potential drug interaction before initiation of medication. The contraindications mentioned in the recommendations should strictly be followed.
● Health care workers and other frontline workers on HCQ should be advised to use PPE. Front line workers should use PPEs in accordance with the guidelines issued by Ministry of Health and Family Welfare or by their HICC.
● They should be advised to consult their physician for any adverse event or potential drug interaction before initiation of medication. The prophylactic use of HCQ to be coupled with the pharmacovigilance for adverse drug reactions through self-reporting using the Pharmacovigilance Program of India (PvPI) helpline/app. (available at: https://play.google.com/store/apps/details?id=com.vinfotech.suspectedadversedrugreaction&hl=en_IN)
● If anyone becomes symptomatic while on prophylaxis, he/she should immediately contact the health facility, get tested as per national guidelines and follow the standard treatment protocol. Apart from the symptoms of COVID-19 (fever, cough, breathing difficulty), if the person on chemoprophylaxis develops any other symptoms, he should immediately seek medical treatment from the prescribing medical practitioner. Refer chapter on… Management of exposed HCW
● All asymptomatic contacts of laboratory confirmed cases should remain in home quarantine as per the National guidelines, even if they are on prophylactic therapy.
● They should follow all prescribed public health measures such as frequent washing of hands, respiratory etiquettes, keeping a distance of minimum 1 meter and use of Personal protective gear (wherever applicable).

Designated Consultants who can be contacted for HCQ prophylaxis in Healthcare Workers

1. Dr. Raviraja Acharya, Prof. & HOD, Dept. of Internal Medicine
2. Dr. Kavitha Saravu, Prof. & HOD, Dept. of Infectious Diseases
3. Dr. Muralidhar Varma, Associate Prof, Dept. of Infectious Diseases
4. Dr. Nitin Gupta, Assistant Prof., Dept. of Infectious Diseases
Background

Quarantine derived from the Latin term *quadragina* meaning 40 is an ancient practice that was widely used during the 14th century to prevent the spread of plague! Back then, when ships were the main mode of long-distance transport, they were required to stay in harbor for 40 days prior to arriving in the port as a means of preventing the transmission of the disease. The practice was, however, misused many a time as the people who were quarantined were often stigmatized and detained with scant regard to their essential needs. The term quarantine, therefore, had an ominous connotation and people tried methods to evade it thereby negating its effect.

Quarantine if implemented in the true sense can be a highly effective public health tool in preventing the spread of contagious disease especially in situations where vaccination or prophylactic treatment is not available, as is the situation with the current COVID 19 pandemic.

Isolation and Quarantine

As we discuss the role of quarantine in the containment of COVID 19, it is important to distinguish between two related public health terms, namely isolation and quarantine. People often confuse the two, and this leads to a lot of unnecessary conundrum. While *isolation* refers to the separation and restricted movement of *ill persons* who have a contagious disease in order to prevent its transmission to others, *quarantine* refers to the same among *well persons*, who have been exposed to a contagious disease before it is known whether they will become ill. Isolation typically takes place in a hospital setting while quarantine could be at home or in a designated community set up.

Quarantine in the background of COVID 19

Refers to the separation and restriction of activities of persons who are apparently well but who may have had exposure to COVID 19 infection [either by virtue of residing or travelling from a highly infected area or by coming in contact with patients confirmed with the disease], so that the transmission of the infection is prevented. People may be advised home or facility-based quarantine depending on the level of exposure and the existing advisories issued by the government.

The recommended duration of quarantine is usually two times the incubation period of the disease in question. Since the incubation period of COVID 19 ranges from 5-14 days, individuals will be advised a total of 14 – 28 days of the quarantine period.

Rationale for Quarantine

The purpose of quarantine is to reduce transmission of COVID 19 by

- Separating COVID 19 suspects or contacts of COVID-19 patients from the community
- Monitoring these separated individuals for the development of signs and symptoms of COVID19
- Segregation of COVID19 symptomatic, as early as possible from other quarantined persons.

**Objectives of this chapter are to:**
- Provide information on the most recent guidelines on quarantine by the district authorities
- Outline the amenities required at the quarantine facility
- Specify standard operating procedures for
  - Monitoring and surveillance of quarantined individuals
  - Referral of suspects / symptomatic individuals
  - Infection control practices at the facility

**I. Quarantine & Testing Policies of MAHE, Manipal for control of COVID 19 (Version 1.0)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Inter - District</th>
<th>Inter-State</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Where to Quarantine / Isolate</strong></td>
<td><strong>When to Test</strong></td>
<td><strong>Where to Quarantine / Isolate</strong></td>
<td><strong>When to Test</strong></td>
</tr>
<tr>
<td>Category I [Symptomatic]</td>
<td>Referred to DCHC for sample collection and Isolation</td>
<td>Tested immediately on arrival</td>
<td>Referred to DCHC for sample collection and Isolation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If positive shifted to DCH</td>
<td>If negative shifted to other hospital based on symptoms or released to 14 days,</td>
<td>If positive shifted to DCH</td>
</tr>
<tr>
<td>Category II</td>
<td>No Quarantine</td>
<td>Not required</td>
<td><strong>Urban Area</strong></td>
</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>[Asymptomatic]</td>
<td>No Quarantine</td>
<td>Not required</td>
<td><strong>Urban Area</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All passengers tested on 14th day of arrival</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Institutional Quarantine for 14 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tested immediately on arrival</td>
</tr>
</tbody>
</table>

- If returned from High-risk states, then Institutional Quarantine for 14 days.
- If returned from other states, then 14 days Home Quarantine.

No further testing required.
II. Quarantine & Testing Policies of MAHE, Manipal for control of COVID 19 (Version 2.0)

Inter district travellers within Karnataka
As per Kasturba Hospital policy, individuals (healthcare workers) who have an inter district travel history within Karnataka and are resuming hospital duty (patient contact), should be under home quarantine for five days. They should undergo COVID test on day 5.

For individuals who are returning to Manipal from other districts of Karnataka and who are not involved in patient care need not be tested for COVID. They are however advised to visit the screening / fever clinic and procure a fitness certificate prior to joining for work / hostel

For interstate travellers (as on 8.6.2020)
All students / Interns / Staff of MAHE involved in patient care will be tested on the 5th (for inter district) or 7th / 14th day (inter-state) as per the hospital policy. Those not involved in active patient care have to procure a fitness certificate from the fever clinic after serving the mandatory quarantine period and prior to joining work.

**High prevalence state as on 4/6/2020: Maharashtra**
CCC: COVID care centres; DCHC: Dedicated COVID health centres

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**COVID 19 monitoring team, MAHE [4.6.2020]**

**III. Quarantine & Testing Policies of MAHE, Manipal for control of COVID 19 (Version 3.0)**
<table>
<thead>
<tr>
<th></th>
<th>Inter-district travelers</th>
<th>Interstate travelers</th>
<th>International travelers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quarantine</strong></td>
<td>Home quarantine for 14 Days</td>
<td>Home quarantine for 14 Days</td>
<td>7 days of institutional quarantine and 7 days of home quarantine</td>
</tr>
<tr>
<td><strong>Testing</strong></td>
<td>1. If symptomatic on arrival OR develop symptoms during quarantine</td>
<td>1. If symptomatic on arrival OR develop symptoms during quarantine</td>
<td>Test once between 5-7 days</td>
</tr>
<tr>
<td></td>
<td>2. History of contact with COVID +ve patient/family member</td>
<td>2. History of contact with COVID +ve patient/family member</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** On the 15th day, prior to reporting to work, a fitness certificate may be obtained from Fever clinic of Kasturba Hospital.

**For exposure related to workplace for MAHE employees and students**

Testing for health care workers and others coming in contact with COVID +ve patient will be classified based on their type of exposure. Only high risk contacts will be tested on Day 7 or later. Low risk contacts will be tested only if symptoms develop. Low risk contacts need not be under quarantine.

**II. Outline of amenities requirement at Quarantine Facility, MAHE[NIH C]**

Following are the requirements that are mandated at a designated quarantine facility:

1. Well ventilated single rooms with attached toilets and access to support services like:
   - In-room food services
   - Laundry services
   - Sanitation services / cleaning & house keeping

2. Properly covered bins as per BMW guidelines to be placed at relevant places

3. Designated space for
   - Administrative offices - Main control room/clerical room
   - Inventory control rooms
   - Restrooms for supporting staffs
- Clinical examination room/nursing station
- Laundry facilities
- Catering facilities
- The holding area for contaminated waste

4. Social support & recreational resources like access to Television/Reading materials/Indoor games

5. Monitoring the health of contacts: During the quarantine period, contacts should be monitored daily for fever and respiratory symptoms. The designated quarantine doctor should make twice a day customary calls to enquire about the health of the quarantined individuals

**Standard Operating Procedures for optimum functioning of the quarantine facility**

**Entry and Exit sites**
The facility should be manned by a well informed and trained security personnel at the main entrance gate of the area
The reception area should have an in and out register and should be manned by a caretaker, who is available 24*7 and is trained in COVID and infection control measures and who will ensure that people follow strict sanitation guidelines while entering the building. [hand sanitizing, wearing masks and gloves etc.]
Awareness posters and videos could be displayed in the lobby and the landings on each floor. Only authorized & trained persons or those designated in work areas are permitted to enter the quarantine areas
Main doors to be kept closed at all times preferably under the observation of the security personnel
Should have a double door entry, with only one door to be open at a single time.

**Manpower resources at the Centre:**
There should be a nodal officer (preferably a medical doctor) for overall coordination and supervision of the quarantine centre.
The nodal officer should liaise with the tertiary care hospital and the infectious disease specialists for any concern with regards to the health and welfare of the quarantined individuals
Public health/preventive medicine specialists are required for monitoring public health aspects of the facility, particularly monitoring and surveillance. Clinical microbiologist and infectious disease specialists should ensure optimum infection prevention & control practices.
Dedicated housekeeping staff should be deployed on a rotation basis.

**Daily reporting format for monitoring & surveillance**
Data pertaining to the number of persons in the quarantine centre needs to be captured twice a day. In addition, details with regards to their wellbeing, any new onset of symptoms or worsening of symptoms should be queried. A clinical examination if warranted, should be carried out with adequate precautionary measures. The reporting format is as illustrated in Annexure I. The format ensures standardized reporting on a daily basis so that the data is captured at the district level and subsequently shared with the state.

**Referral of Quarantined individuals**
If the quarantined individuals are noted to have symptoms related to COVID 19 such as fever, cough, sore throat, breathlessness etc., they will need to be referred to designated hospitals. This will be done using an ambulance with due precautions as per referral SOP (available as a
Ambulances including advanced lifesaving ambulance should be available at the facility for immediate deployment if the need arises.

**Supervision & Coordination**
The nodal officer needs to supervise and coordinate with various entities working with the facility. To ensure all activities take place according to standard protocol, separate teams could be constituted like the Monitoring team (nodal officer & DDSA), Admin team (DSA, DGS & chief warden), Referral team (Infectious diseases), Medicine / Equipment team (MS office), hygiene sanitation team (HICC). Daily review meetings should be conducted by the monitoring team to discuss day to day affairs and sort out any issue requiring attention in consultation with the Admin team.

A 24x7 control room manned by the caretaker should be in place so that the quarantined people can have access to communication and help if the need arises.

**Monitoring and Supervision**
The facility should be inspected both internally and externally on a daily basis by the Admin team and the Monitoring team and gaps identified. Necessary corrective actions and preventive actions to be put in place by the team.

**Lodging, Catering, Laundry and other related activities**
Quarantined individuals should be served food in their rooms. They are not supposed to leave their rooms until they have served the mandatory quarantine period. It is ideal for serving pre-packed food in disposable containers. Food should be delivered by the no contact method, wherein the concerned housekeeping staff should ring the bell and leave the food container outside the room, which could then be collected by the quarantined individual. Food is preferably delivered in disposable items. Once they have finished, they are expected to dispose of the container in a closed bin that is available just outside the door. Any washable dish should be cleaned with hot detergent water, and the washing personnel should wear heavy-duty gloves, plastic apron and triple-layer mask.

A separate room needs to be assigned to perform laundry services for cleaning of all the clothes and other washing related activities. Before laundering, all the washable items should be placed in 1% sodium hypochlorite solution up to 15 minutes and then taken up for regular wash with a detergent solution. Alternatively, disposable bed sheets could be explored that could be changed every two days.

An electric kettle and water dispenser may be provided depending on feasibility.

**Information, Education & Communication (IEC) and Psycho-social support**
Although most of the people quarantined in the MAHE facility may be health care professionals with prior knowledge of COVID 19, there might however be a sense of fear and panic among some of them. Besides, some of the other stakeholders like the housekeeping staff, security personnel etc. may have a heightened sense of fear leading to stigma and a subsequent reluctance in carrying out their activities in an optimum manner. It is, therefore, essential to carry out interpersonal communication with all of them. Psychiatrists and clinical psychologists could develop a module to this extent and deploy it in a manner that is feasible and acceptable.

Quarantined people and support staff need to be educated about universal infection control measures and personal protective measures. Written instructions on Do’s and Don’ts in the quarantine zone should be displayed in order to avoid the spread of the infection. Importance
of frequent hand washing, especially after touching surfaces like door handles, stair railings, bed railings, etc. to be instructed for strict compliance.

**Establishment of Infection Prevention Control (IPC) measures**
The quarantines should always maintain social distancing (>2 metres) and should not move in the general lobby, corridors etc. When they access common areas for unavoidable reasons, they must wear a triple layer (3 ply) mask.

**Environmental cleaning**: The cleaning staff should wear 3 ply mask, gown, heavy-duty gloves and boots. All the high touch surfaces (tabletops, chairs, doorknobs, telephone receivers, light switches, tap handles etc.), floor and toilets should be cleaned and disinfected daily with 1% sodium hypochlorite solution. Always start from clean areas and move towards dirty areas. Higher surfaces should be cleaned before the floor.

High touch surfaces: Wet wipe with 1% sodium hypochlorite or 70% alcohol- once daily.

Floors: First mopped with soap and water, dried and mopped with 1% sodium hypochlorite. Between each room, the mop should be washed and new cleaning solution should be taken once daily.

**Toilet**: Washed with detergent followed by 1% sodium hypochlorite- once daily
The cleaning items should not be shared with any other areas. After the process, the mops should be thoroughly rinsed in water and disinfected by immersing in 1% hypochlorite for 15 min, rinsed again in water before drying in sunlight with mop head upwards. Disinfect the buckets with sodium hypochlorite after the use.

**Linen**: The bedsheets, pillow covers are first immersed in 1% sodium hypochlorite for 15 min, before handing over to hospital laundry. Never shake the cloth that might disperse particles. Linen should be bagged in hampers while being transported and the person should wear 3 ply mask, gloves and gown.

**Biomedical waste (BMW) management**
All waste from quarantine rooms is collected in yellow bags/red bags and put in a common large similar coloured bag with COVID-19 waste label outside. It should be directly handed over to the BMW collector, and the record of such waste should be maintained separately.
Staff involved in handling BMW should wear 3 ply mask, plastic apron, heavy-duty gloves and boots.

**Training**
Training is important to ensure that all activities take place as per established protocol and SOPs. The nodal officer and the preventive medicine specialist should be trained on the SOPs that needs to be followed at the Quarantine centre for daily monitoring, movements in the facility, infection prevention control measures and use of personal protective measures.
Support staff such as the housekeeping staff, those working in the laundry, Mess/canteen workers, security personnel, drivers, general duty workers etc. need to be trained on the use of mask, gloves, cleaning and disinfection procedures.
Regular training should be provided to all the above-mentioned personnel on a need basis. As and when new staffs take over, proper training should be provided before they start work. All training activities must be carried out under strict guidance of trained specialists
Inventory management
It is preferable that the quarantine facility has a stock of basic PPE (gloves, masks, goggles) and medical equipment (Infrared thermometer, Stethoscope, BP machine) in the event of an emergency. These need to be procured, and a log of daily consumption should be maintained.

Discharge of quarantined people from the Facility
The quarantined people could be discharged at the end of 14 days provided they remain asymptomatic, and the tests are negative. Instructions should be provided to self-monitor their health at their home (home quarantine) for the next 14 days and report to the public health specialist on a daily basis. In case of any symptoms suggestive of COVID-19 they should immediately report. Their details will be continued to be monitored, and the same reported to the district health authorities until the completion of the remaining 14 days. A designated transport could be used to drop the discharged individuals to their places of residence.

Terminal disinfection and decontamination procedures
The Quarantine facility should be disinfected once the individual vacates the room and the premises.
Cleaning/ decontamination should be performed by the trained housekeeping staff using appropriate personal protective equipment (PPE). All frequently touched areas, such as surfaces of walls, windows, door handles, cots, the toilet bowl and bathroom surfaces need to be carefully cleaned. All the items inside the room are wiped with a detergent solution followed by 1% sodium hypochlorite. The floor should be mopped with detergent solution, dried and once again mopped with 1% sodium hypochlorite and washrooms should be done with soap and water, followed by 1% sodium hypochlorite. Fogging or spraying is not recommended. While cleaning, doors could be kept open to aid better ventilation. All linen (pillow covers, bed sheets, curtains, etc.) should be first treated with 1% hypochlorite solution and then sent to the laundry to be washed using a hot-water cycle (90°C) with detergent. Mattresses/pillows should be covered with rexin and disinfected with 1% hypochlorite.

Annexure I: Reporting format for monitoring & surveillance

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Name of the Centre</th>
<th>Centre In Charge</th>
<th>Address &amp; Contact No:</th>
<th>Date:</th>
<th>Census at 8 AM:</th>
<th>State from where arrived</th>
<th>Date of arrival</th>
<th>Symptomatic</th>
<th>If yes, type of symptoms</th>
<th>Whether case referred to designated hospital</th>
<th>Date of sample collection</th>
<th>Test result</th>
<th>Current status of symptoms</th>
<th>Remar...</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Annexure II: Standard Operative Producers for monitoring the quarantined individuals

i. Junior Residents from Internal Medicine manning the Fever Clinic could be the on call doctor for the quarantine facility in case of any emergency.

ii. Junior Residents from Community Medicine could carry out the monitoring and surveillance activities and ensure that the data is duly submitted to the District Health Officer by 5 PM every day.

iii. The name of the respective junior residents on call each day should be displayed at the control room.

iv. Residents will ensure infection control/protective measures while examining quarantined persons

v. If any symptomatic case/ additional symptoms are observed/ reported, it should be discussed with the infectious disease consultant for referral to the designated hospital, if required.

vi. In case a symptomatic case needs referral the nodal officer should be intimated.

vii. In case any patient needs to be transferred due to any eventuality to the referral centre, the SOPs for transfer should be followed.

viii. The medical team may take help of psychiatrists / clinical psychologists for psychosocial support if the need arises

Annexure III: Standard Operating Producers for Care Takers of the Facility

- Maintain log of all people entering/exiting in the quarantine facility, where the quarantine people are housed. Registration of name with time and purpose for entering the building

- Care taker should ensure that the incoming people to the quarantine building are aware of universal infection control precautions and are practicing the same such as mandatory hand hygiene using sanitizers or soap &water, wearing appropriate mask, using gloves.

- Only then will the person be allowed to enter the premises.

- Hands should be sanitized before exiting the quarantine area.

- Preferably do not carry Mobile phones inside the building
- Dustbins should be covered at all times and this should be ensured by the caretaker.
- Wastes to be disposed as per the Biomedical Waste Management Rules.
- Supervise IPC in the facility in coordination with the HICC team

**Annexure IV: Requirements of Equipment for Quarantine Facility**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Monthly requirement for holding a maximum of 70 persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gloves</td>
<td></td>
</tr>
<tr>
<td>• reusable vinyl or rubber gloves for environmental cleaning</td>
<td>10</td>
</tr>
<tr>
<td>• latex single-use gloves for clinical care</td>
<td>60</td>
</tr>
<tr>
<td>Hair covers</td>
<td>300</td>
</tr>
<tr>
<td>Particulate respirators (N95, FFP2, or equivalent)</td>
<td>10</td>
</tr>
<tr>
<td>Surgical (triple layer) masks (3ply)</td>
<td>500</td>
</tr>
<tr>
<td>Gowns and aprons (reusable non-fluid-resistant gowns)</td>
<td>30</td>
</tr>
<tr>
<td>PPE Kit</td>
<td>5</td>
</tr>
<tr>
<td>Alcohol-based hand rub</td>
<td>50</td>
</tr>
<tr>
<td>Liquid soap (for washing hands in clean water)</td>
<td>100</td>
</tr>
<tr>
<td>Clean single-use paper towels</td>
<td>400</td>
</tr>
<tr>
<td>Sharps containers</td>
<td>1</td>
</tr>
<tr>
<td>Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or</td>
<td>20 litres</td>
</tr>
<tr>
<td>Bio Medical Waste bags</td>
<td>200</td>
</tr>
<tr>
<td>Large plastic bags</td>
<td>200</td>
</tr>
<tr>
<td>Non-contact thermometers</td>
<td>10</td>
</tr>
</tbody>
</table>

**Annexure V: Guidelines for the quarantined individuals on discharge**

Following information should be provided to the individuals who are being discharged from the facility
- Provide details of your stay for next 14 days including the contact numbers.
• Use triple layer surgical mask during travel and when coming in contact with people (follow correct use and disposal of mask as briefed during the stay in quarantine center)

• Maintain personal hygiene and follow frequent hand-wash with soap and water or use alcohol based hand sanitizer.

• Use respiratory etiquettes (use tissue paper/ hand-kerchief to cover your nose and mouth, turn head away from the person facing of you, and while coughing/sneezing).

• Monitor your health and check your body temperature twice daily for the next 14 days.

• Retain the aircraft boarding pass/ rail ticket/ details of Journey by taxi (including contact number of drivers)

• Avoid going out of the house and remain in a designated room in the house specially if there are more than one member in the family.

• Keep contact with only one identified care giver (low risk family member). He / she should wear mask and wash hands, every time he/ she comes in contact with you.

• Report immediately if you develop fever, cough or difficulty in breathing to the surveillance doctor who will call you every day to check on you.
### IMPORTANT FORMS

#### i. FEVER CLINIC PROFORMA

<table>
<thead>
<tr>
<th>Fever Clinic form - Outpatient area / emergency triage area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of visit</td>
</tr>
<tr>
<td>Full name</td>
</tr>
<tr>
<td>Occupation</td>
</tr>
<tr>
<td>Address: Fathers / spouse name</td>
</tr>
<tr>
<td>House number</td>
</tr>
<tr>
<td>Village / locality</td>
</tr>
<tr>
<td>Taluk</td>
</tr>
<tr>
<td>District</td>
</tr>
<tr>
<td>PIN code</td>
</tr>
<tr>
<td>State</td>
</tr>
<tr>
<td>Mobile Number</td>
</tr>
<tr>
<td>AADHAR Number (optional)</td>
</tr>
<tr>
<td>Chief complaint – duration</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Fever</td>
</tr>
<tr>
<td>Breathing difficulty</td>
</tr>
<tr>
<td>Fatigue</td>
</tr>
<tr>
<td>Medical problems (circle)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>Chemotherapy</td>
</tr>
</tbody>
</table>

Clinical survey / opinion
Advice given
Doctors name sign Patient signature
ii. Fever Clinic Advisory

Patient Name: _______________________________ Age: __________ M/F

Fever clinic visit on: _________________ Fever Clinic Serial No.: ______

- Advised to undergo further testing at Designated Centre/ district Hospital
- Advised strict rest and Home quarantine
- Advised to report to local hospital immediately on appearance of new symptoms or worsening of complaints
- Advised admission and further evaluation – refused

Advised to take following medications:
iii. **COVID 19 Screening Check list before Surgery**

- Patient Name:
- Age/Sex:
- Hospital Number:
- Procedure planned:

<table>
<thead>
<tr>
<th>HISTORY</th>
<th>QUESTION</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>Was the patient working at a hospital which potentially involves exposure to large group of people in the last 28 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travel</td>
<td>International/National travel (Inter-district or Inter-state) particularly to hotspot areas or international travel in past 28 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>Any travel by family members to hotspots (Inter-district or Inter-state) or international travel in past 28 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any history of symptoms (URI/LRI/FEVER) in past 28 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any family member on COVID Duty (Police/Army/Doctor/Drivers etc.) living in same house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>Any contact with suspected or diagnosed COVID Case in the past 28 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms (Current or in last 28 days)</td>
<td>Fever</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>LRTI symptoms - Cough/ Expectoration/ Breathlessness</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>URTI Symptoms - Sore throat/Nasal block/Rhinorrhea/Cough</td>
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<tr>
<td></td>
<td>GI Symptoms - Diarrhea</td>
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</tr>
</tbody>
</table>

**FOR EMERGENCY PROCEDURE:** Please score the above sheet, but can go ahead with surgery with / without IFD consultation with full PPE in designated OT

**FOR SEMI-URGENT/ELECTIVE PROCEDURE:** Please score the above sheet, If the answer to any of the above is YES – consult IFD Specialist
### Sample Referral Form for SARI and COVID-19

**ICMR Specimen Referral Form for COVID-19 (SARS-CoV2)**

**INTRODUCTION**
This form is for collection centres/labs to enter details of the samples being tested for Covid-19. It is mandatory to fill this form for each and every sample being tested. It is essential that the collection centres/labs exercise caution to ensure that correct information is captured in the form.

**INSTRUCTIONS:**
- Inform the local / district / state health authorities, especially surveillance officer for further guidance.
- Seek guidance on requirements for the clinical specimen collection and transport from nodal officer.
- This form may be filled in and shared with the IDSP and forwarded to a laboratory where testing is planned.
- Fields marked with asterisk (*) are mandatory to be filled.

**SECTION A – PATIENT DETAILS**

**A.1 TEST INITIATION DETAILS**
- Doctor Prescription: Yes [ ] No [ ]
  *Repeat Sample: Yes [ ] No [ ]
  *If Yes, Patient ID: ________________________________

**A.2 PERSONAL DETAILS**
- Patient Name: ________________________________
- Age: ______ Years/Months [ ] (If age < 1 yr, pls. tick months checkbox)
- Gender: Male [ ] Female [ ] Others [ ]
- Present Village or Town: ________________________________
- District of Present Residence: ________________________________
- State of Present Residence: ________________________________
- Present patient address: ________________________________
- Nationality: ________________________________
- *Mobile Number: ________________________________
- *Mobile Number belongs to: Self [ ] Family [ ]
- *Pincode: ________________________________
- *Downloaded Aarogya Setu App: Yes [ ] No [ ]

(These fields to be filled for all patients including foreigners)

Email: ________________________________
Aadhar No. (For Indians): ________________________________
Passport No. (For Foreign Nationals): ________________________________

**A.3 SPECIMEN INFORMATION FROM REFERRING AGENCY**
- Specimen type: TS/NPS/NS [ ] BAL/ETA [ ] Blood in EDTA [ ] Acute sera [ ] Convalescent sera [ ] Other [ ]
- Collection date: ________________________________
- Sample ID (Label): ________________________________

**A.4 PATIENT CATEGORY (PLEASE SELECT ONLY ONE)**
- Cat 1: Symptomatic International traveller in last 14 days. [ ]
- Cat 2: Symptomatic contact of lab confirmed case. [ ]
- Cat 3: Symptomatic healthcare worker. [ ]
- Cat 4: Hospitalized SARI (Severe Acute Respiratory Illness) patient. [ ]
- Cat 5a: Asymptomatic direct and high risk contact of lab confirmed case. [ ]
- Cat 5b: Asymptomatic healthcare worker in contact with confirmed case without adequate protection [ ]
- Cat 6: Symptomatic Influenza Like Illness (ILI) patient in hospital/ MoHFW identified clusters. [ ]
- Other: ________________________________

(Please select “other” only if the patient doesn’t fall in any other category)

**A.5 STATUS OF CURRENT RESPIRATORY INFECTION**
- Respiratory Infection: Severe Acute Respiratory Illness (SARI): Yes [ ] No [ ]
- Influenza Like Illness (ILI): Yes [ ] No [ ]
### SECTION B- MEDICAL INFORMATION

#### B.1 EXPOSURE HISTORY (2 WEEKS BEFORE THE ONSET OF SYMPTOMS)

1. Did you travel to foreign country in last 14 days? [ ] Yes [ ] No
   If yes, place(s) of travel: ___________________________________________
2. Have you been in contact with lab confirmed COVID-19 patient? [ ] Yes [ ] No
   If yes, name of confirmed patient: _________________________________
3. *Were you Quarantined?: [ ] Yes [ ] No [ ] If yes, where were you quarantined: Home [ ] Facility [ ]
4. *Are you a health care worker working in hospital involved in managing patients?: [ ] Yes [ ] No

#### B.2 CLINICAL SYMPTOMS AND SIGNS

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>First Symptom</th>
<th>Date of onset of symptoms [ ] [ ] (dd/mm/yy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td>Diarrhoea</td>
<td>Dietting</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>Nausea</td>
<td>Haemoptysis</td>
</tr>
<tr>
<td>Sore throat</td>
<td>Chest pain</td>
<td>Nasal discharge</td>
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<td></td>
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<td>Sputum</td>
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<tr>
<td></td>
<td></td>
<td>Abdominal pain</td>
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<td></td>
<td></td>
<td>Fever at evaluation</td>
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</tbody>
</table>

#### B.3 PRE-EXISTING MEDICAL CONDITIONS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>Condition</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic lung disease</td>
<td></td>
<td>Malignancy</td>
<td></td>
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<tr>
<td>Chronic renal disease</td>
<td></td>
<td>Heart disease</td>
<td></td>
</tr>
<tr>
<td>Immunocompromised condition</td>
<td></td>
<td>Chronic liver disease</td>
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<td></td>
<td></td>
<td>Hypertension</td>
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<tr>
<td>Other underlying conditions</td>
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</tbody>
</table>

#### B.4 HOSPITALIZATION DETAILS

<table>
<thead>
<tr>
<th>Hospitalized: [ ] Yes [ ] No</th>
<th>Hospital State: ___________________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization Date: [ ] [ ] (dd/mm/yy)</td>
<td>Hospital District: ________________________________________</td>
</tr>
<tr>
<td>Hospital Name: ___________________________________________</td>
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</tr>
</tbody>
</table>

#### B.5 REFERRING DOCTOR DETAILS

| *Name of Doctor: _______________________________ | Doctor Mobile No.: _______________________________ |
|                                                | Doctor Email ID: _______________________________ |

* Fields marked with asterisk are mandatory to be filled

---

**TEST RESULT (To be filled by Covid-19 testing lab facility)**

<table>
<thead>
<tr>
<th>Date of sample receipt(dd/mm/yy)</th>
<th>Sample accepted/Rejected</th>
<th>Date of Testing(dd/mm/yy)</th>
<th>Test result (Positive / Negative)</th>
<th>Repeat Sample required (Yes / No)</th>
<th>Sign of Authority (Lab in charge)</th>
</tr>
</thead>
</table>
v. COVID 19 Clinical Case Sheet

<table>
<thead>
<tr>
<th>DATE/TIME</th>
<th>OP/IP NO:</th>
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</table>

<table>
<thead>
<tr>
<th>NAME:</th>
<th>DOB (AGE):</th>
<th>Sex: Male/Female</th>
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<table>
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<tr>
<th>ADDRESS:</th>
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<table>
<thead>
<tr>
<th>PIN CODE:</th>
<th>EMAIL:</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
<th>MOBILE:</th>
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<tbody>
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<table>
<thead>
<tr>
<th>OCCUPATION: HEALTH CARE PROFESSIONAL HCP/OTHERS</th>
</tr>
</thead>
<tbody>
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<table>
<thead>
<tr>
<th>EMERGENCY CONTACT PERSON NAME/MOBILE:</th>
</tr>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>REFERRAL DOCTOR/INSTITUTE:</th>
<th>RESIDENT DOCTOR/DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

History

Recent (last one month) any International Travel Y/N (If Yes where? /Date of Arrival):

Recent (last one month) any Domestic Travel Y/N (If Yes where? / Date of Arrival):

Recent Close Contact with COVID19 positive Patient Y/N

<table>
<thead>
<tr>
<th>Symptom</th>
<th>YES/NO</th>
<th>Duration</th>
<th>Others Specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breathlessness</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Co morbidities</th>
<th>YES/NO</th>
<th>Duration</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Mellitus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic/ Rec Lung Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer/ Immunosuppressed</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Known History of Drug Allergy:

Examination

<table>
<thead>
<tr>
<th>Pulse per min:</th>
<th>SBP/DBP:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature:</th>
<th>Nutritional Assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Resp Rate per min:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
Oxygen Saturation:

<table>
<thead>
<tr>
<th>GENERAL SIGN</th>
<th>YES/NO</th>
<th>GENERAL SIGN</th>
<th>YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallor</td>
<td></td>
<td>Clubbing</td>
<td></td>
</tr>
<tr>
<td>Cyanosis</td>
<td></td>
<td>Pedal Edema</td>
<td></td>
</tr>
<tr>
<td>Icterus</td>
<td></td>
<td>Redness of Eyes</td>
<td></td>
</tr>
</tbody>
</table>

RS/CVS/PA/CNS

ENLIST THE CONTACTS** IN THE FOLLOWING FORMAT

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Type of contact (Family (f), community(c), health care facility(h))</th>
<th>Contact details (Phone Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Contact**

- Providing direct care without proper Personnel Protective Equipment (PPE) COVID-19 patients
- Staying in the same close environment of a COVID-19 patient (including workplace, classroom, household, and gatherings)
- Travelling together in close proximity (1 meter) with a COVID-19 patient in any kind of conveyance within 14-day period after the onset of symptoms in the case under consideration.

PLAN OF CARE

INVESTIGATIONS:

TREATMENT:

TREATING DOCTOR’s SIGNATURE AND NAME:

_______________________________________
vi. Daily monitoring form for COVID-19 and suspects

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>8 AM</th>
<th>2 PM</th>
<th>8 PM</th>
<th>2 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory distress</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Myalgia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sore throat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of smell</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of taste</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturation of oxygen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
# LIST OF IMPORTANT PHONE NUMBERS

<table>
<thead>
<tr>
<th>Name &amp; Designation</th>
<th>Contact Number</th>
<th>E-Mail ID</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dr. Raviraja Acharya</strong></td>
<td>9845471000</td>
<td><a href="mailto:rvacharya@manipal.edu">rvacharya@manipal.edu</a></td>
</tr>
<tr>
<td>Professor &amp; Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Internal Medicine,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chairman – COVID Management, KH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kasturba Hospital, Manipal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dr. Kavitha Saravu</strong></td>
<td>9448107636</td>
<td><a href="mailto:kavitha.saravu@manipal.edu">kavitha.saravu@manipal.edu</a></td>
</tr>
<tr>
<td>Professor &amp; Head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Infectious Diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kasturba Hospital, Manipal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dr. Muralidhar Varma</strong></td>
<td>9845069639</td>
<td><a href="mailto:muralidhar.varma@manipal.edu">muralidhar.varma@manipal.edu</a></td>
</tr>
<tr>
<td>Associate Professor &amp; Chairman –HICC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Infectious Diseases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kasturba Hospital, Manipal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dr. Nitin Gupta</strong></td>
<td>7838340627</td>
<td><a href="mailto:nitin.gupta@manipal.edu">nitin.gupta@manipal.edu</a></td>
</tr>
<tr>
<td>Assistant Professor, Department of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td></td>
<td></td>
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<tr>
<td>Kasturba Hospital, Manipal</td>
<td></td>
<td></td>
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<tr>
<td><strong>Dr. Vandana K E</strong></td>
<td>9902206009</td>
<td><a href="mailto:vandana.ke@manipal.edu">vandana.ke@manipal.edu</a></td>
</tr>
<tr>
<td>Professor &amp; HOD, Department of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microbiology</td>
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<tr>
<td>Kasturba Hospital, Manipal</td>
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</tr>
<tr>
<td><strong>Dr. Shashikiran Umakanth</strong></td>
<td>9008418171</td>
<td><a href="mailto:shasikiran.u@manipal.edu">shasikiran.u@manipal.edu</a></td>
</tr>
<tr>
<td>Professor &amp; HOD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. of General Medicine;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nodal Officer (COVID-19); Medical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superintendent, Dr. T.M.A Pai Hospital,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Udupi</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dr. Rahul Munikrishna</strong></td>
<td>7760849736</td>
<td><a href="mailto:rahul.munikrishna@manipalhospitals.com">rahul.munikrishna@manipalhospitals.com</a></td>
</tr>
</tbody>
</table>
USEFUL WEBSITES


