



अखिल भारतीय आयुर्विज्ञान संस्थान (एम्स, ऋषिकेश)

All India Institute of Medical Sciences (AIIMS)

Dept of Medicine (ID Division), Rishikesh, Uttarakhand, India, 249203

Clinical Management

Protocol of FLU

(COVID/Swine flu)

AIIMS, Rishikesh

Contents

1. Screening flow
2. Treatment Summary
3. Flow of Patients from ED
4. Sample collection/indication
5. Treatment – COVID
6. Treatment – Swine Flu
7. Thrombolytic therapies
8. Respiratory therapies
9. Isolation & Follow-up policy
10. Acknowledgment



PROVISIONAL SCREENING FOR FLU SUSPECT IN ALL OPD/CLINIC

- Screening questions to be asked by receptionist:
 - Have u suffered from any of the following symptoms (**fever, cough, cold, throat pain, breathlessness, chest pain, loss of smell/taste, diarrhea, abdominal pain, or bleeding tendency**) in past 14 days
 - Have **you exposed** with any positive cases in past 14 days
- If **anything above positive**, mandate patient and care takers to wear N95 mask and prioritise to send patients to **CFM/Flu clinic in Trauma building** OPD or **Emergency medicine**
- Advise patients that they are suspected Flu and write in OPD slip same
- Availing Hand hygiene and at least 1m physical distancing of patient and attendants with wearing of face mask
- HCWs including guards to wear N95 mask, gloves, scrub suit/disposable gown, and if available headcover & face shield as per work types

FLU SUSPECT/CONFIRMED

FLU NEGATIVE

ENTRY at CFM/Flu clinic in
Trauma building

ENTRY TO EMERGENCY

STABLE PATIENT COMING
BETWEEN 8AM TO 1PM

CRITICALLY ILL PATIENT ANYTIME

ALL PATIENT COMING BETWEEN
1PM TO NEXT DAY 8 AM

ENTRY at NORMAL
OPD

Suspected/proven COVID-19 Or ILI

Asymptomatic

Mild illness

Moderate illness

Severe illness

Critical illness

- Symptomatic patients*
- No evidence of pneumonia
- No hypoxia

- Pneumonia present
 - SpO₂ > 90-94% AND
 - RR < 30/min
 - No rapid SO₂ deterioration
- OR
- Any illness in vulnerable groups#

- Severe pneumonia +
 - SpO₂ < 90-94% and/or
 - RR > 30/min

- ARDS
- Sepsis
- Septic shock
- MIS-C
- Acute thrombosis
 - ACS
 - PE
 - Stroke etc

*Symptoms of COVID-19

- Fever/chills
- Cough
- Sore throat
- Chest pain
- Shortness of breath
- Hemoptysis
- Anosmia
- Abdominal pain
- Loose stool

#Vulnerable population

- Age > 60 years
- CKD, CLD
- Chronic cardio-pulmonary disease
- Immunocompromise, Steroid therapy > 2w
- Uncontrolled diabetes
- Malignancy
- Post-transplant patients
- Pregnancy
- Extreme obesity




For all COVID-19 patients in ED Or ILI

- Universal masking
- Contact precautions
- Ensure well ventilated ED cubicle/room
- Minimize contact if not medically required
- Proper notes and documentation



Treatment Summary

KNOW SWINE FLU

CATEGORY A	CATEGORY B	CATEGORY C
		
Mid Fever, cough, sore throat, bodyache, headache, diarrhoea & vomiting	High grade fever, severe sore throat & risk groups having signs of CATEGORY A	Symptoms of A & B, drowsiness, low BP, breathlessness, chest pain, Blood in sputum
What To Do	What To Do	What To Do
<ul style="list-style-type: none">✓ NO testing required✓ NO Tamiflu (anti viral tablet) required✓ Take rest, Do not mix with public & high risk members	<ul style="list-style-type: none">✓ NO testing for H1N1 required✓ Home isolation✓ Tamiflu (anti viral tablet) as per doctor's prescription	<ul style="list-style-type: none">✓ H1N1 Testing✓ Treatment under doctor's supervision✓ Immediate hospitalization

COVID Category A

1. Mild COVID (Fever/Flu-like symptoms, RR <24, SpO₂ >94%, CXR – no pneumonia)
2. Asymptomatic COVID

How to manage

1. No RAT/RTPCR testing (optional)
2. Home isolation for 5days
3. Symptomatic treatment and SpO₂ monitoring
4. Complete bed & mental rest
5. Adequate hydration and Taking only easily digestible foods
6. Sleep in Prone or semi prone positions
7. If cough persists > 5days, add MDI Budecort 800mcg BD for 5days
8. If fever persists for >3days, add tab naproxen/NSAIDs for 3days

COVID Category B

1. Moderate COVID (Breathing difficulty, RR 24-30, SpO₂ 90-94%, CXR – pneumonia in <3 zones)
2. Mild COVID + Uncontrolled Comorbidities or a HCW

How to manage

Continue treatment as in category A +

1. RAT/RTPCR testing
2. Hospital admission in primary care hospitals for monitoring Or 5days home isolation for HCW
3. Symptomatic Rx and/or of comorbidities and SpO₂ monitoring
4. If deteriorating trend, give paxlovid if within 5days of illness, still deteriorating add steroid and anticoagulant

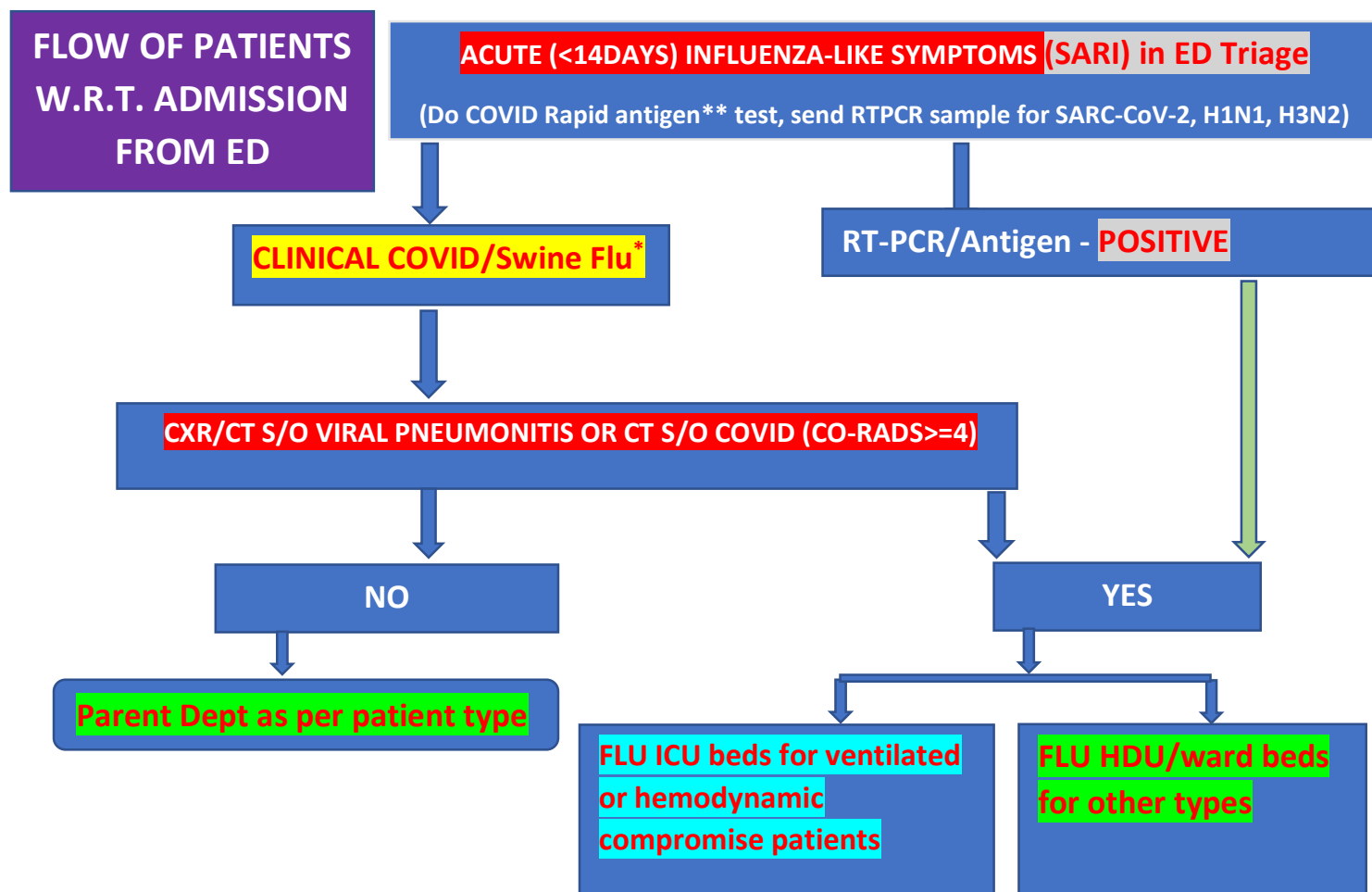
COVID Category C

1. Severe COVID ((Breathing difficulty, RR >30, SpO₂ <90%, CXR – pneumonia in >2 zones, CT chest >50% involvement)
2. Critical COVID (MOF, Shock)

How to manage

Continue treatment as in category B +

1. Hospital admission in higher center
2. Organ supportive treatment (e.g. HFNC/NIV/IV for respiratory failure)
3. Steroid (e.g. Dexona 6mg IV OD for 5-10days)
4. Anticoagulants (e.g. LMWH 0.4ml SC OD)
5. Remdesivir if non-intubated by 7days of illness
6. If steroid is not responding in 48hours, add immunomodulatory like Tocilizumab, Baricitinib, Tofacitinib etc)
7. Critical patients need advance ICU care



After 5th Day of symptom onset in Category 1/2: **Discharge/Transfer**

After 20th day of symptom onset in Category 3 AND still requiring hospital/ICU care due to lungs involvement: **Discharge/Transfer to Parent Dept ward/ICUs**

In Immunocompromised patients of any category: **Discharge/Transfer only after RT-PCR negative with repeat tests every 5days.**

N.B. - This is for general guidance to shift patients on priority basis. However, if any difficulty is being faced, contact patient treating faculty incharge for final decision.

✓ COVID/SWINE FLU admission is a dynamic process, each one is expected to contribute to manage this crisis.

* **CLINICAL COVID** – Patients with influenza-like illnesses (ILI) and imaging (CXR – peripheral opacities /CT-chest - if CT – CORADS ≥ 4) suggestive of VIRAL PNEUMONITIS. If **clinically non-COVID and RTPCR negative**, shift to parent dept immediately if not previously.

** **COVID rapid antigen** - If positive, no RTPCR testing, if negative, do RTPCR testing



RT-PCR

(COVID/H1

N1/H3N2)

TESTING

INDICATION

1. All symptomatic (ILI symptoms) contacts of cases.
2. All patients of Severe Acute Respiratory Infection (SARI) or any of the above listed COVID symptoms with severity.
3. All hospitalised patients who develop ILI symptoms.

Sample collection:

Collection location: Designated place beside screening OPD or in isolation rooms or in Emergency

Collection time: 24hrs

Preferred sample: Throat and Np swab in viral transport media (VTM) for RT-PCR/Multiplex PCR and transported on ice; Np swab for Antigen test

Alternate: Nasopharyngeal swab, BAL or endotracheal aspirate which has to be mixed with the viral transport medium and transported on ice for RT-PCR/Multiplex PCR

General guidelines for RT-PCR sampling:

1. Trained health care professionals to wear appropriate PPE with latex free purple nitrile gloves while collecting the sample from the patient
2. Maintain proper infection control when collecting specimens
3. Restricted entry to visitors or attendants during sample collection
4. Complete the requisition form in RT-PCR app for each specimen (both for Antigen and RT-PCR testing) submitted
5. 30min gap between two sample collections if in an isolation room
6. Proper disposal of all waste generated
7. Maintaining register of all patients who are tested, report delivery to right place, person and in right time, and update report to non-admitted patients

Lower respiratory tract

- Bronchoalveolar lavage, tracheal aspirate, sputum
- Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container



TREATMENT PROTOCOL

RT-PCR Confirmed/ Clinical COVID

NON-CRITICAL TYPE (no hypoxia or radiographic evidence of pneumonia)

**Supportive
treatment only**

CRITICAL TYPE

1. Presence of hypoxia or radiographic evidence of pneumonia
2. Any single organ failure like kidney, liver, etc
3. MOFS/ARDS
4. Sepsis/Shock

Nurturing care: In Viremia phase (first week of illness), basic viral fever management holds true that includes

- 1) Start Tab Vit-C 500mg OD for next 15days
- 2) Paracetamol 650mg (10mg/kg/dose) QID for till febrile, then SOS
- 3) Tab Monteleukast-LC/Fexofenadine OD if URI symptoms and other symptomatic treatments as required
- 4) Complete bed rest
- 5) 100% free of mental stress/fear
- 6) Adequate hydration in the tune of 1-2 L extra per day from normal intakes
- 7) Taking only easily digestible foods to have low metabolism
- 8) Try to sleep in Prone or semi prone positions 4-6 times (30-60min each time with slow change in positions) per day
- 9) Add Tab Naproxen 250mg BD for 3days if fever persists after 5days of symptom onset; Add Nebuliser/MDI Budecort 800mcg BD for 5days if cough persists after 5days of symptom onset
- 10) Paxlovid ((Nirmatrelvir/Ritonavir – 300/100mg BD for 5days) as per availability: For all symptomatic mild-mod patients and co-morbidities within 5days of symptom onset

Most important in the early viral fever management is to give body rest (this depends on physical rest, mental rest, inner calm and quietness, lowering as low as basal metabolic rate). **This to be discussed with each patient**

Primary care:

1. **Dexamethasone (6mg IV OD for 5-10days)** for **Oxygen requiring OR chest infiltrates >25%**
2. **Inj. LMWH (0.4ml SC OD)** for **all symptomatic or D-dimer >2 UL**
3. **Awake Proning:** Must
5. **Other organ supportive therapy** as required including antimicrobials as per co-infections and institute protocol
6. **Immunomodulatory therapy** (Tocilizumab/ Baricitinib/ Tofacitinib as per availability **if steroid fails** after 48h) – use as per CDC/IDSA guideline

Monitoring

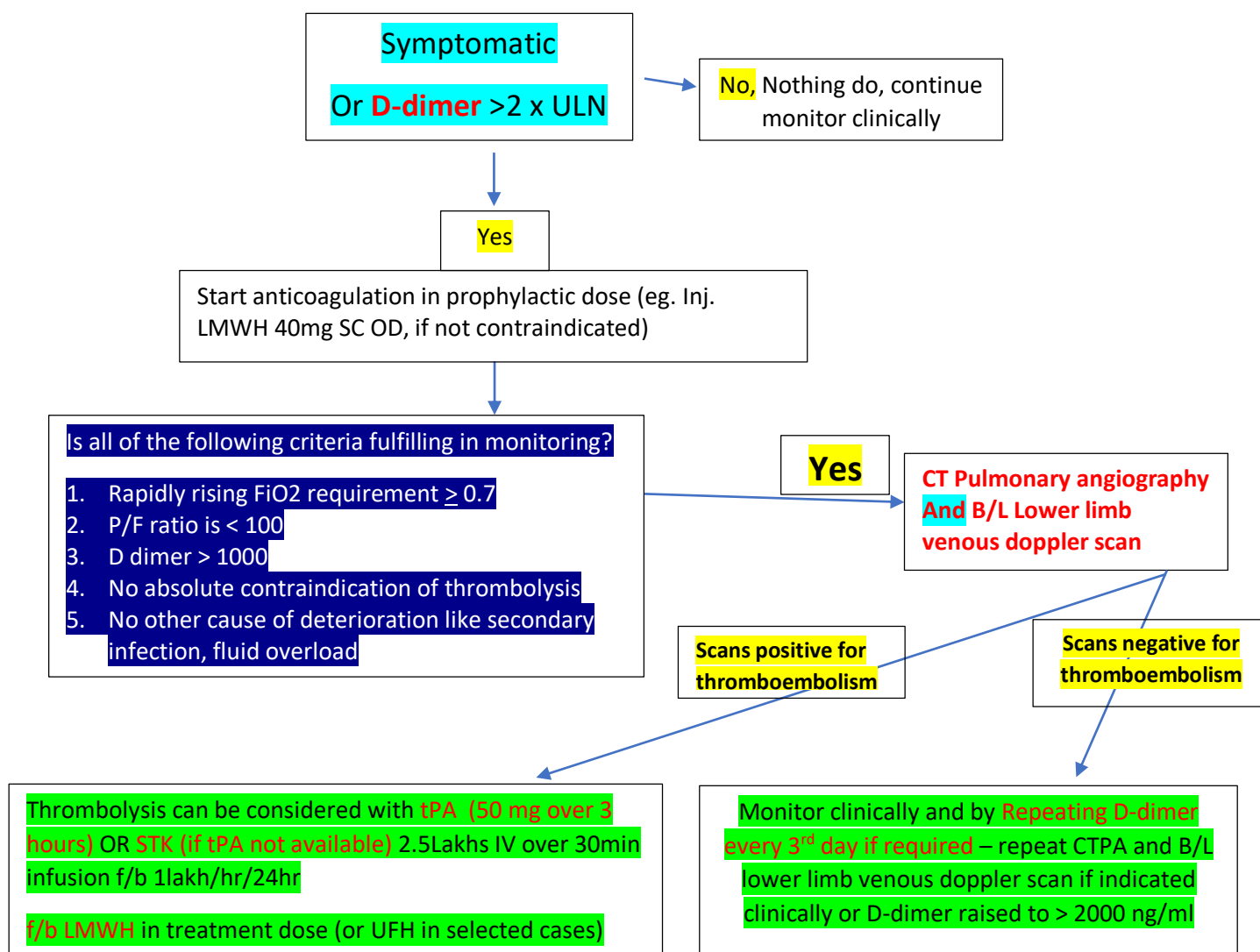
- a. Daily monitoring of vitals, SpO₂, **1MSST** (if desaturate in two days in asymptomatic, go for HRCT-CTPA chest and further treatment plan), and symptoms
- b. Repeat investigations (**CBC, LFT, KFT, D-dimer, HS-CRP, LDH, Chest X-Ray** (as required), **ECG** (as required), **USG** (as required), **ABG** (as required), **Viral markers** (once), **Procalcitonin** (as required), **Pro-BNP** (as required), **Ferritin** (as required), other organ specific tests) every 72 hourly (flexible depending on clinical scenario)
- c. Monitoring for adverse drug reactions and documentation
- d. Daily update in Case record forms (CRFs – Modules 1, 2, 3) and progress sheets
- e. Before discharge ensure **6MWT performance** if feasible and document and advise **rehabilitation**
- f. If LTOT, plan for **TKI/antifibrotic treatment** if required
- g. Screen for **Long COVID** symptoms at 4–6 weeks post-discharge

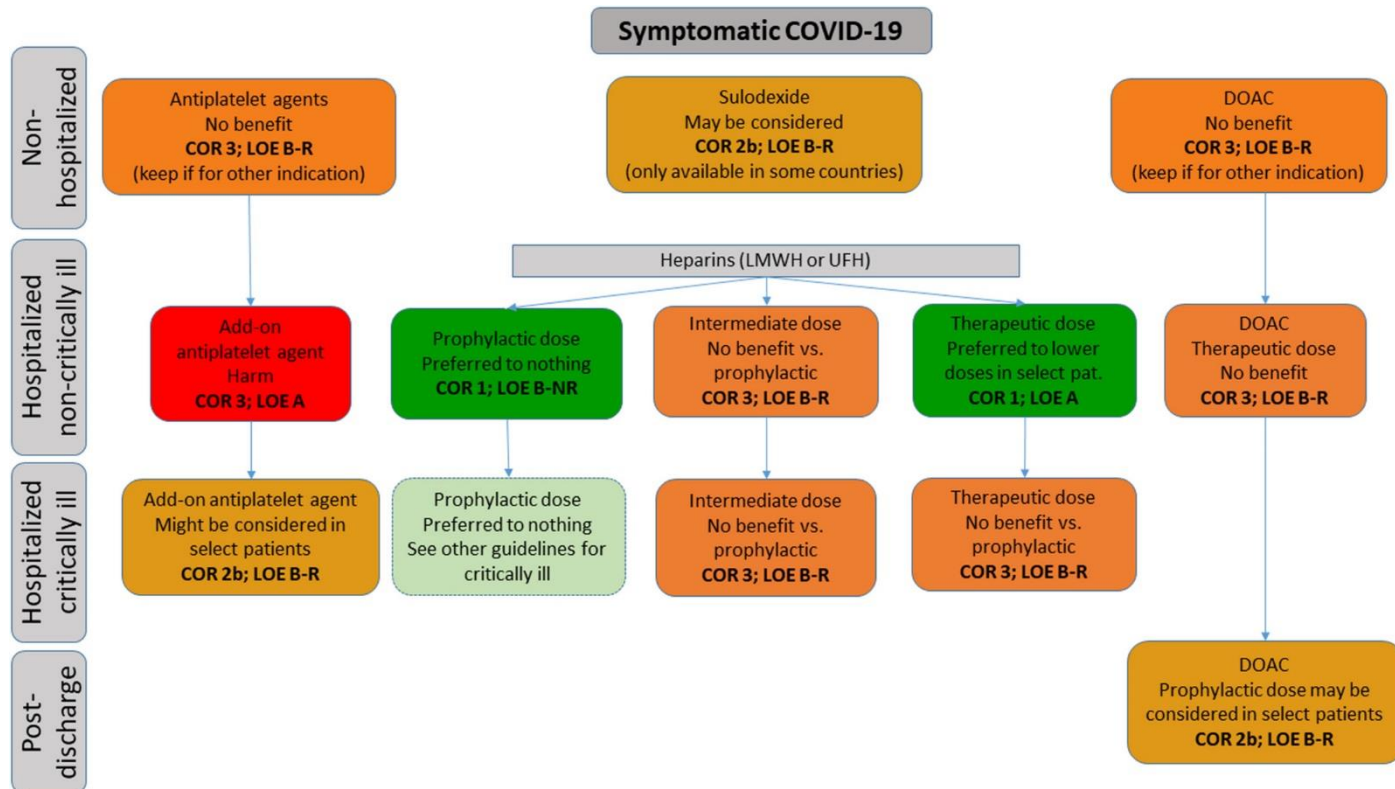


Thromboprophylaxis/Treatment in COVID-19 patients

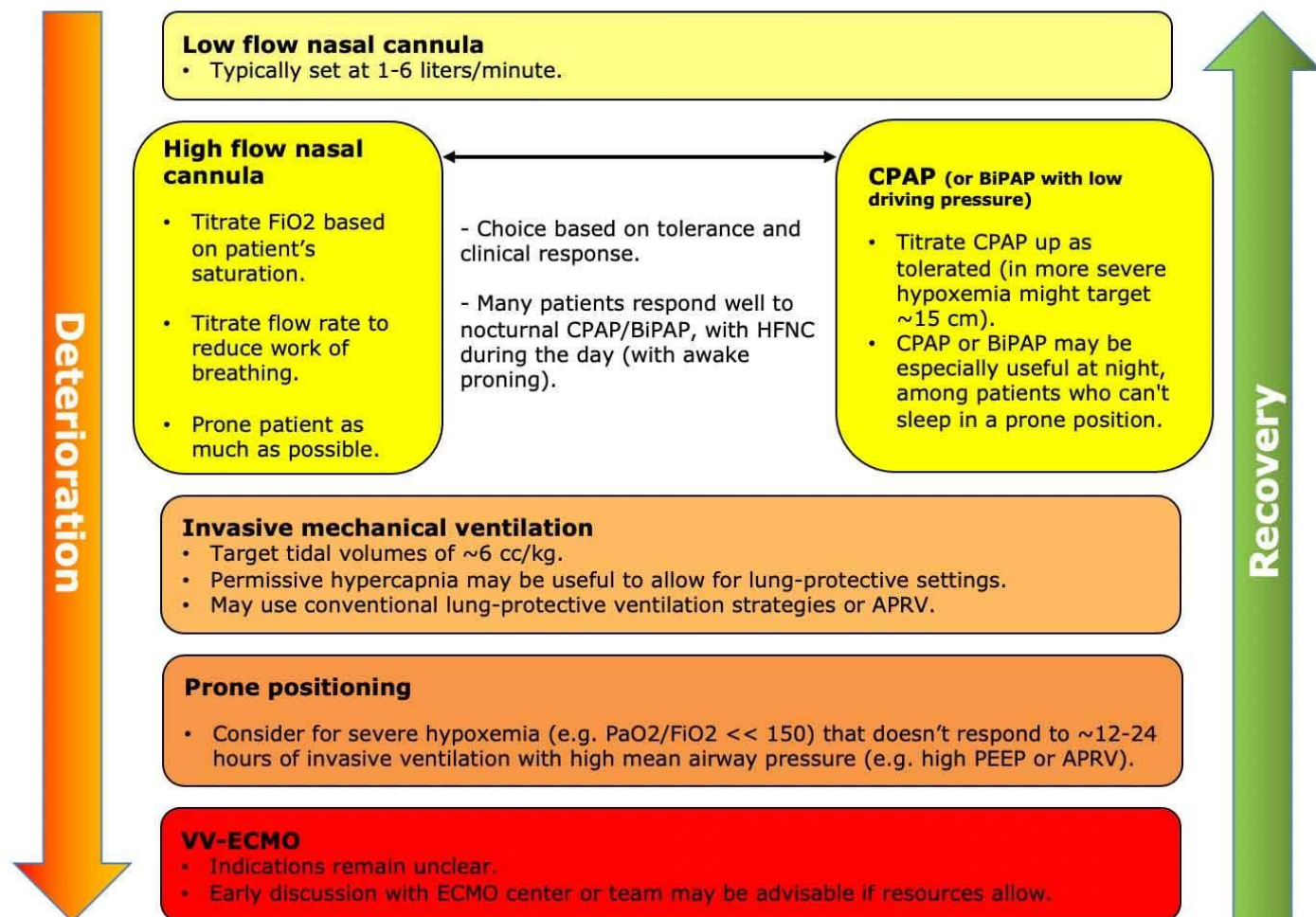
COVID-19 is a hypercoagulable state, and the risk of thromboembolic disease is increased in critically ill (and sometimes well-appearing) individuals. Thromboembolism is typically venous but in some cases may be arterial. Bleeding is much less common but can occur, including intracerebral bleeding, highlighting the importance of documenting ischemia or thrombosis when feasible.

- **Thromboprophylaxis** should be held only if platelet count is $< 25 \times 10^9/L$ or fibrinogen level is $< 0.5 \text{ g/L}$
- Anticoagulants should be given for entire duration of hospitalization
- ***High-risk** include prior VTE, recent surgery or trauma, immobilization, or obesity
- **DIC and SIC score** to be calculated on daily basis and if >5 or >4 respectively, be vigilant for requirement of blood products transfusion.





General schema for respiratory support in patients with COVID-19





SWINE FLU (H1N1/H3N2)

Categories	Treatment								
Category A <ul style="list-style-type: none"> ➤ Patients with mild fever plus cough/sore throat with or without body ache, headache, diarrhea, and vomiting Category B <ul style="list-style-type: none"> ➤ B(i)- Category A plus high grade fever and severe sore throat ➤ B(ii)- Category A plus on or more of the following <ul style="list-style-type: none"> • Pregnant women • Person aged 65 years or older • Patients with lung, heart, liver disease, kidney disease, blood disorder, diabetes, neurological disorders, cancer, and HIV/AIDS • Patient on long term cortisone therapy • Children – mild illness but with pre-disposing factors 	Category A and B – Home based care <p>Nurturing care: In Viremia phase (first week of illness), basic viral fever management holds true that includes:</p> <ol style="list-style-type: none"> 1) Start Tab Vit-C 500mg BD for 7days 2) Paracetamol 650mg (10mg/kg/dose) QID for till febrile, then SOS 3) Tab Monteleukast-LC/Fexofenadine OD if URI symptoms and other symptomatic treatments as required 4) Complete bed rest 5) 100% free of mental stress/fear, 6) Adequate hydration in the tune of 1-2 L extra per day from normal intakes, 7) Taking only easily digestible foods to have low metabolism, 8) Try to sleep in Prone or semi prone positions 4-6 times (30-60min each time with slow change in positions) per day. 9) Add Tab Naproxen 250mg BD for 3days if fever persists after 5days of symptom onset; 10) Add Nebuliser/MDI Budecort 800mcg BD for 5days if cough persists after 5days of symptom onset <p>Most important in the early viral fever management is to give body rest (this depends on physical rest, mental rest, inner calm and quietness, lowering as low as basal metabolic rate). This to be discussed with each patient.</p> <ul style="list-style-type: none"> • Monitoring to assess worsening of symptoms Category B patients that require drug therapy <ul style="list-style-type: none"> • With pre-disposing risk factors as described • Start Oseltamivir as below Early warning signs/Symptoms for hospitalization in category A and B <ul style="list-style-type: none"> • High grade fever not responding to antipyretics • Worsening of symptoms 								
Category C <ul style="list-style-type: none"> ➤ Patients having signs and symptoms of category A and category B plus of one of the following <ul style="list-style-type: none"> • Breathlessness, chest pain, drowsiness, fall in blood pressure, sputum mixed blood, bluish discoloration of nail • Worsening of underlying chronic conditions 	Category C <ul style="list-style-type: none"> • Immediate Hospitalisation • Start Oseltamivir (Baloxavir as a single-dose) immediately, without waiting for test results • Immediate supportive management Dose for Oseltamivir treatment is as follows: By weight <table> <tr> <td>< 15 kg -</td> <td>30 mg BD for 5 days</td> </tr> <tr> <td>15 - 23 kg -</td> <td>45 mg BD for 5 days</td> </tr> <tr> <td>24 - 40 kg -</td> <td>60 mg BD for 5 days</td> </tr> <tr> <td>> 40 kg -</td> <td>75 mg BD for 5 days</td> </tr> </table> Dose by weight for chemoprophylaxis is similar except it is once daily for 10 days	< 15 kg -	30 mg BD for 5 days	15 - 23 kg -	45 mg BD for 5 days	24 - 40 kg -	60 mg BD for 5 days	> 40 kg -	75 mg BD for 5 days
< 15 kg -	30 mg BD for 5 days								
15 - 23 kg -	45 mg BD for 5 days								
24 - 40 kg -	60 mg BD for 5 days								
> 40 kg -	75 mg BD for 5 days								



Supportive management of critically ill patients of COVID/Swine flu

1. Give supplemental oxygen therapy immediately to patients with SARI (Severe acute respiratory illness) and respiratory distress, hypoxaemia, or shock: Initiate oxygen therapy at 5 L/min and titrate flow rates to reach target **SpO₂ ≥90%** in non-pregnant adults and **SpO₂ ≥92-95 %** in pregnant patients

2. Use conservative fluid management in patients with SARI when there is no evidence of shock: Patients with SARI should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation

Fluid Management

- ✓ Patients present at different stages of illness in COVID. Those admitted later have increased fluid losses due to fever, tachypnea and other factors.
- ✓ Therefore, there is patient to patient variation of fluid requirement.
- ✓ Broad guidelines can be as follows:
 - ❖ Use conservative fluid management in patients when there is no evidence of shock
 - ❖ For routine maintenance IV fluids **@1ml/kg/h** of crystalloids
 - ❖ **Fluid Creep**- Nursing officers to consider all other sources of fluid intake such as oral intake, blood products, enteral or parenteral nutritional intake, fluids required for drug dilution and drug administration
 - ❖ If patient develops hypotension (SBP < 90mm Hg), give 250 – 500 ml of crystalloid fluid over 15-30 min and assess for fluid overload
 - ❖ If no response to fluid overload or if signs of volume overload, reduce fluid administration
 - ❖ **IVC collapsibility** is a good indicator in such cases
 - ❖ Use vasopressors when shock persists despite fluid resuscitation to maintain mean arterial pressure **(MAP) ≥65 mmHg** AND lactate is < 2mmol/L, in absence of hypovolemia
 - ❖ Vasopressors (i.e. norepinephrine/ epinephrine/ vasopressin) infusion to be started at a minimum rate to maintain SBP>90mmHg or MAP 60-65 mm Hg
- 3. Do not routinely give systemic corticosteroids for treatment of bacterial pneumonia or others unless they are indicated for COVID related hypoxia
- 4. **Closely monitor patients** with SARI for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions like mechanical intubation immediately
- 5. During intensive care management of SARI, determine which chronic therapies should be continued and which therapies should be stopped temporarily.
- 6. Give empiric antimicrobials to treat all likely pathogens causing SARI. Give antimicrobials within one hour of initial patient assessment for patients with sepsis: Although the patient may be suspected to have COVID – 19/Swine flu, administer appropriate empiric antimicrobials within ONE hour of identification of sepsis
- 7. **Awake proning**: As detailed below

High Flow Nasal Cannula Oxygen Therapy (HFNC/HFNO)

Indication

- Severe respiratory failure (respiratory rate >30 BPM with oxygen saturations 92% despite oxygen at 15 L/min via reservoir bag, and/or arterial oxygen partial pressure to fractional inspired oxygen (P_{aO_2}/F_{iO_2}) ratio <150)
- In moderate respiratory failure, if $SaO_2 < 92\%$, or increase in work of breathing (WOB), despite supplemental oxygen up to 6 L/pm (alternative to NRBM).

Contra Indication

- ✓ Patients with exhaustion or confusion
- ✓ Patients with hypercapnia (exacerbation of obstructive lung disease, cardiogenic pulmonary oedema), hemodynamic instability, multiorgan failure, or abnormal mental status should generally not receive HFNO, although emerging data suggest that HFNO may be safe in patients with mild-moderate and non-worsening hypercapnia.

Stetting of HFNC

- For stable patients start with Flow of 20 LPM increase to 50-60 L/min with FiO_2 0.8-1.0. Thereafter the settings to be titrated aiming for an oxygen saturation (SpO_2) >92%.
- In case of sever respiratory distress start with a flow of 60lpm with FiO_2 of 1.0. Thereafter the settings to be titrated aiming for an oxygen saturation (SpO_2) >92%.

Important considerations for patients of HFNC

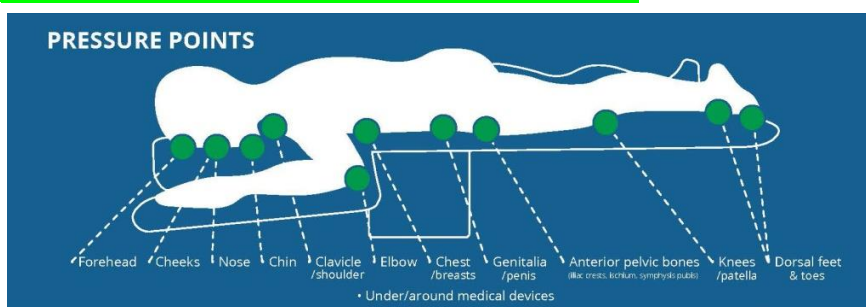
- Awake prone positioning was encouraged at every clinical encounter and reinforced by nursing staff according to a shared clinical protocol.
- Patients treated with either HFNO should be closely monitored for clinical deterioration.
- Mechanical ventilation (Invasive/Non-Invasive) should be considered in case of non-improvement or deterioration of respiratory parameters (WOB, SpO_2 , RR, etc.) after 1 hour of HFNC therapy with a flow of 60lpm & FiO_2 0.8-1.0

Switching Between NIV and HFNC





PROTOCOL FOR PRONE VENTILATION



I. Criteria for consideration of prone ventilation

- A. Moderate to severe ARDS resulting in hypoxemic respiratory failure with P/F ratio <150 mm Hg, PEEP > 5 cm H₂O, and FiO₂ > 0.6).
- B. Low tidal volume ventilation with tidal volume < 6 ml/kg of predicted body weight.
- C. Best PEEP titration previously performed unable to achieve above target

II. Contraindications

- A. Raised Intracranial pressure or low cerebral perfusion pressure
- B. Massive hemoptysis requiring immediate intervention including angiography or placement of a double lumen ETT or bronchial blocker
- C. Tracheal surgery/sternotomy during previous 15 days or presence of tracheostomy < 24 hrs
- D. Patients with high risk airway.
- E. Serious facial trauma or facial surgery during the previous 15 days
- F. Cardiac pacemaker inserted in the last 2 days
- G. Unstable spine, femur, pelvic fractures, or unstable chest wall, major abdominal surgery
- H. Mean arterial pressure lower than 65 mm Hg despite fluid resuscitation and vasopressors or mechanical circulatory support
- I. Unstable arrhythmia or H/O CAD with risk factors for arrhythmias
- J. Pregnant women
- K. Anterior chest tube with air leaks
- L. Suspected or documented intra-abdominal hypertension
- M. Use of extracorporeal membrane oxygenation (ECMO)
- N. Burns on more than 20 % of the body surface including chest or abdominal surface
- O. Any seizure episode

III. Methods

A. Preparation for proning

1. Nursing officer
 - a. 3 to 5 nursing officers are recommended depending on the patient size and clinical context to assist in turning the patient
 - b. Ensure that the gastric tube (taped around the head) and all vascular devices are secured in place
 - c. Duodermes are placed for skin protection (knees, forehead, chest, iliac crests)
 - d. Discontinue tube feeds at least 1 hr prior to proning and aspirate all gastric contents.
 - e. Apply eye lubricant and tape eyelids shut
2. Resident doctor
 - a. Ensure that the endotracheal tube is secure and that the length of the ventilator tubing is adequate during positioning
 - b. It is recommended that the ventilator is set up for capnography to monitor EtCO₂ during turning process and while in prone position.
 - c. Empty condensate in the ventilator tubing



B. **Proceeding to the lateral position**

1. Move the patient laterally in the bed to the *opposite* side selected for the direction of rotation (*e.g.* if the patient will be turned to the right, the initial lateral movement will be to the left)
2. Attach ECG electrodes to back
3. Monitor for at least 2 minutes in the lateral position for signs of hemodynamic instability or worsening hypoxemia or a change in end-tidal CO₂.

C. **Pillow positioning**

1. Across patient's chest - allowing breasts to be supported and free from pressure
2. Across pelvis - ensuring abdomen to be free of compression
3. Under shins - preventing hyper-extension at ankle and minimising pressure exerted on patient's knees

D. **After prone positioning**

1. Re-check position of endotracheal and gastric tubes as well as vascular access devices paying special attention to ensure that no lines or tubes are kinked.
2. Re-zero hemodynamic monitoring equipment as necessary.
3. Continue ARDSnet ventilation with goal Pplat ≤ 30 cm H₂O, pH 7.20-7.45, PaO₂ ≥ 55 mm Hg
4. Measure Pplat and respiratory system compliance (Crs) 1 hr after proning and q6 hrs after that with ABG's obtained simultaneously. Lung mechanics and blood gas analysis should also be performed immediately before returning to supine position.
5. Keep minute ventilation same as in supine
6. Head should be rotated to the opposite side every 2 hrs.
7. Urine output to monitor 1 hrly.

IV. **Indications to return to the supine position**

- A. The duration of prone therapy ordered (*e.g.* 16 hrs) has elapsed.
- B. Complications occurring during a prone session
 1. Airway/respiratory complications
 - a. Unscheduled extubation
 - b. Mainstem bronchus intubation or ETT obstruction
 - c. Significant hemoptysis
 - d. Worsening hypoxemia defined as SpO₂ < 85% or PaO₂ < 55 mmHg for more than 5 minutes
 2. Cardiovascular complications
 - a. Cardiac arrest
 - b. Hypotension defined as systolic blood pressure < 60 mmHg for more than 5 min
 - c. Bradycardia defined as heart rate < 40 beats/min for more than 1 minute
 - d. Any hemodynamically unstable tachyarrhythmia
 3. Any other life-threatening reason at the discretion of the medical team

V. **Indications to terminate prone therapy**

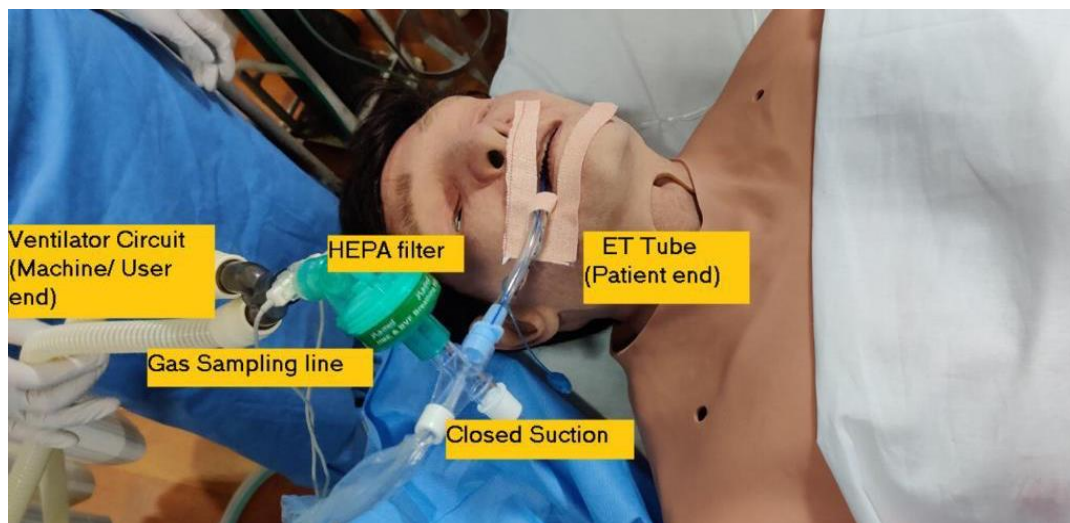
- A. Improvement in oxygenation with PaO₂/FiO₂ ≥ 150 mmHg with PEEP ≤ 10 cm H₂O and FiO₂ ≤ 0.6 which persisted 4 hrs after the end of the prior prone session
- B. PaO₂/FiO₂ ratio deterioration by more than 20 % relative to supine after two consecutive prone sessions

VII. **Other points to consider**

- A. Chest x-rays should be performed while in the supine position
- B. Enteral nutrition may be continued in the prone position at the discretion of the team.



Ventilator Protocol



Indications of Invasive Ventilation after failed HFNO/NIV

1. Worsening oxygenation $\text{PaO}_2/\text{FiO}_2$ or $\text{SpO}_2/\text{FiO}_2 < 150$
2. Hypercapnia/acidosis with a $\text{pH} < 7.3$
3. High work of breathing ($\text{RR} > 30$)
4. Altered mental status attributed to respiratory failure

Ventilatory Settings

1. Ventilation Mode – Assist Control Mode or SIMV
2. Inspiratory Time – 0.7 – 1.2 s
3. Flow rate – initially 25 lit/min (range 15-60 lit/min)
4. Tidal Volume – Tidal volume: initially 6mL/kg predicted body wt. (range 4-8)
5. PEEP – PEEP 10 cm H₂O: Monitor hemodynamics with increasing PEEP
6. Respiratory rate: Initially 15/min. (Range 15-35)
7. Plateau pressures of ≤ 30 cm H₂O (reflects respiratory system compliance)
8. Peak inspiratory pressure < 35 cm H₂O
9. FiO_2 to maintain a SpO_2 of 88-98%
 - a. $\text{FiO}_2 < 0.6$
 - b. Try to avoid 100% oxygen, which favors de-nitrogen atelectasis
 - c. Lower FiO_2 of 0.7-0.9 may not drastically change oxygenation due to high level shunts

10. Sedation Analgesia

- a. Fentanyl – 100 μg bolus followed by 50 $\mu\text{g/hr}$ continuous infusion
- b. Midazolam – 0.05 mg/kg bolus followed by 0.02-0.06mg/kg/hr continuous infusion

11. Goals to be achieved

- a. Oxygenation - $\text{PaO}_2 > 60$ / SpO_2 88-98%
- b. Ventilation -
 - i. pH 7.25-7.42
 - ii. PaCO_2 40-65 / end-tidal carbon dioxide (ETCO_2) 35-60 mm



12. Precautions:

- a. Avoid disconnecting the patient from the ventilator, to avoid loss of PEEP and atelectasis
- b. Reduce incidence of venous thromboembolism by
- c. Pharmacological prophylaxis
 - i. Low molecular-weight heparin 40 mg SC/day
 - ii. For those with contraindications, use mechanical prophylaxis

13. Troubleshooting

- a. Peak airway pressure >35 cm H₂O / Plateau Pressure > 30 cm H₂O
 - i. Evaluate for pneumothorax
 - ii. Consider Neuromuscular Blockade
 - iii. Consider diuresis
 - iv. Reduce Tidal Volume by 1ml/kg (not < 4ml/kg)
 - v. Reduce Respiratory Rate by 2-4 / min/change (Not < 8/min)
 - vi. Consider closed ET suctioning
- b. FiO₂ > 0.6 with SpO₂ < 88%
 - i. Increase PEEP by 2 (max 25)
 - ii. Consider diuresis c. pH < 7.25
 - iii. Increase Respiratory Rate by 2-4 / min/change (max 35) d. pH > 7.42
 - iv. Decrease Respiratory Rate by 2-4 / min/change (min 8)

Management protocol for ARDS Patient

1. Implement mechanical ventilation using lower tidal volumes (4–8 ml/kg predicted body weight, PBW) and lower inspiratory pressures (plateau pressure)
2. Hypercapnia is permitted if meeting the pH goal of 7.30-7.45. Ventilator protocols are available.
3. The use of deep sedation may be required to control respiratory drive and achieve tidal volume targets
4. In patients with severe ARDS, prone ventilation for >12 hours per day is recommended
5. Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
6. In patients with moderate or severe ARDS, higher PEEP instead of lower PEEP is suggested. Tables are available to guide PEEP titration based on the FiO₂ required to maintain SpO₂.
7. A related intervention of recruitment manoeuvres (RMs) is delivered as episodic periods of high continuous positive airway pressure [30–40 cm H₂O], progressive incremental increases in PEEP with constant driving pressure, or high driving pressure
8. In settings with access to expertise in extracorporeal life support (ECLS), consider referral of patients with refractory hypoxemia despite lung protective ventilation.
9. Avoid disconnecting the patient from the ventilator, which results in loss of PEEP and atelectasis.
10. Use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required
11. Use of corticosteroid in selected patient is permitted only after consultation with on-call faculty



Prevention of Complications

Anticipated Outcome	Interventions
1. Reduce days of invasive mechanical ventilation	<ul style="list-style-type: none">• Use weaning protocols that include daily assessment for readiness to breathe spontaneously• Minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions
2. Reduce incidence of ventilator associated pneumonia	<ul style="list-style-type: none">• Keep patient in semi-recumbent position (head of bed elevation 30-45°)• Use a closed suctioning system; periodically drain and discard condensate in tubing• Change heat moisture exchanger when it malfunctions, when soiled, or every 5–7 days
3. Reduce incidence of venous thromboembolism	<ul style="list-style-type: none">• Use pharmacological prophylaxis (low molecular-weight heparin[preferred if available] or heparin 5000 units subcutaneously twice daily) in adolescents and adults without contraindications.• For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices)
4. Reduce incidence of catheter related bloodstream infection	<ul style="list-style-type: none">• Use a checklist with completion verified by a real-time observer as reminder of each step needed for sterile insertion and as a daily reminder to remove catheter if no longer needed
5. Reduce incidence of pressure	<ul style="list-style-type: none">• Turn patient every two hours
6. Reduce incidence of stress ulcers and gastrointestinal bleeding	<ul style="list-style-type: none">• Give early enteral nutrition (within 24–48 hours of admission)• Administer histamine-2 receptor blockers or proton-pump inhibitors in patients with risk factors for GI bleeding.



Isolation POLICY for COVID 19/Swine Flu patients

- ✓ No need for RT-PCR testing further
- ✓ For Non-critical type cases (category 1&2) - Isolation advised for **05 days** after symptom onset
- ✓ **For Critical type cases (category 3)** - Isolation advised for **20 days** after symptom onset
- ✓ **For asymptomatic cases (incidental COVID positive during work-up for other illnesses):** See cycle threshold (CT) values of RT-PCR, if >25 in first report de-isolate immediately, consider it as non-COVID

FOLLOW-UP POLICY FOR COVID 19 PATIENTS

- ❖ No RT-PCR testing in follow-up
- ❖ While discharging from COVID area, please advise to follow-up in **Fever clinic** (Wednesday and Thursday, 2-4pm) for acute issue and **Long COVID syndrome**, any doubt contact OPD staff, **7217014335** or **Telemedicine OPD**
- ❖ HCWs/any community members are allowed for duty joining **after 05 days of total isolation** in Category 1&2 from day of symptom onset **(All leaves are medical leaves)**
- ❖ In category 3 **after discharge**, they are allowed for duty joining after necessary bed rest as advised during discharge and if clinically fit to join the work through **concerned OPD**

DEAD BODY MANAGEMENT

- 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.
- If the family of the patient wishes to view the body at the time of removal from the isolation room or area, they may be allowed to do so with the application of Standard Precautions.
- Place the dead body in leak-proof plastic body bag. The exterior of the body bag can be decontaminated with 1% hypochlorite. The body bag can be wrapped with a mortuary sheet or sheet provided by the family members.
- Disinfect bag housing dead body; instruments and devices used on the patient.
- Disinfect linen. Clean and disinfect environmental surfaces.
- Patient care takers are advised to maintain standard precautions while handling infected body.



ACKNOWLEDGMENT

I would like to thank Executive Director & CEO Prof Meenu Singh for providing me opportunity to be part of this protocol to prepare. I would like to thank MS and Dean (A) for their invaluable support. I would like to thank Dr RaviKant, HOD, Department of medicine for invaluable support. I would like to thank my colleagues in Medicine Department, Dr V.S.Pai, and Dr Mukesh for their constant motivation. I would like to thank the Senior Residents and Junior Residents of Department of Medicine and other departments and Nursing officers, ward attendants, Guards, and housekeeping staffs posted in ward for their role in management of the patients. Last I would like to acknowledge the supporting role of the following departments in preparing the department protocol for FLU management at present:

1. Department of hospital administration, AIIMS Rishikesh
2. Department of Microbiology, AIIMS Rishikesh
3. Department of CFM, AIIMS Rishikesh
4. Department of Emergency Medicine and Trauma Surgery, AIIMS Rishikesh
5. Department of Pulmonary and Critical Care, AIIMS Rishikesh
6. Department of Anaesthesia and Critical Care Medicine, AIIMS Rishikesh

This protocol is based on local, national, and international guidelines, updated research studies, in-house research findings, and expert opinions.