GOVERNMENT OF WEST BENGAL
HEALTH & FAMILY WELFARE DEPARTMENT
SWASTHYA BHABAN, BLOCK GN-29, SECTOR V
SALT LAKE CITY, KOLKATA -91

Memo No. M/6A1 **Date: 17.04.2020**

To
The Principal (All Medical Colleges)
The Medical Superintendents cum Vice Principal (All Medical Colleges)
The Chief Medical Officer of Health (All Districts and Health Districts)
The Superintendents (All DH/ SSH/ SDH/ SGH)
The Block Medical Officer of Health (All blocks)

State Protocol for Clinical Management of COVID-19 Cases, West Bengal

In partial modification of the Memo No. HPH/9M-21/2020/77 dated 31.03.2020, the following final guideline in order to streamline the management protocol of COVID-19 affected patient across the State, prepared by the Expert Committee is hereby being circulated.

All concerned are hereby instructed to **adhere to the guidelines outlined in the enclosed protocol.**

All concerned are further instructed to share the guidelines to all faculties, specialists, Medical Officers under their control.

17/4/2020
Director of Medical Education
Government of West Bengal

17/4/2020
Director of Health Services
Government of West Bengal

Memo No. M/6A1/1(A) Dated: 17.04.2020

Copy forwarded for information and necessary action please to:

1. DDHS (PH) and SSO, IDSP, West Bengal.
2. SNO, IDSP, West Bengal
3. Dy. CMOH-II, all Districts and Health Districts.
4. Guard File

17/4/2020
Director of Medical Education
Government of West Bengal

17/4/20
Director of Health Services
Government of West Bengal

SALIENT POINTS IN MANAGEMENT OF SEVERE COVID-19 IN ADULTS	
Oxygen therapy	• Administer oxygen to all Severe Acute Respiratory Illness (SARI) patients with respiratory distress / hypoxemia / shock • Start with nasal prongs @ 5L/min or simple face mask / venturi mask / nonrebreathing mask @ 10-15L/min, as needed • Titrate for target SpO_2 • Initial target $SpO_2 \geq 94\%$ • Target SpO_2 after initial stabilization: 90-96%
Initial fluid management	• Conservative fluid strategy if no evidence of shock • Cautious IV fluids • Monitor for worsening of oxygenation during fluid therapy
Empiric antimicrobials	• To all patients as early as possible, preferably within the first hour • Choose drugs to cover all suspected bacteria and influenza • Try to send blood cultures before starting antimicrobials; do not delay antimicrobials waiting to send cultures • De-escalate based on culture results or clinical judgment
Monitor closely for signs of clinical deterioration (rapidly progressive respiratory failure)	• Monitor vital signs and gas exchange at regular intervals • Check whether tolerating oxygen therapy • Do not delay intubation if worsening • If High Flow Nasal Cannula (HFNC) is available, consider a short HFNC trial in selected patients under close monitoring → Do not delay intubation if worsening • If HFNC not available, consider a short Noninvasive Positive Pressure Ventilation (NIPPV) trial in selected patients under close monitoring → Do not delay intubation if worsening

	• Airborne precautions must during HFNC /NIPPV / Endotracheal intubation • MDI with spacer preferred to nebulizers, if possible NB: Aerosol generating procedures: Intubation, Extubation, HFNC, NIPPV, Bag masking, Open suctioning, T piece / any open circuit, Bronchoscopy, CPR, Nebulisation, Tracheostomy
Monitor closely for signs of clinical deterioration (shock or sepsis)	• Monitor vital signs at regular intervals • Appropriate investigations at regular intervals
Investigations	• **Baseline investigations:** Complete haemogram with neutrophil-lymphocytic ratio, LFT, Urea, Creatinine, CRP, ECG, CXR, ABG with lactate (if SpO_2<94%), Ferritin(if available),Urine RE • **Follow up investigations:** Investigations to monitor organ functions regularly; Other investigations as decided by treating team; Early detection of myocardial involvement by troponins, NT-pro BNP and echocardiography; USG Abdomen
Address comorbidities	• Tailor management according to comorbidites
Criteria of CRITICAL CARE UNIT (CCU) admission	• Requiring mechanical ventilation • Hypotension requiring vasopressor support • Worsening mental status • Multi-organ dysfunction syndrome
When to intubate	• Features of respiratory fatigue with increased work of breathing and worsening respiratory parameters indicating respiratory failure • Haemodynamic instability • Altered sensorium with a threatened airway NB: Although intubation decision should be individualized, **keep a low threshold for intubation**
How to intubate	• Full complement of PPE with face shield • Ensure scene safety& check readiness of all

	essential drugs& equipments prior to intubation • Most experienced team member to intubate • Complete airway assessment prior to intubation • Hemodynamic evaluation & optimization, if needed, prior to intubation • Use Heat Moisture Exchanger (HME) with bacterial-viral filter in every oxygenation interface (face mask, circuit, endotracheal tube (ETT), catheter mount, LMA) • Use closed system suctioning • Preoxygenation with 100% oxygen • Rapid sequence intubationusing induction agent (propofol or etomidate) and muscle relaxant (succinylcholine or rocuronium) • Limit bag mask ventilation unless unavoidable • Apply cricoid pressure only in case of ongoing regurgitation • Use videolaryngoscope with separate screen, if available • In anticipated difficult airway, anaesthesiologist may be called to intubate • In unanticipated difficult airway, use LMA and simultaneously call for expert help • Clamp ETT during unavoidable disconnections & connections • Use end-tidal CO_2 and CXR to confirm correct position of ETT • After intubation, appropriate cleaning/disinfection of equipment and environment is mandatory
COVID-19 & ARDS: Invasive mechanical ventilation	
Initial mode	Volume Control (VC) NB: Can use Pressure Control (PC) if tidal volume goals are met. But mostly PC is tried when initial VC mode fails
Initial Settings	• Tidal volume (VT): 6ml/kg predicted body weight (PBW) • Rate: to match baseline minute ventilation (not > 35) NB: PBW= Males: 50 + 2.3 (Height in inches – 60) Females: 45.5 + 2.3 (Height in inches – 60)

Tidal volume adjustment:

- Check Plateau Pressure (Pplat)
- Plateau Pressure goal ≤ 30 cm H_2O
- If Pplat>30: decrease VT by 1ml/kg steps to minimum 4ml/kg
- If breath stacking(auto PEEP) or severe dyspnea occurs, may increase VT to 7-8 ml/kg if Pplat remains≤30

Set PEEP according to the PEEP-FiO_2 tables to achieve oxygenation goal (PaO_2 55-80 mm Hg / preferably SpO_2 90-96%):

Lower PEEP-Higher FiO_2 combinations:
(start with minimum value for a given FiO_2)

FiO_2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
PEEP	5	5-8	8-10	10	10-14	14	14-18	18-24

Higher PEEP- Lower FiO_2 combinations:

FiO_2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5
PEEP	5	8	10	12	14	14	16	16	18
FiO_2	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.0	
PEEP	20	20	20	20	22	22	22	24	

- Higher PEEP (>10) in moderate to severe ARDS
- Lower PEEP (≤10) in mild ARDS and "non-ARDS like" severe pneumonia
- Continue with higher PEEP if PEEP responsive (recruiters) and lower PEEP if PEEP non-responsive (non-recruiters)
- PEEP responsive (Recruiters): Keeping FiO_2 unchanged, *usually* oxygenation improves with increase in PEEP with minimal / no drop in mean arterial pressure, minimal / no rise in $PaCO_2$ and minimal / no rise in driving pressure
- Try to keep Pplat≤30 and driving pressure (Pplat-PEEP) <15

Fluid management

- Conservative strategy in absence of tissue hypoperfusion
- Try to avoid hypervolemia

↓

Oxygenation improving

- Reduce PEEP &FiO_2 gradually
- Shift to a partial assist / spontaneous mode, if tolerated
- Plan for protocolised liberation from ventilation

Oxygenation not improving

Search for and address reasons of failure:

- Ensure conservative fluid management

	• Treat patient-ventilator dyssynchrony, if present • Shift mode (volume limited to pressure limited) • Search for complications of disease or ventilation	
	⬇	
Oxygenation improving	Optimize and persist with above-mentioned approaches till patient is ready for liberation from ventilation	
Oxygenation not improving	**If acceptable gas exchange not achievable without incurring Pplat > 30, consider rescue therapies:**	
	Prone ventilation	• Most preferred rescue therapy • Consider in PaO_2/FiO_2<150 with a FiO_2 ≥0.6 and PEEP ≥5 or PaO_2 / FiO_2 ≤100 with a PaO_2 ≤60 despite optimization of ventilator settings at FiO_2 of 1 • Consider early proning (within first 36 hours) • 12-16 hours / day • Always check for contraindications and complications
	Recruitment maneuvers	• Consider in PEEP responsive patients • Preferred method: Sustained high pressure inflation (35-40 cm H_2O of CPAP for 40 seconds) • Avoid staircase maneuvers (Incremental PEEP) • Avoid routine use of recruitment maneuvers
	Neuromuscular blockers	• Consider continuous infusion for up to 48 hrs in case of persistently high plateau pressures or severe dyssynchrony • Can use intermittent boluses to facilitate lung protective ventilation, if needed
	Pulmonary vasodilators	• If available, a trial of inhaled prostacyclin or nitric oxide may be considered, if other rescue strategies have failed
	ECMO	• Consider venovenous (VV) ECMO, if available, only in selected patients with refractory hypoxemia, despite optimizing ventilation, proning and using other rescue therapies • Referral to ECMO Centre may be needed

Ventilator precautions	• Fresh ventilator circuit for every new patient • HME with bacterial-viral filters must be fitted • Tubings and HME with bacterial-viral filters to be changed every 48 hours / when visibly soiled • Use closed system suctioning • Avoid routine suctioning • Avoid unnecessary disconnections • Clamp ETT for unavoidable disconnections & connections
Sample collection in severe disease	• If upper respiratory tract samples (nasopharyngeal & oropharyngeal) test negative, but still the clinical suspicion remains high specially in presence of pneumonia or severe disease, send lower respiratory tract samples also (expectorated sputum or tracheal aspirates / mini BAL / BAL in intubated patients) • Can send only lower respiratory tract samples in intubated patients
COVID-19 & Shock: Haemodynamic support	
Fluid therapy	**Strategy of acute resuscitation:** • Individualize, monitoring tissue perfusion • Conservative strategy preferred to liberal • Try to avoid hypervolemia • Follow lactate
	Choice of fluids: • Buffered / balanced crystalloids • Avoid HES / Dextran / Gelatin / routine use of albumin
	Assess fluid responsiveness, whenever possible: • Use dynamic parameters for assessing preload responsiveness (e.g. Passive Leg Raising), as feasible
Vasoactive agents	• First line vasopressor: Noradrenaline

	(Vasopressin / Adrenaline if Noradrenaline not available) • Second line vasopressor: Add Vasopressin • MAP target: 60-65 mm Hg • Presence of cardiac dysfunction & persistent hypoperfusion despite fluids & Nordadrenaline: Add Dobutamine • Avoid Dopamine • Refractory shock despite fluids & vasopressors: Add IV Hydrocortisone (200mg / day as continuous infusion / intermittent doses)
Renal replacement therapy	
When to dialyze in Acute Kidney Injury (AKI)	• Volume overload • Severe metabolic acidosis • Refractory hyperkalemia • Uremic encephalopathy • Uremic pericarditis
Strategy	• All modalities of renal replacement therapy can be used depending on clinical status • Preferably bedside dialysis. Portable reverse osmosis water in a tank may be used, if needed. • Acute peritoneal dialysis can be tried in selected patients where hemodialysis facility is not available • Cytokine removal therapies not recommended
Other critical care management	
• Protocolised light sedation • Enteral nutrition • Glycemic control • Prevention of hospital acquired infections • Deep vein thrombosis prophylaxis • Stress ulcer prophylaxis • Pressure ulcer prevention by two hourly turning • Protocolised liberation from ventilation • Caution about premature extubation (especially without facilitative HFNC / NIPPV) and subsequent reintubation • Early physical therapy • Use point-of-care ultrasound as much as possible to avoid transfers out of CCU for	

investigations (e.g. CT scans)

- De-isolate after clinical recovery and two RT-PCR negative samples taken 24 hours apart