COVID-19 Ventilation

Quick Reference Guide

V1.1 – last updated 17th March 2020

Initial management

- ALL patients should be discussed with consultant intensivist prior to intubation
- Strict level 2 PPE for all aerosol generating procedures (e.g. intubation)
- Avoid right internal jugular cannulation (preserved for Vascath/ECMO)
- Site left IJ CVC, ART line, NG tube & urinary catheter immediately following intubation
- Measure height and calculate ideal body weight *(man = height - 100; woman = height - 105)*
- Consider alternative diagnoses (bacterial infection, influenza, PE)
- Prescribe the ventilation and oxygenation goals
- Sedate deeply to RASS -3 to -5 with Propofol/Fentanyl +/- Midazolam
- Maintain MAP 60-65mmHg with noradrenaline
- Fluid requirements will be met with enteral feed and drugs.
- DO NOT give maintenance IV fluids.
- Goal directed fluid management may cause harm and is NOT indicated

Bolton | Critical Care

“Do no more harm” ventilation strategy

- Following intubation, perform a SINGLE recruitment manoeuvre (30 cmH_2O for 30 seconds using the ventilator) or 10 minutes of a tidal volume 8-10ml/kg Ideal body weight (600-700ml for 70kg man)
- PRVC using tidal volume 6ml/kg Ideal body weight (~420ml for 70kg man)
- I:E ratio 1:2 or 1:1.5
- Aim SpO_2 92-96% and titrate PEEP using ladder (start at 10cmH_2O)

Step 1	FiO_2 < 0.4	PEEP 5cmH_2O
Step 2	FiO_2 0.4 - 0.6	PEEP 10 cmH_2O
Step 3	FiO_2 >0.6	PEEP 15 cmH_2O

- Measure and maintain peak/plateau pressure <30cmH_2O
- If peak/plateau pressure >30cmH_2O contact Consultant Intensivist for advice
- Consider neuromuscular blockade by infusion for first 24-48 hours
- Accept hypercapnia as long as pH >7.2
- High respiratory rates may cause breath stacking and hypotension
- Promote NEGATIVE fluid balance each 24 hours: start furosemide 20mg tds
- If FiO_2 >0.6 and PEEP>10cmH_2O after all the above, position PRONE for 16 hours and repeat every 24 hours until sustained clinical improvement

Ongoing Care

- Twice daily medical review (see proforma overleaf)
- Can the patient be considered for any urgent Public Health Research?
- Be aware of the cardiac side effects of any ventilation strategy
- If a fluid bolus is required use 20% Human Albumin Solution
- DO NOT give routine maintenance fluid, promote NEGATIVE fluid balance
- Consider a calorie dense NG feed (e.g. Nepro HP 1.8kcal/ml; aim 25kcal/kg/day)
- Check ABG 12 hourly unless clinical deterioration
- Discuss with microbiology at least twice a week
- DO NOT give steroids
- SLAVED process checks:
    - ▷ Sedation hold and trial pressure support ventilation if FiO_2<0.5 and PEEP <10cmH_2O
    - ▷ Lines: Are they clean? Are they needed?
    - ▷ Analgesia, Antimicrobials and Antivirals
    - ▷ Ventilation as above
    - ▷ Enteral: Feed NG and prescribe laxatives
    - ▷ DVT prophylaxis and Delirium assessment

SpO_2 < 88% or pH < 7.2 despite optimal therapy?

- Is there a pneumothorax? Is another pathology present? - perform a CXR
- Contact Consultant Intensivist of the day
- Consider bronchoscopy if mucous plugging suspected
- Consider if CVVH has a role in promoting negative balance
- Consider prone ventilation if FiO_2 >0.6 and PEEP >10cmH_2O
- How is the Right ventricle behaving? Consider bedside ECHO
- Use ARDS guide: http://gmccn.org.uk/riconpages/lung-protective-ventilation
- Contact ECMO coordinator/consultant for further advice after intensivist review: https://mft.nhs.uk/wythenshawe/services/cardiology-and-cardiothoracic- surgery/ecmo-service/

Date: **Time:**

Patient ID

Consultant:

Critical Care – COVID-19 Daily Ward Round

Airway		
Cuff leak?	Change tube	
> 10-14 days ventilated?	Consider risk/benefits of (surgical?) tracheostomy	
Breathing **Aims** pH > 7.2 Sats 92% pO_2 9 6-8ml/kg ideal body weight tidal volume		
Ventilator safe?	6-8ml/kg tidal volume ideal body weight	
$FiO_2 \leq 40\%$?	Wean to spontaneous breathing mode and reduce support Stable for 12 hours – expert advice +/- extubation to facemask	
FiO_2 40% - 60%?	Complication? Sputum plugging, pneumothorax, secondary infection PEEP trial / on-ventilator recruitment manoeuvre Consider CXR	
$FiO_2 \geq 60\%$?	Do above Higher PEEP trial 10 - 15 Use atracurium infusion for paralysis No improvement in 1 hr – prone (16 hrs prone/8 hrs supine) No improvement in 6 hrs – expert advice +/- ECMO referral	
Circulation **Aims** MAP 65 Neutral or negative fluid balance		
Norad > 0.5 mcg/kg/min?	ECHO/POCUS & CO monitor & consider CT body No steroids and hold diuretics 20% HAS if fluid bolus required Consider vasopressin Check allergies - add Tazocin 4.5g TDS (adapt local guidance)	
Positive fluid balance?	Add furosemide 20mg TDS or increase current dose Consider CVVHF if FiO_2 > 60% refractory to proning and IV diuretics	
CPR and escalation decisions?	Family & "three wise people" and consider national guidance	
Disability		
Wean sedation if $FiO_2 \leq 40\%$?	Daily sedation hold or stop midazolam/clonidine Half propofol/fentanyl rate every 4 hours Consider midazolam/clonidine if agitated and/or high BP	
Exposure		
Central line?	Change or remove if red or > 10 days or not needed for > 1 day	
Research?	Recruitment into COVID or non-COVID study?	
Food and family		
Feed?	NG feed (calorie dense), add Senna 15ml bd when established Glucose? Insulin if > 20 mmol/L or complications	
Bowels?	Add Senna 15ml bd after day 3 then lactulose at day 5	
Family update?	Phone/Skype/dedicated family update team	
Haematology		
Pregnancy test?	bHCG and if positive contact obstertics	
Blood tests?	Daily FBC/U&E/Coag & less frequent others (LFT/CRP)	
Infection and drugs		
What infection?	Dry viral swab from NBL sample or throat swab for COVID-19, respiratory viruses & sputum M/C/S (fungal?). Review microbiology results / advice	
Drug chart?	Clexane 40mg od (bd > 100kg, 20mg < 50kg or renal failure) No PPI if absorbing Critical Care order sets prescribed	
New secondary infection?	Check allergies - add Tazocin 4.5g TDS 5 days + ? fluconazole Expert advice if already on antibiotics	

To do:

Signed _____