Management of critically ill patients with CoVID-19

The management of CoVID-19 is less complex than unselected patients with critical illness because large numbers of patients are being encountered with a single disease entity with predictable pathophysiology.

1. Recognise that patients are failing current treatment or are in extremis requiring immediate intubation. Treatment failure can include failure to improve on NIV/CPAP or HFNO. Respiratory rate alone is not an indication for intubation as work of breathing is dependent on the magnitude of pleural pressure swings and tidal volume. Tachypnoea is a physiological response to lung inflammation[1].
2. Intubate patient with a team using intubation check list (https://cardiffcriticalcare.co.uk/sops/intubation-in-icu-sop/).
3. Perform CTPA (dual energy if possible) – this should be done if not previously performed or there has been a clinical deterioration prior to intubation – this provides information on thromboembolic disease, underlying parenchymal disease and likelihood or response to proning
4. Would not normally institute remdesivir in patients admitted to critical care, there is little data to support its' efficacy in reducing mortality on hospitalised patients[2-6].
5. Patients should have 10 days treatment with Dexamethasone 6mg daily[7]
6. IL-6Rα blockade (Tocilizumab and Sarilumab) should be given in patients requiring respiratory support (including HFNO and NIV/CPAP) if not already received on ward – Tocilizumab 8mg/kg of actual body weight up to a maximum of 800mg, repeated 12-24 hours later at the discretion of the treating clinician. Sarilumab 400mg, administered once as an intravenous infusion.
7. Patients should be sedated according to a targeted RASS score if targeting deep sedation doses should be minimised as early deep sedation is associate with increased mortality and delirium[8].
8. Patients are at risk of both venous and arterial thromboembolic disease and should be on enhanced prophylaxis or fully anticoagulated if proven thrombus/embolus. Standard thromboprophylaxis may be inadequate even in non-CoVID patients[9]. Treatment or prophylactic anticoagulation should be monitored at least twice weekly, or more frequently if renal impairment or dose adjustments are made. Doses should be adjusted according to COVID thromboprophylaxis SOP.
9. Ventilation should be set according to unit protocol aiming to minimise **driving pressure** and **mechanical power** (ventilation best practice review). Mechanical power can also be calculated using a simplified equation using minute volume (VE), inspiratory flow (F), peak inspiratory pressure (PIP) and PEEP[10]. Use of **neuromuscular blockade**, **proning, nitric oxide and rescue therapies** should follow the same guidance. Note the evidence for NMB and proning is during early mechanical ventilation. Careful consideration should be given for instituting this at later time-points. In PROSEVA proning could be continued for up to 28 days – the average was 4.
10. Initial investigation should include pulmonary sampling for bacterial, viral and fungal infection (the latter is increased with steroid use and may occur late in illness appendix on fungal screening). Blood cultures, and urinary antigen testing (Legionella and Pneumococcus) should also be sent on admission.
11. Additional blood tests include PCT, D-Dimer, Ferritin, CK, Triglycerides
12. ECHO should be obtained

13. Every patient who is eligible should have the opportunity to enter an interventional immunomodulatory trial early in their stay.
14. If patients are not improving then need to revisit potential complications – repeat CTPA and consider ECHO to exclude pulmonary emboli, new infections and cardiac disease. Repeat pulmonary infection screening with NBL or ideally BAL looking for respiratory viruses, bacterial infection, fungi (PCP) and aspergillus and DNA virus reactivation (CMV, Varicela, EBV, HSV as these are a common cause of respiratory deterioration in all mechanically ventilated patients). These investigations may be overlooked and patient data should be recorded on S Drive - COVID Deteriorating Patient Aide Memoire.
15. Patients failing treatment need to be considered for rescue therapies (ventilation best practice review)
16. Patients in whom other diagnosis are excluded or adequately treated may be considered for compassionate use of LFG316 a C5 inhibitor if there is evidence of raised TCC and CH50[11].
17. In patients with rapid deterioration or cardiovascular collapse additional diagnosis to consider are: septic shock, propofol infusion syndrome, HLH (https://www.mdcalc.com/hscore-reactive-hemophagocytic-syndrome), thrombosis including extra-pulmonary thrombosis and bleeding.
18. Avoid early withdrawal – the underlying pathophysiology in survivors is slow to resolve
19. Minimising sedation and weaning respiratory support should be considered early along with early mobilisation
20. A T-piece trial is the optimal method to assess the potential for extubation, but a cuff leak should be demonstrated prior to extubation as upper airway swelling is common.

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