

COVID-19: shared experience among an international panel of intensive care clinicians

A rapid dissemination summary report of a facilitated 'Knowledge Sharing Session' between international clinicians from China, France, Germany, Italy, Spain, the UK and the USA with considerable collective experience of ICU management of COVID-19 infected patients. The session was hosted on 13 April 2020, 16:00 to 18:00, by the Intensive Care Society, following an informative session held previously between UK clinicians.

This paper is not a clinical guideline. It summarises emerging consensus themes in **bold**. It also highlights areas where clinical consensus was lacking and suggests emerging questions where data sharing and research may help to inform clinical practice. Knowledge and experience is as at the time of discussion and may change in this rapidly developing situation.

Pathophysiology: Ventilation-perfusion mismatch

This does not appear to be ARDS in initial stages but a Ventilation/Perfusion mismatch – how should this be managed?

- Several units report success in using high flow oxygen and awake proning to mitigate the need for ICU admission
- Others are using proning for CPAP patients too

Use of CPAP

Is early intubation preferable or can we defer intubation, by using non-invasive ventilation, without causing harm i.e. inducing lung injury?

No consensus but a variety of current practices described as below. No harm from use of CPAP in the following circumstances reported.

- Some use it frequently as a first-line on wards (as high as 50% of all respiratory support offered) and report much lower IPPV requirements overall
- Others focus on high flow oxygen with conscious proning (the Intensive Care Society has issued [guidance on conscious proning](#)) and then escalation to early mechanical ventilation in patients with rapidly increasing oxygen requirements
- Some units reserve CPAP for COVID-19 hypoxia where lung oedema is suggested on ultrasound imaging, CT or chest X-ray
- CPAP use is common as a ceiling of therapy
- Some units are now establishing CPAP wards as ceiling of therapy and managed by Respiratory Physicians

Mechanical Ventilation

Do we treat like a traditional ARDS picture? Do we need a high PEEP?

- **Many units agreed that initial suggestion of high PEEPs is not necessary**, although one unit was using the ARDSNET high PEEP table
 - Many units start with PEEP 10 cm H₂O and reduce to PEEP 7-8 H₂O
 - Use of prone positioning is common
 - A few units measure lung compliance (e.g. volume controlled ventilation 8ml/kg tidal volume) and use lower PEEP in those with low pressure (higher compliance)
- It is commonly observed that blood lactate is not elevated despite profound hypoxaemia, and bradycardia is not uncommon

What is the approach to secretion management and mucus plugging?

- There was variable experience, with some units reporting higher than expected secretions and plugging, especially after day 5/6 of intubation; others reporting no particular problems. There is variation within-country as well as internationally.
- There was no consensus on prevention or treatment strategies
 - Some units routinely practice chest physiotherapy to manage secretions
 - A few units report use of hypertonic saline, N-acetyl-cysteine and Ambroxol
 - **There was a strong consensus to use wet not dry circuits**

Mechanical Ventilation

What are observed durations of intubation, and experiences of weaning and extubation?

- Most units reported mean duration of intubation between 10 and 14 days, with one unit (which uses little CPAP and tends to intubate early) reporting mean duration as 7.5 days
- Weaning and extubation seems challenging with high re-intubation in COVID-19 patients
- Use of spontaneous breathing trials is common
 - Some combine these with additional measures to ensure patients are ready to be extubated e.g. trials of zero PEEP and /or checking that inflammatory markers are low
 - Extubation 1 to 2 days later than usual practice is common

Fluid Balance

What is the approach to fluid balance?

- Several units agreed that patients often present to ICU in a hypovolaemic state due to sweating and poor fluid intake (illness, use of CPAP) and supported the use of fluid challenges to cautiously correct this and to enhance pulmonary perfusion

Renal failure

What is the reported incidence on ITU?

- Reported incidence varies between 10-35%, without obvious signals to account for this variation
- Hypotension, hypovolaemia, high airway pressures and hypoxaemia may all contribute. Pre-existing renal disease makes renal injury more common. A role for direct disease-related injury and/ or microvascular thrombosis appears likely.
- There was general consensus that patients do not need to be run as dry as for an ARDS protocol

Patho-physiology: Pro-Coagulation

What is the approach to investigation of pro-thrombotic tendency?

- High rates of thrombosis are universally seen in COVID-19. This can be induced (e.g. thrombosis around venous access) or spontaneous (usually in the venous circulation).
- There is no clear consensus on the pathogenesis of spontaneous venous clots found in the lung: they may result from emboli or from thrombosis in situ or microangiopathy. Any role of anti-platelet therapy is not known.
- There was no consensus on the prevention, detection or treatment of such events and a range of strategies are used to trigger further investigation or treatment (D-Dimer > 3,000 triggering full anticoagulation; frequent use of lower limb venous ultrasound; use of CTPA where clinical suspicion exists, or (one unit) routinely performing CTPAs with all chest CT scans. There was no clear consensus on the level that warrants treatment, nor the most effective treatment strategy.
- Some commented that Factor Xa levels needed monitoring as full heparinization was inadequate in creating sufficient anticoagulation

Infection

How do you assess for superadded infection requiring antibiotic use and have you experienced increased fungal infections in COVID-19 patients?

- There was no clear consensus on antibiotic use, although some use procalcitonin to guide their introduction
- Fungal infections (skin and systemic) seem common in some units and not others, without clear causes such as high use of steroids or antibiotics



Emerging questions for consideration

- *What is the pathophysiology of coagulopathy in COVID-19, and when in the course of the disease does it occur? How should it be diagnosed and managed?*
- *Why do some centers see problematic plugging and others not?*
- *Why is there a variation in rates of kidney injury?*

With thanks to our panel members

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