COVID-19: a synthesis of clinical experience in UK intensive care settings

A rapid dissemination summary report of a facilitated 'Knowledge Sharing Session' between UK clinicians with considerable experience of ICU management of COVID-19 infected patients. The session was hosted on 3 April 2020, 10:30 to 11:30 am, by the Intensive Care Society as part of the National Emergency Critical Care Committee.

This paper summarises emerging learning shared by experienced clinicians. It may inform the national guidelines group but **should not itself be used as a clinical guideline document**. Knowledge and experience may change in this rapidly developing situation. The content represents a synthesis of understanding at the time of writing.

Key emerging knowledge and suggestions for practice are in **bold text**

- *Bullets in italics (right column) outline modifications to clinical practice made by individual trusts*

COVID-19 underlying patho-physiology presentation of respiratory failure

COVID-19 appears to have several phases. Management should be guided by timing of the onset of symptoms to understand where in the trajectory of the disease the patient is.

- **Early phase of respiratory failure primarily affects the vasculature. Pro-coagulation leading to micro-vascular pulmonary thrombosis has been observed. Lung compliance is generally good.**
- **Later respiratory failure can involve ARDS and bacterial pneumonia**

Mechanical Ventilation

Aggressive ventilation in the early phase may adversely affect later outcomes. The starting PEEP and tidal volumes should be lower than previously recommended – PEEP10 appears satisfactory for many.

Proning patients should be considered early, to support the vasculature	• *Proning on ITU admission if in early phase (predominantly perfusion) disease. It can be done irrespective of PF ratio, and if response is +ve, this may avoid aggressive ventilation.* • *Using cut off P/F ratio =<16 for proning* • *Using 'proning teams' to manage turning, e.g. by engaging orthopaedic nursing teams*
Pulmonary vasodilatation may provide short-term benefit	• *Using nitric oxide in early stages – it can help but may become refractory after 96 hours or so* • *Using nebulised or IV prostacyclin – this may be helpful as part of therapeutic trial, **if** you are using wet circuits*
Cast formation and plugging can affect dry circuits, wet circuits *may* be beneficial	• *Using wet circuits for all-COVID areas where full PPE is in use* • *Using checklists to monitor HMEs eg 12-hourly as these can fill with water rapidly – this is important in context of reduced nursing ratio. Routinely change every 24 hours in any event if not needing a change before that.* • *Managing patients on anaesthetic machines by: using higher flow rate to help limit need for sodalime changes (but beware total O2 use limitations), zoning the machines together, educating nursing staff on use of the machines, asking anaesthetists familiar with machines to support, transferring patients out for weaning*
Severe upper airway swelling in some patients may make extubation difficult	• *Using dexamethasone prior to extubation, having nebulised adrenaline available, with surgical airway expertise (e.g ENT) on site and on standby* • *A mobile airway team might be an alternative*

Re-intubation rates within 24-48 hours seem higher than expected (up to 60%) so delaying initial extubation for longer than usual may be sensible

Fluid Balance

Careful use of fluids towards euvolaemia may be beneficial in early phase disease - *provided that* the ventilation effort is well controlled to avoid oedema – as perfusion is a problem and prior to ITU patients tend to have been kept dry.

Antibiotics

Antibiotic usage should be judicious. There are some reports of later aspergillosis and candida infections.	• *Stopping antibiotics in COVID patients unless clearly indicated, using procalcitonin (PCT) and other inflammatory markers to monitor for bacterial infection and restarting as required** • *Using procalcitonin as a 'stop' signal to guide when to stop antibiotic use** **False negative PCTs seem less of an issue than false positives in determining antibiotic use – anecdotally, rising procalcitonin has also been seen in patients without evidence of bacterial infection, perhaps in relation to 'cytokine storm', and so a low PCT may be more helpful (true negative) than a high PCT (false positive)*

Workforce and Infection Control

Ensure staff are comfortable in their PPE	• *Buddying for donning and doffing, potentially using medical students to observe and confirm effective practice*
Promote effective use of the Teams model (eg for resus, intubation, proning)	• *Developing SOPs for tasks for helpers – links to some resources which can be adapted for local use are available below*
Beware of 'cognitive overload' which can detract from getting basic ITU care right	• *Having a tactical commander on site so the clinical leads can focus on clinical tasks and provide support to the nursing and allied staff*

Renal Support

Renal injury has been more common in UK cases than anticipated (20-35% of ITU patients). Careful attention to adequate hydration, and use of lower PEEP, may help.

Consider commencing therapeutic anticoagulation prior to haemofiltration	• *Using aPTT for monitoring, and close partnership with renal team to manage resources* • *Using shorter sharper diafiltrating to service machines to more than 1 person and manage filter supply*

Oxygen

While this is a national issue and work is underway, it will be necessary to work with your local oxygen engineering team to understand the limitations of your local system

Regionally – consider the use of oxygen around your local area when considering logistics of transport, mutual aid, patient transfers, etc

Additional resources

- **British Association of Critical Care Nurses**: https://www.baccn.org/about/covid-19-nurse-educational-resource-centre/resources-1/
- **NHS England and NHS Improvement**: https://www.england.nhs.uk/coronavirus/secondary-care/

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