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I have just finished a very useful ICU / NHS Nightingale teleconference, the aim of which was to consolidate experiences about CV19 and how best to manage the disease. I have provided a summary below. Please understand that the information is experience, not evidence. I think it highlights a number of areas that we need to discuss URGENTLY as a group. The take home message is that advice given at the beginning of this journey needs to be adapted as we learn more about CV19. The other important thing to begin to understand is that this disease has distinct phases and treatment will differ as patients move through these phases.

The call had about 80 people on it, most listening. There were about ten “experts” invited to speak, from high volume centres. I represented our site. Others included Georges, GSST & Brompton.

Ventilation

- Early high PEEP is probably not the right strategy and may be harmful. This is not ARDS in the early phase of the illness.
 - Avoid spontaneous ventilation early in ICU admission as also may be harmful.
 - There is clear microvascular thrombosis happening in the pulmonary circulation, which leads to an increased dead space.
 - Also some evidence of early pulmonary fibrosis reported from Italy, possibly oxygen related, possibly inflammation related.
 - Not many patients have reached extubation yet in London, re-intubation seems to be common. I highlighted our experiences of airway swelling / stridor / reintubation.
 - Brompton are seeing wedge infarcts in the lungs on imaging, along with pulmonary thrombosis without DVT.
 - Proning is essential and should be done early. Don't just do it once. Threshold for many centres is a PF ratio of 13, but all agreed, do it even earlier.
 - Early on in the disease, the benefit of proning lasts < 4 hours when turned back to supine, as the disease progresses into a more ARDS type picture, the effect is more long lasting.
 - Many centres using inhaled nitric oxide and prostacyclin with good effect.
- Tachyphylaxis with NO after 4-5 days.
- Generally people are using humidified circuits with HMEs.
 - A very interesting thing they are doing at Georges is cohorting by phase of disease i.e. early, late, extubation / trachy. It involves more moving of patients but helps each team to focus on things more easily.
 - Leak test before extubation is crucial, others are also seeing airway swelling.
 - Wait longer than usual before extubating, high reintubation rates reported. Do not extubate if inflam markers still high.

My conclusions from this are:

- Less aggressive PEEP strategy at the beginning of the disease and go straight for proning.
- Thromboembolic disease is prevalent, look for it. No one is sure about whether we

should anti-coagulate everyone, this is probably too risky.

- An extubation protocol is needed immediately.
- We should consider using inhaled prostacyclin again (like we previously did) as it seems to be working early in the disease.

Fluid balance

- All centres agreed that we are getting this wrong.
 - Most patients come to ICU after a few days of illness where their temp was 38-40 and they were hyperventilating i.e. severely dehydrated.
 - High rates of AKI being caused by over zealous driving with frusemide, leading to unnecessary CVVHF.
 - Hypovolaemia leads to poor pulmonary perfusion and increased dead space.
 - Centres echo'ing their patients are seeing a lot of RV dysfunction without raised PA pressure.
 - Many have improved oliguria by dropping the PEEP i.e. these patients are really hypovolaemic.
- [On nights I have observed many of our patients with a zero fluid balance and temperature of 39 i.e. they will be 2-3 litres negative in reality.]
- Most centres are therefore now backing off of strict zero balance, particularly in hyperpyrexia. They are moving more towards avoidance of large positive fluid balance.
 - Lung 'leak' not as prominent in this disease as classic ARDS

My conclusions from this are:

- Avoid hypovolaemia as it will impede gas exchange and cause AKI. Progression to CVVHF increases mortality.
- Avoid hypervolaemia
- How we achieve this is difficult, but the frusemide and noradrenaline cocktail needs to be carefully tailored, especially in pyrexial patients.
- Echo patients to understand their volume status.

Renal

- Higher than predicted need for CVVHF - ? Due to excess hypovolaemia.
- Microthrombi in kidneys probably also contributing to AKI.
- CVVHF circuits clot frequently. Georges and Kings now fully anticoagulant the patient (rather than the circuit) as it is the only way they can prevent this. One centre using full dose LMWH as they have run out of pumps.
- Kings now beginning acute peritoneal dialysis as running out of CVVHF machines.

My conclusions from this are:

- Aggressive anticoagulant strategy required for CVVHF, potentially systemic.
- If we run out of machines, PD may / may not help (our previous experiences with it are not great, but I have no alternative other than using CVVHF like intermittent dialysis and sharing machines)

Workforce

- A 'tactical commander' is essential on every shift, who is not directly responsible the

care of ICU patients.

- Most centres now getting towards 1:6 nursing ratio with high level of support workers on ICU.
- Training has largely fallen by the wayside as it is too large a task. People are being trained on the job.

My conclusions from this are:

- On call consultant to coordinate but not be responsible for patients (as is the model we have now adopted).
- We need one support worker per patient. Other centres are using everyone they have. From med students to dental hygienists. We are behind the curve ++ with this. Last time I was on a night shift, theatres were full of non-medical staff refusing to help ICU - this is unacceptable.

There were some brief discussion about CPAP:

- Proning patients on CPAP on the ward is very effective, I tried it the other day - worked wonders.
- Prolonged use of CPAP may (I stress the word may) lead to patients being more systemically unwell when they get to ICU.
- Considerable oxygen supply issues with old school CPAP systems.

My conclusions from this are:

- As per local guidelines, assess the effectiveness of CPAP after an hour, if it isn't effective then bail out and consider intubation.
- If effective, regular review is required. If at any point it is failing, bail out and consider ventilation.
- Whilst we may have a shortage of ventilators, holding people indefinitely on CPAP may be short-sighted as it may be converting single organ failure into multiple organ failure.

OK, that's all I have.

I will stress again that this is simply a summary of discussions, none of which are backed up by large, robust multi-centre RCTs.

My conclusions after each section are nothing more than suggestions to be discussed.

We need to adapt fast to what we learn about this disease and learn from our colleagues at other centre. We are all in this together and joined up thinking is required.

Lastly, we desperately need to look at our own data to understand whether we are getting this right or not.

Good luck, stay stay safe and be kind to one another.