

Evening Medical Update: High Dependency Unit September 2023

Assessment and management of cardiogenic shock - Dr Louise Hartley, Consultant in Critical Care, Royal Infirmary of Edinburgh

What about using Dopamine and dobutamine in cardiogenic shock?

My first go to is noradrenaline and if I think I need inotropy I will add in Dobutamine (or even milrinone). Dobutamine is easily titratable with a quick on and offset. So yes, it definitely has benefit! It's often frequently used as a sole agent in CCU's peripherally, however it is associated with hypotension and you often require norad to increase your systemic perfusion pressure.

Dopamine isn't really used in Scotland as per the EPOCHS study. The notion of 'renal dose dopamine' has *not* shown to improve outcomes nor protect the kidney. When dopamine is compared to norad in subgroup analysis of CS patients it is associated with worse mortality. It is also associated with arrhythmia. (Reference below).

De Backer D, Biston P, Devriendt J, et al. Comparison of dopamine and norepinephrine in the treatment of shock. *New Engl J Med*. 2010;362:779-789

You mentioned aetiology and its impact on outcomes. How do you use this and other factors when decision-making re which patients with CS to escalate to higher levels of care and mechanical support?

A number of factors should be reviewed when deciding on suitability for MCS. This includes age, co-morbidities, frailty, stage of cardiogenic shock and associated organ dysfunction to name a few. In most cases to undergo VA ECMO you have to a suitable candidate for transplantation (as ECMO is used as a bridge to transplant when recovery fails).

These decisions are complex and each case needs to be reviewed on its own merit by an experienced MDT. Generally, outcomes are worse when patient is older, frailer and has co-morbidities or organ dysfunction. Myocarditis outcomes tend to be good, post cardiectomy notably poor when put onto ECMO.

Of note there are a group of patients who have reversibility but are not transplant candidates. Those are the beta blocker or calcium channel blockers overdoses or the PEs. These patients can recover (quickly) when ECMO is utilised. However, here isn't a pathway that can adequately manage these sick patients currently in Scotland.

Dopamine for cardiogenic shock vs Noradrenaline for septic shock. Would that be appropriate from the contemporary practice?

As above, I would not use dopamine for cardiogenic shock due to its side effects in the critically ill patient. I would aim to start norad first in any hypotensive patient. After more information was available (clinical assessment, haemodynamics etc) I would consider starting an agent with inotropy like dobutamine or milrinone. This would need to be done in critical care.

For sepsis my first go to agent is noradrenaline +/- vasopressin if the requirements are high.

Use of non-invasive echo measurements of CO and response of fluid is it valid or better invasive?

I am a real advocate for TTE (or TOE) in CS. However, it can be quite time consuming and not easily accessible to all. To monitor effects of fluid on CO/LV VTi etc you need to monitor the effects which requires serial echos. This may be challenging when you have a ward full of unwell patients. Invasive forms of CO monitoring do have a place, however some only work when in sinus rhythm and there isn't a balloon pump. This is where a pulmonary artery catheter has a role. These however should only be used in a centre with experience in the CS patient. They are associated with complications.

Is there any RCT that demonstrates that ECMO has mortality benefits?

Excellent question! However, the answer isn't quite straightforward.

If we keep this answer to use of ECMO in VA for CS then there has been one RCT published recently. I will not mention ECMO in cardiac arrest (for which there is RCT benefit) nor ECMO in respiratory failure.

VA ECMO for CS has exponentially increased across the world. There are many observational studies showing benefit but it should be noted the pathology is heterogenous and some will do better than others. ECLS shock (the recent RCT) on the face of it was a negative trial....but.....they used it in all stages of CS. In the UK we would only undertake it in those who were very much the sicker end of the spectrum. There was also cross over in this trial which skews the results. I think it will be difficult to undertake another trial because of lack of equipoise.

I would like to re-iterate the point that use of VA ECMO in CS should be a MDT decision.

Critical Care outreach – Mr Ronnie Dornan, Clinical Nurse Specialist, Borders General Hospital, Melrose

Is there anything particular in NEWS you'd think could be changed to improve its ability?

To always keep in mind that a patient with a low NEWS score can still be unwell. When reviewing a patient with a low NEWS score consider if there are factors that could be masking deterioration eg – antipyrexics, β Blockers, steroids. On our chart we have box with a score of 3 for looks unwell.

What do you find to be the biggest challenges/sticking points for integration of CCOT, and are there any times where the service hasn't worked well or you've had to change how it works?

Funding a service is always a challenge. In terms of integration the first step was to build strong professional relationships with staff. The service works well in all clinical areas and is viewed as essential to patient safety.

Is there an economic argument for universal CCOT across Scotland?

I believe there is as all hospitals in England see Critical Care Outreach as essential.

I wonder if there is an additional benefit to your role through your nursing expertise (as opposed to a doctor's perspective) and wondered if this was your observation too and if so whether you had any examples.

With a nursing background we can share knowledge and skills that are not always covered in depth in medical education. An example would be technical equipment: Infusion pumps, intercostal chest drains, central venous lines, tracheostomy management, vascular access. We often have medical students shadowing which is a great opportunity for sharing knowledge and skills.

Do you think there is fear of unnecessary escalation and what can be done about it

I don't fear unnecessary escalation and I am always more concerned about a missed opportunity for early escalation.