**Special skills in: Extracorporeal Membrane Oxygenation (ECMO)**

I was introduced to ECMO as part of my Advanced Intensive Care Medicine year. I always thought it would be an interesting part of training but I soon found myself completely captivated by this challenging patient group. I was attracted by the combination of both clinical and non-clinical elements: floridly unwell patients, multidisciplinary teamwork, retrieval, communication, technical skills and sheer satisfaction of instituting a potentially life saving therapy.

ECMO can be broadly divided into:

1. veno-venous ECMO (VV-ECMO) for acute respiratory failure
2. veno-arterial (VA-ECMO) for acute cardiac +/- respiratory failure.

Focusing on VV-ECMO, there are five commissioned centres in the UK each with an allocated geographical area of the United Kingdom: Guy’s and St. Thomas’ Hospital, Royal Brompton and Harefield Hospital, Papworth Hospital, University Hospital of Leicester and University Hospital South Manchester. Referrals for patients with acute severe respiratory failure are made either online or by telephone to a specialist nurse or doctor at which point the patients are evaluated in detail for suitability for VV-ECMO. Once accepted, the ECMO retrieval team mobilise to the referral centre where depending on patient the patient's status, they are likely to either institute mobile VV-ECMO or retrieve the patient to base for further assessment and/or VV-ECMO.

The extracorporeal circuit consists of: drainage cannula, tubing, centrifugal pump, membrane oxygenator and return tubing / cannula. Deoxygenated blood leaves a large central vein into the drainage cannula flowing into the external circuit. The sophisticated centrifugal pumps create a negative pressure prior to the pump aiding venous drainage and positive pressure after the pump augmenting forward flow. Blood flows from the area of the centrifugal pump to the oxygenator where oxygenation and carbon dioxide removal occur. There are multiple configurations of cannula type and position for VV-ECMO but as a general concept, deoxygenated blood is drained from the IVC and oxygenated blood returned to the right atrium or large vein near the right atrium. Common configurations are: (1) Bicaval dual lumen cannula inserted into the right internal jugular vein through the right side of the heart to the IVC. Drainage is from the distal end of the cannula in the IVC and return to the right atrium (2) Multiple single lumen cannulae, usually with the drainage cannula via the femoral vein to the IVC and separate return inserted into the femoral vein with the tip sitting in a more proximal IVC position.

**Advice for interested trainees**

Exposure to ECMO as a trainee can be part of your allocated rotations or as a formal pre-arranged visit. To advance skills, most of the commissioned ECMO centres offer stand alone fellow posts varying from pure ECMO to more combined duties within a specialist cardiac intensive care. The knowledge learning curve is initially quite steep whilst the practical side is more incremental.
as experience increases. ECMO retrievals are often at anti-social hours and depending on the geographical area covered, can be quite long. The patients by definition will have acute severe respiratory failure and will often be profoundly unwell. Good communication, multidisciplinary team work and interpersonal skills are imperative for the whole process of ECMO. My personal experience has been six months of VV-ECMO as part of my Advanced ICM training and one year as a post CCT Fellow in a unit offering both VV and VA-ECMO services. I enjoyed both jobs and it’s definitely been advantageous to have worked in several centres.

**Useful resources:**

Adult ECMO centres UK:

- [http://www.uhsm.nhs.uk/ecmo/Pages/home.aspx](http://www.uhsm.nhs.uk/ecmo/Pages/home.aspx)
- [http://www.papworthhospital.nhs.uk/content.php?/our_services/theatres_critical_care_anaesthetics_services/extra-corporeal_membrane_oxygenation_service_ecmo](http://www.papworthhospital.nhs.uk/content.php?/our_services/theatres_critical_care_anaesthetics_services/extra-corporeal_membrane_oxygenation_service_ecmo)
- [http://www.guysandstthomas.nhs.uk/home.aspx](http://www.guysandstthomas.nhs.uk/home.aspx)

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