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ECMO Cannulation and Retrieval Guidance for Referring Hospitals

INTRODUCTION

ECMO is a life-saving intervention performed for respiratory and / or cardiac failure. The patients in whom we perform this procedure on are critically unwell and are in need of timely intervention. The procedure we perform is often unfamiliar to theatre teams assisting us and therefore the purpose of this document is to outline the process and to help you prepare. The team arriving at your hospital consists of an ECMO trained consultant, an ECMO specialist nurse and a perfusionist all of whom are very experienced in performing mobile ECMO and will happy to answer any queries.

All of our ECMO cannulations are carried out in theatre if the patient's condition allows. On very rare occasions cannulation will be undertaken in the ICU. We have produced two videos to explain the process of ECMO cannulation for relatives – ECMO video for relatives (https://vimeo.com/181918572) and staff – ECMO video for staff (https://vimeo.com/181918762)

This document contains a mobile ECMO preparation checklist, followed by more detailed instructions for the different members of your team. Any questions please contact the duty ECMO Co-ordinator via our call-handling service – 0300 300 3200

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MOBILE ECMO PREPARATION CHECKLIST

Date: Wednesday, 16 May 2018 **Time:** 15:21

PLEASE ENSURE THE FOLLOWING ARE READY FOR THE ECMO TEAM'S ARRIVAL.

INTENSIVE CARE UNIT

Next of Kin Available for Assent (preferably in person)	☒
Supply of Current Infusions for the Return Journey – in 50ml syringes please	☒
Copy of the Patients Casenotes	☒
Relevant imaging sent electronically to Glenfield or copied onto CD	☒
Medical Discharge Summary	☒
Nursing Transfer Letter	☒
Transfer ventilator and monitor ready	☒

THEATRE

Theatre available	☒
Theatre team – Scrub nurse, Anaesthetist, ODP/ODA, Runner	☒
Radiographer	☒
C-arm (theatre table adjusted to allow C-arm to image neck to groin)	☒
Sterile cover for C-arm	☒
2 x packed red cells available in theatre for cannulation	☒
Additional Requests:	

THANK YOU FOR YOUR COOPERATION – ANY QUESTIONS OR CONCERNS, PLEASE CONTACT THE DUTY ECMO CO-ORDINATOR (0300 300 3200)

ICU Team

1. Cross match 2 units of blood – other clotting products may be requested by the ECMO team depending on blood results (see additional requests on preparation checklist)
2. Ensure Next of Kin is aware of plans for ECMO retrieval and are present on the team's arrival to allow assent to be taken
3. Prepare for theatre transfer: –
    a. portable monitor
    b. ventilator (ICU ventilator preferred if moveable)
    c. appropriate sedation and transfer drugs ready
    d. local pre-theatre (WHO) checklist completed
4. Draw up enough spare infusions for 2h in theatre and twice the transfer time back to Glenfield. All *transfer* infusions need to be in 50ml syringes please
5. Photocopy all relevant notes and results of investigations

Theatre Team

1. Theatre personnel needed:
    a. Anaesthetist
    b. Scrub nurse
    c. ODP/runner
    d. Radiographer
2. All those staying in theatre will need x-ray lead protection
3. We will bring all necessary cannulation equipment but in addition will need:
    a. Sterile trolley cover
    b. Sterile cover for the C-arm
    c. Ultrasound machine for vascular access (sonosite or similar)
    d. Local WHO checklist
4. Theatre table must be configured so the C-arm is able to image the patient from neck to groin (this may require the table to be positioned the 'wrong way' around).

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Anaesthetist

1. Responsible for providing anaesthesia and titration of inotrope/vasopressor infusions until the patient is safely established on ECMO and ECMO consultant de-scrubbed
2. Antibiotics
    a. Some patients require addition antibiotics peri-cannulation – we will discuss with you on arrival to theatre
3. Heparin bolus
    a. All patients require a heparin bolus of 50-75u/kg at cannulation – this will be prepared for you by our team
    b. You may be asked to administer the heparin at the correct point of cannulation by the ECMO consultant
    c. Please ensure heparin has been given before the ECMO cannula is advanced
4. Ensure 2 units cross-matched blood are available immediately (preferably in theatre)
5. Patients can drop their blood pressure immediately post ECMO cannulation or over the following 30 minutes. Please draw up emergency drugs:
    a. Metaraminol/phenylephrine for bolus
    b. Ephedrine for bolus
    c. Dilute adrenaline (10micrograms/ml) for bolus
    d. Calcium (chloride preferred) for slow bolus
6. Patients do not usually require warming or diathermy
7. If the patient is very unstable post cannulation we may require a transthoracic echo machine for urgent further assessment

Scrub Nurse

1. The scrub nurse will assist the ECMO consultant in cannulation – we expect that you will not have seen this procedure before
2. The aim of cannulation is to pass a guidewire under fluoroscopic control via the right internal jugular vein in the neck, down the superior vena cava, through the right atrium into the inferior vena cava. The skin is then dilated and the cannula is advanced over this wire to rest with its tip in the IVC
3. The most important role of the scrub nurse is to control the guidewire and ensure its position does not move whilst we pass serial dilators followed by the cannula itself
4. On rare occasions we will undertake 2 separate cannulations – either using both femoral veins or one femoral vein and the right internal jugular vein

Radiographer

1. Responsible for ensuring all theatre team are wearing lead protection
2. The C-arm must be covered in a sterile field and able to image the patient from neck to groin
3. ECMO cannulation involves passing a guidewire from the right internal jugular vein in the neck, down the superior vena cava, through the right atrium into the inferior vena cava (IVC), ensuring a straight line down to the infra-hepatic IVC with no kinks, loops or deviation into the right ventricle, hepatic or renal veins
4. The guidewire is placed under continuous fluoroscopic guidance – the ECMO consultant will ask you to screen and follow the tip of the guidewire until it is in the correct position in the infra-hepatic IVC
5. Following skin dilation we may ask for a second check that the guidewire position remains correct which will involve screening from neck to lower abdo
6. The cannula is then placed on the wire and advanced to lie with its tip in the hepatic IVC under fluoroscopic screening – we will ask you to follow the cannula tip from insertion at the neck to ensure correct placement

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Ideal Theatre Configuration