Results of catheter interventions on ECMO

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Introduction
• Extracorporeal Membrane Oxygenation (ECMO) has become a standard treatment modality for managing congenital heart disease patients with severe cardiovascular instability.
• It is important to be able to understand the underlying pathology that has led to the requirement for ECMO so that structural problems can be addressed.
• Cardiac catheterisation can provide for real time diagnostic information as well as allowing intervention to be performed.
• Vascular access in these often complex patients can be limited, and there is a need to preserve vessels, some of our interventions were performed using the arterial limb of the ECMO circuit.
• We describe our institutional experience of performing cardiac catheterisation whilst the patient is on ECMO.

Methods
All patients <16 years undergoing cardiac catheter on ECMO between November 2010 and November 2018 were identified from the departmental database and a retrospective case note review carried out.

Direct ecmo arterial limb access (DEALA)
Direct ecmo arterial limb access (DEALA) was achieved by inserting a Y connector cut into the arterial ECMO tubing with an incorporated haemostatic valve from a 10% dextrose bag (Fresenius Kabi). A standard sheath is then inserted through the valve through which the catheters are passed for the procedure. Following the procedure the y connector is removed and replaced with a straight connector.

Results
• 42 patients had 47 cardiac catheters +/- intervention on ECMO
• Mean weight 15.7kg (range 2.4-71.8)
• Median age 9 months (range 1 day to 14 years)
• Diagnostic information gathered in all cases
• 11 had this carried out via DEALA
  – 3 of these (3 shunt revascularisations with stents) were carried via ECMO circuit
  – No procedural adverse events occurred no cases of infection.
• Eight patients could not be weaned from ECMO, the remainder survived to PICU discharge.

Conclusions
• Cardiac catheterisation and interventions can be safely performed whilst patients are on ECMO and can provide the necessary diagnostic information and selected therapeutic interventions.
• Catheterisation can safely be performed via the arterial limb of the ECMO circuit.
• We suggest that cardiac catheterization should be carried out early in the ECMO run if there is uncertainty regarding the diagnosis and in particular if there are concerns regarding coronary or shunt flow.