# MR Imaging Under GA

## Indications for General Anaesthesia (GA) for Paediatric MR
Practice varies throughout the world. However, most centres in the UK will perform cardiovascular MR under general anaesthetic (GA) for children under the age of 7 years.

## General Safety Issues Specific to Paediatric Cardiac Imaging
- Patient metal checked and the safety questionnaire performed with parents before the child is anaesthetised.
- Senior cardiac anaesthetist continuously present in every case.
- Full monitoring: pulse oximetry, end-tidal gas analysis, ECG and non-invasive BP.
- Wrap the patient in gamgee or blankets to keep him or her warm.
- Ten metre circle breathing system needed, to link the patient to anaesthetist in MR control room.
- Breath-holding in passive expiration, controlled by breaking the circuit in the control room.
- The large dead space prohibits low flow anaesthesia.
- Reversal of anaesthesia and extubation in CMR induction room. Ensure that the team is aware of the cardiac arrest procedure.

Importantly, the child MUST be withdrawn from the MR room for resuscitation. Metallic objects such as resuscitation trolley MUST NOT be brought into the scanning room.

## Environmental and Physical Constraints
Performing general anaesthesia (GA) in a magnetic resonance (MR) environment is challenging for many reasons
- During the scan, there is limited access to the child and ventilation equipment.
- Care is required for staff and patient safety with regard to ferromagnetic equipment.
- There is a potential for RF interference with monitoring equipment.

## Technical Factors Specific to MR in Infants and Small Children
- Prolonged, multiple breath holds are required. This can cause hypoxia. Adequate pause for ventilation control between breath holds is required.
- A reliable ECG is vital for gating during image acquisition.
- Monitor patient temperature closely. The low ambient temperature in MR scanning room produces a hypothermia risk, particularly for small infants.

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![Image](image.png)

**Fig. 2.1.** Photography showing one of our dedicated paediatric cardiac MR labs. Inset, control room with monitoring equipment and long anaesthetic tubing to enable the anaesthetist to sit in the control room during MR scanning.
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