



## **Fetal MRI: a literature review of methods to optimise patient comfort, safety and image quality for clinical and research purposes**

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### **Objective**

Ultrasound is the mainstay tool for antenatal screening. The first fetal MRI happened in 1984 in Aberdeen, Scotland. It has been an upward journey since then, where improvements in hardware and software developments made it possible for fetal MRI to be gradually introduced for research and clinical purposes, as an adjunct diagnostic tool, complimentary to ultrasound. The aim of this literature review is to highlight the opportunities and challenges in optimising fetal MRI across the last decade, ensuring a safe, comfortable and high quality imaging examination for patients and healthy volunteers, alike.

### **Methods**

A literature review methodology was employed, with the following keywords: fetal (AND foetal), MRI, antenatal (AND prenatal AND ) screening (AND imaging), patient safety, patient positioning, imaging protocols AND sequences, image optimisation. The Medline, Ebscohost, CINAHL databases were explored, limited to the last 10 years and English language only, with no location delimiters.

### **Results**

Twenty-four papers were identified, all of which were hand-searched and their abstracts examined for relevance. Of those 24 papers, only 17 were of direct relevance to the area of interest. There is great variation on MRI systems and equipment used for fetal MRI, patient preparation before a scan, MRI protocol parameters employed. All studies described extensively the positioning required for the pregnant patients and volunteers as the left lateral position, to prevent inferior vena cava syndrome. Metal check of the patient, heating prevention of the expectant mother and dealing with claustrophobia were the major other issues relating to patient safety and comfort.

### **Conclusion**

There is great variability in the equipment and protocols used when a pregnant patient or volunteer is examined using MRI, as an adjunct tool for antenatal screening. However patient safety and comfort measures are more aligned to include prevention of compressing the inferior vena cava, monitoring of the mother's vital signs, dealing with claustrophobia, metal checks heating prevention and comfortable positioning, to ensure a safe, high quality and patient-centred scanning session.