

MR Imaging of the Fetal Brain and Spine: A Maturing Technology

P D Griffiths, **FRCR, PhD*, M N J Paley, ***PhD*, E H Whitby, ****FFRCSI*

Abstract

Introduction: We describe the background and refinements to a 3-year research study designed to evaluate the role of magnetic resonance (MR) imaging in detecting and defining abnormalities of the fetal central nervous system in utero. Methods: We describe our experience of using ultra-fast MR imaging methods (specifically single-shot fast spin echo) in 250 fetuses at various gestational ages. All fetuses had known or suspected brain or spine abnormalities based on antenatal ultrasound imaging. We describe the ethical issues raised by this type of work and the differences in diagnostic accuracy between ultrasound and MR imaging. Results: We show that MR imaging can be performed in a clinical environment with a high degree of success: only 2 women out of 250 could not be examined (1 was claustrophobic and the other was too large for our scanner). In the 100 cases of singleton pregnancies, where detailed follow-up is available, there is a >40% improvement in diagnostic accuracy when MR imaging is included in the fetal assessment compared to ultrasound alone. Conclusion: We conclude that in utero MR imaging is a powerful tool in the assessment of fetal brain and spine abnormalities, and suggest that further work be undertaken to provide a widely available clinical service.

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* Professor

** Professor of MR Physics

*** Senior Lecturer

Academic Unit of Radiology

University of Sheffield, United Kingdom

Address for Reprints: Professor Paul D Griffiths, Schering Professor of Radiology, Academic Unit of Radiology, Floor C, Royal Hallamshire Hospital, Glossop Road, Sheffield S10 2JF, United Kingdom.

Email: P.Griffiths@Sheffield.ac.uk