

The Role of Fetal MRI in Diagnosis of Intrauterine Neurological Congenital anomalies

Essay

☪☪ *Submitted for the partial fulfillment of Master
Degree
in Radiodiagnosise*

By

Susan Ramadan Elshershaby

M.B., B., Ch,

Supervised by

Dr. Sameh Mohamed Abd Elwahab

Professor of Radiodiagnosis

Faculty of Medicine, Ain Shams University

Dr. Ahmed Fathy AbdElghany

Lecturer of Radiodiagnosis

Faculty of Medicine, Ain Shams University

**Faculty of Medicine
Ain Shams University**

2010

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List of Abbreviations

MRI	Magnetic resonance imaging
US	Ultrasound
CNS	Central nervous system
CSF	Cerebro-spinal fluid
Li, Lv.	First and fifth lumbar vertebrae
Sii	Second sacral vertebra
GA	gestational age
RARE	Rapid acquisition and relaxation enhancement
HASTE	half-Fourier acquired single-shot turbo spin-echo
SS-FSE	single-shot, fast spin-echo
TR	repetition time
TE	echo time
V M	Ventriculomegally
NTDs	Neural tube defects
Acc	Agenesis of corpus callosum
MCDs	malformations of cortical development
HARD±E	hydrocephalus, agyria, and retinal dysplasia with or without encephalocele
PVH	Periventricular heterotopias
SCH	Subcortical heterotopias
PMG	Polymicrogyria
CMI	Chiari I malformation
SCM	Split cord malformation
T	Tesla
FMPSPG	Fast multiplanar spoiled gradient-recalled acquisition in the steady state
CT	Computed tomography
M	months

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دور الرنين المغناطيسي في تشخيص الخل التكويني في الجهاز العصبي للاجنه داخل الرحم

رسالة توطئة للحصول علي درجة الماجستير
فى الاشعه التشخيصيه

مقدمة من:

الطبيبة/ سوزان رمضان الشرشابي
بكالوريوس الطب والجراحة

تحت إشراف

ا.د/ سامح محمد عبد الوهاب
أستاذ الاشعه التشخيصيه
كلية الطب- جامعة عين شمس

د/ أحمد فتحي عبد الغني
مدرس الاشعه التشخيصيه
كلية الطب- جامعة عين شمس

كلية الطب
جامعة عين شمس

2010

الملخص العربي

يعتبر التصوير السريع للجنين باستخدام الرنين المغناطيسي من الوسائل الآمنة والدقيقة في اكتشاف عيوب الجهاز العصبي المركزي والتي تستعصي على الموجات فوق الصوتية في تشخيصها وذلك لتفوق الرنين المغناطيسي في توضيح التفاصيل التشريحية للجنين وتتبع نمو أجزاء المخ والنخاع الشوكي وأيضا في توضيح عيوبهما مثل توقف أو اختلال النمو في أي جزء منهما وهو أيضا يؤكد ثبوت العيوب الخلقية التي تم تشخيصها باستخدام الموجات فوق الصوتية وتحديد أن كانت مصحوبة بعيوب خلقية أخرى أو لا.

أيضا يتفوق الرنين المغناطيسي قدرته على تصوير الجزء الخلفي من العلبه المخيه خاصه بعد تعظمها حيث يصعب على الموجات فوق الصوتية تصوير منطقه المخيخ وجزء المخ بدقه وتحديد عيوبهما الخلقية مثل عدم تكوين أجزاء منهما أو وجودهما في مكان ادني من الطبيعي ولهذا يستخدم تصوير الجنين بالرنين المغناطيسي في ارشاد خطط العلاج واتخاذ القرار أيضا يمكن الاعتماد على تصوير الجنين قبل الولاده لتفادي تصويره بعد الولاده والتي قد تحتاج حقن الطفل بمهديء خاصة لو كانت حاله الطفل حرجه.

Acknowledgment

Thanks are given to Allah the source of all knowledge, by whose abundant aid this work has come to fruition.

Words stand short when coming to express my deep gratitude and great thanks to Professor/ Sameh Mohamed Abd Elwahab Professor of Radiodiagnosis, Faculty of Medicine Ain Shams University.

I am deeply grateful to Dr/ Ahmad Fathy AbdElgahny Lecturer of Radiodiagnosis, Faculty of Medicine Ain Shams University.

I am also delegated to express my deep gratitude and thanks to all my dear professors, my colleagues and my family.

Susan Ramadan Elshershaby.



Introduction

The evaluation of fetal CNS by US is limited because of the nonspecific appearance of some anomalies, technical factors that make visualization of the brain near the transducer difficult and visualization of the posterior fossa difficult late in gestation, and subtle parenchymal abnormalities that frequently can not be visualized. (*Levine D. et al., 2003*).

Studies have demonstrated the benefit of MRI in fetuses with CNS abnormalities, MRI can detect the fetal brain tissue more clearly, observe the myelinating process, and provide more information which can not be obtained from US. (*Coakley F V. et al., 1999*).

Meanwhile, MRI was independent of amniotic fluid volume, maternal somatotype, fetal skull, and the maternal pelvic skeleton. Congenital anomalies of the CNS such as partial or complete agenesis of the corpus callosum, Dandy-Walker malformation, periventricular nodular heterotopia more reliably on the basis of fetal MRI compared with prenatal sonography (*Kubik-Huch RA. et al., 2000*).

Sonography is the primary technique for fetal imaging because of its proven utility, widespread availability, and relatively low cost. However, limitations include a small field of view, limited soft-tissue acoustic contrast, beam attenuation by adipose tissue, poor image quality in oligohydramnios, and limited visualization of the posterior fossa after 33 weeks' gestation because of calvarial calcification (*Garel C. et al., 1998*).

Accordingly, sonographic findings are occasionally inconclusive or insufficient to guide treatment choices (*Angtuaco T. et al., 1992*).

Introduction and Aim of the Work



Over the past decade, fetal MRI has emerged as a clinically useful supplement to sonography and is rapidly moving from the realm of select academic medical centers into community practice. Advances in fetal medicine and surgery have also driven the development of fetal MRI, Any radiologist who performs prenatal sonography can expect to see occasional patients who will benefit from the incremental information provided by MRI. (*Coakley FV. et al., 2001*).

Aim of the work

The aim of this work is to evaluate the role of fetal MRI in diagnosis of intrauterine neurological Congenital anomalies