OBSTETRIC MRI: HOW WE DO IT IN SHEFFIELD

- Debbie Jarvis, Senior Radiographer, Sheffield University MRI Unit
OBSTETRIC MRI: A Practical Guide

- Patient Management and Care
- Placenta and Foetal MRI
- Scanning Technique
- Sequences Used
First Scans in 1998

Number of scans increased from 3 to over 250 per annum
Equipment

- GE 1.5T HDx Scanner
- 8 Channel HR Cardiac Coil
PATIENT MANAGEMENT and CARE

- Appointment within 1 week unless clinically indicated otherwise
- Partners/Relatives included (at patient request)
- Safety forms completed and checked
- Feedback/Results given after scan
- Contact details given for further queries
PATIENT MANAGEMENT and CARE

- Patient appropriately dressed
- Clear Explanation of Scan
- Patient into scanner Feet First either supine or on side
- Radiologist oversees scan
SCAN TECHNIQUE: Foetal MRI

- True Anatomical Planes of Foetus Acquired
- Speed is Key
- Sequences not annotated, each a localiser for next
SEQUENCES USED: Foetal MRI

- T2w Single Shot Fast Spin Echo
- FIESTA- T2w Balanced Gradient Echo
- T1w- Fast Gradient Echo/Spoiled GE
- FLAIR (brain only)
- Diffusion Weighted Imaging
- MOVIE
Single Shot Fast Spin Echo

- Core MRI sequence
- Fast - 2 slices/3 seconds
- All 3 planes of Foetus
- 5mm and 3mm slice thickness, 0 Gap
FIESTA

- Acquired in 3 planes, 5mm slices.
- Faster than SSFSE so less sensitive to movement
- High SNR and CNR
T1- Fast Gradient Echo/Fast Spoiled Gradient Echo

- FGRE- Better Contrast for Brain- identifies possible bleed- Axial plane 5mm slices
- FSPGR- Better Contrast for Body- helps locate Liver/Bowel
FLAIR and DWI

- Useful for identifying/clarifying abnormal signal in brain
- Brain DWI b-value 700, axial 5mm slices
- Body DWI b-value 500-axial 5mm slices—useful to locate kidneys
MOVIE

- Multiphase, 45 Seconds to Acquire
- Asses Swallow/ Diaphragm movement
Recent increase in referrals

Aim to determine any invasion and extent (Accreta/Percreta/Increta)

Patients scanned at 32/40 weeks

Scans Acquired using Anatomical planes of mother and full placental imaged.
SEQUENCE DEVELOPMENT

- Dark intra-placental bands
- Uterine bulging
- Loss of heterogeneity of placenta signal

Phantom constructed using belly pork and a recently delivered, donated placenta.
SEQUENCES USED: Placenta MRI

- T2w SSFSE
- FIESTA
- T1 FGRE
- DWI
Placenta SSFSE

- 5mm- Axial, Sagittal and Coronal
- 3mm- Axial and Sagittal
- Identifies any dark intra-placental banding and assesses heterogeneity.
Placenta: FIESTA

- 4mm slices - whole placenta in axial and sagittal planes.
- Delineates the placenta/myometrium borders, identifies uterine bulging
- Placenta becomes relatively featureless - banding or heterogeneity is lost.
Placenta: T1 FGRE

- 5mm slices- axial and sagittal planes
- Identifies Haemorrhage and retro-placental bleeding
Placenta DWI

- B value 1000 sec/mm² - placenta higher signal than myometrium
- 3 minute scan - Axial plane only
Placenta Location

- 3mm slices parallel/perpendicular to birth canal
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<th>PREP TIME</th>
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<th>Slice Thickness / Slice Gap mm</th>
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