

## Joint Trust Guideline for Safe Transfer of Stable Babies from the Neonatal Unit to the Magnetic Resonance Imaging (MRI) Unit

<b>For Use in:</b>	The Neonatal Unit and Department of Radiology
<b>By:</b>	Doctors, Nurses, and ANNPs
<b>For:</b>	Stable (non-ventilated) neonates and infants transferred from the neonatal intensive care unit (NICU) to the magnetic resonance imaging unit in the radiology department.
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This guideline has been approved by the Trust's Clinical Guidelines Assessment Panel as an aid to the diagnosis and management of relevant patients and clinical circumstances. Not every patient or situation fits neatly into a standard guideline scenario and the guideline must be interpreted and applied in practice in the light of prevailing clinical circumstances, the diagnostic and treatment options available and the professional judgement, knowledge and expertise of relevant clinicians. It is advised that the rationale for any departure from relevant guidance should be documented in the patient's case notes.

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Version Number	Date of Update	Change Description	Author
1	16/04/2015	Change of header & footer to joint hospital version. On JPUH version change of content and contact numbers	THCGAP
2	17/07/2017	Chloral sedation the routine for brain MRI in term/near-term, rather than optional and audit standards amended.	THCGAP
3	03/09/2020	Updated supporting personnel list. Removed broken web link to BAPM consent from the 'Parental Consent for Scan' section. Updated references and links in the 'References / Source Documents' list.	Prof Paul Clarke

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### Scope and Objective

To allow the safe transfer and scanning of stable, self ventilating (i.e. non-ventilated) infants from the neonatal unit to and in the 1.5 Tesla (T) or 3T magnetic resonance imaging (MRI) scanners in the Radiology Department. Infants must be transported from neonatal unit to the MRI department in the neonatal transport incubator, and accompanied by the appropriately qualified personnel. Neonatal staff (doctor/ANNP plus a neonatal nurse) are to remain in attendance (in the MR control room) for the duration of the infant's scan. Guidance on patient monitoring is tailored according to patient circumstances and which MR scanner is used. Guidance regarding routine use of sedation for neonates undergoing MRI is also included.

### Abbreviations

aEEG	amplitude integrated electroencephalogram
ANNP	advanced neonatal nurse practitioner
CPAP	continuous positive airway pressure
CUSS	cranial ultra sound scan
CT	computed tomography
DWI	diffusion weighted imaging
HIE	hypoxic-ischaemic encephalopathy
IV	Intravenous
Mag	magnet
MRI	magnetic resonance imaging
NLS	Newborn Life Support
nHFT	nasal high flow therapy (Vapotherm®)
NICU	neonatal intensive care unit
SpR	specialist registrar

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T Tesla

## Rationale

Magnetic resonance (MR) imaging is now considered to be the gold standard for imaging the neonatal brain. All term infants with hypoxic-ischaemic encephalopathy (HIE) who have undergone therapeutic hypothermia should have an MR brain scan ideally in the second week of life. Other term infants presenting with neurological symptoms (seizures, altered consciousness, altered tone) and certain preterm infants may warrant MR imaging at the discretion of the attending neonatologist.

Although MRI does not involve ionising radiation, the presence of a very strong magnetic field in and around the scanner poses a real and potentially life-threatening risk to patients and personnel. **It is therefore essential that all individuals transferring babies for an MRI are familiar with the safety procedures in place within the MRI Department, have read this guideline**, have completed an up to date safety questionnaire (an annual requirement), and receive a safety brief from an MRI Authorised Person..

This guideline is applicable for *stable, self-ventilating (i.e. non-ventilated)* infants transferred from the neonatal unit for an MR brain scan.

Transfers to other departments within the hospital and transfers of ventilated or unstable infants (including those on nasal continuous positive airway pressure (nCPAP), nasal high-flow therapy, and those on inotropic support) will be covered by separate Trust guidelines (to be authored).

## Broad Recommendations

### Timing of MR scan

The very real anxiety and need for early information about long-term prognosis needs to be tempered by ensuring that as much information as possible is obtained from imaging. Specific patterns of injury following HIE on conventional MR imaging have been identified as being associated with long term neurodevelopmental problems. These changes on conventional imaging are typically seen after 5 to 7 days. Before this time, conventional imaging may appear normal and give false reassurance. Diffusion weighted imaging (DWI) is useful in identifying brain injury in the first week of life but is inaccurate in predicting the extent of the injury. Furthermore, in instances of widespread injury, it may be difficult to find an area of normal DWI signal to compare with. DWI normalises by the end of the first week. In addition, infants who have suffered HIE are usually more stable after the first few days; by the second postnatal week most babies no longer have an ongoing need for inotropic support, ventilation, or supplementary oxygen, and so are better able to tolerate being transported to the MR scanner and the scanning procedure at this time. Thus MR imaging of infants with HIE for prognostic purposes should ideally be undertaken in the second week of life.

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In a small number of infants earlier MR imaging (ie within the first week) may be clinically indicated, either to clarify the diagnosis and exclude other pathologies (e.g. intracranial haemorrhage, perinatal arterial ischaemic stroke, metabolic conditions) or where withdrawal of intensive care is being considered. Decisions to withdraw intensive care should not rest with the results of the MR scan alone, but need to be taken in conjunction with information from clinical assessment as well as results from other modalities (e.g. resistive index, amplitude integrated electroencephalogram, a EEG, and conventional EEG).

### **Location**

There are two different magnetic field strengths of MR scanner within the Department of Radiology at the Norfolk and Norwich University Hospital: 1.5 Tesla (T) and 3.0 T. Infants may be scanned in either scanner according to the direction and agreement of the supervising consultant radiologist. Neonatal brain scans for infants in research studies will generally be done in the 3T scanner.

### **Clinical equipment list**

For all scans:

- Neonatal Transport incubator.
- MRI transfer bag containing resuscitation equipment.

### **Procedure**

#### **Personnel requirements for scan**

The attendant consultant neonatologist/ lead nurse covering the room within the neonatal unit where the baby is being nursed will assign the necessary medical and nursing personnel for the transfer to the MR department. The following personnel are the minimum required for each infant transferred out of the department for scanning:

- Porter/s.
- One medical practitioner or advanced neonatal nurse practitioner (ANNP) who is Newborn Life Support (NLS) certified and competent in intra hospital transfers (This could be a consultant neonatologist or experienced junior or senior Specialty Trainee in paediatrics or neonatal medicine/ specialist registrar/ clinical fellow/ ANNP. The relevant personnel will depend upon the clinical needs of the infant following assessment on the ward, and the direction of the attendant neonatologist in charge.).
- One trained neonatal nurse (NLS accredited) with experience in intra hospital neonatal transfer.

#### **Preparation for the scan**

- Doctor/ ANNP to book MR scan via the ICE requesting system, providing full clinical details on the request form. The MRI department has designated time slots for non-urgent in-patient examinations. Early booking of scans will enable optimal use of these slots and will improve efficiency with scan timing.

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Contact the MRI department on ext. 5225/5226 to ascertain the time slots available. If the scan is urgent, discuss with paediatric radiologist who will vet the request and organise a slot for the scan.

- Ensure infant has no clinical contraindications to MRI.

### **On the day of scan**

- The baby should be weighed and temperature, pulse, respiratory rate and baseline oxygen saturation must be recorded.
- Perform a general examination of the baby on the NICU.
- In all cases confirm the arrangements with the MR radiographers in the MR department via telephone extension 5225/5226 (MR control room).
- Sedation (chloral hydrate) will normally be required for the scan as a routine (unless attendant consultant has decided otherwise). It must be prescribed and administered prior to leaving the neonatal unit (see below).

### **Parental consent for the scan**

- Verbal informed parental consent for MR imaging *and* for the use of sedation should be obtained.
- Consent should be taken by the attending consultant neonatologist and/or neonatal doctor/ANNP. The discussion should be recorded in the 'Parental Communication sheet of the infant's medical notes.
- Use of an interpreter (or telephone interpreter service) should be considered if English is not the parent's first language, especially if there is any doubt about parental understanding.
- If the baby is looked after by an agency/ guardian then document the named person(s) with parental responsibility, and approach this/these person(s) for verbal consent.

### **Use of routine sedation for scanning**

Successful scanning may be possible without need for sedation in some cases by careful attention to the infant's comfort and needs, feeding and sleep regimes, and by minimising auditory stimulation and optimising swaddling.[Gale et al., 2013; Mathur et al., 2008]. However a recent audit in our department showed a far higher success rate with routine chloral use compared with only 'feed and wrap' (Ibrahim et al., 2015). In a series of 23 babies studied in our centre, we showed that routine chloral sedation combined with Med-Vac immobilisation safely achieved a 100% success rate for completed MRI with good-quality clinical and research imaging; this success rate showed that the combination was far superior to the 'feed and wrap' method.(Ibrahim et al., 2015)

Therefore, the agreed default position for our NICU as of this updated guideline version is that chloral hydrate should normally be given as a routine for brain MR scans done in term/near term infants. A decision *not* to use sedation for any

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particular baby may be made in individual cases at the discretion of the attending consultant neonatologist.

### **For scans with sedation**

Sedation can very occasionally result in hypoventilation or apnoea therefore all infants who have received sedation must be continuously monitored during transportation to and from the MRI scanner, during the scan itself, and on the neonatal unit until the effects of the sedation have worn off.

For self-ventilating infants, light sedation using chloral hydrate will be given. Sedation will be given routinely unless the attendant consultant has decided otherwise or if the parents do not consent to its administration. Routine chloral sedation for neonatal MR scans has been shown to be safe, but this is reliant on appropriate monitoring and trained personnel in attendance who are able to intervene promptly if required (Finnemore et al, 2012).

The rationale for the use of sedation should be discussed with parents beforehand and their agreement documented in the parental communication notes. It should be explained that sedation is much more likely to increase the chances of a successful scan, but that it is not mandatory and that it will entail a small risk of hypoventilation that may require intervention by the attendant medical personnel. Sedation should be prescribed and administered to allow sufficient time to be effective during the MR scan (usually ~30 minutes before the anticipated scan time slot).

- Oral chloral hydrate is best absorbed on an empty stomach because gastric contents delay its absorption. An infant's enteral feed should be omitted 1 hour prior to the administration of chloral hydrate.
- Nursing staff looking after the baby should time feeds accordingly.
- The neonatal team member who will be transporting the child to the MRI department should assess the child to ensure that an appropriate dose of chloral hydrate has been prescribed.
- Chloral hydrate should be prescribed on the NICU. It should not be administered to the baby until the MR radiographer has been contacted and has confirmed that the MR system is working and the scan is due to go ahead at a specific time.
- The oral or nasogastric route should be used for chloral hydrate administration. As a guide, use the following dose for sedation for MRI:

### **Dose for term newborn infant: chloral hydrate 50mg/kg**

Give the dose ~30 minutes prior to anticipated start of imaging. The sedative effect will usually last 90-120 minutes.

Document any problems with coughing or vomiting following administration. A top-up feed can be given during the scan if the baby awakens and is unsettled.

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Sedated babies should not be left unattended under any circumstances. Following chloral hydrate administration, the attendant neonatal nurse should record oxygen saturation at 5 minute intervals.

For infants who are already receiving regular sedation, or anticonvulsants which may have sedative effects (e.g. phenobarbital), additional sedation may not be required. If in doubt, seek advice of the attendant consultant neonatologist. If further sedation is indicated, this should be prescribed and administered, allowing sufficient time for it to be effective during the MR scan.

If further sedation is likely to be needed during the scan, the drug must be prescribed on the NICU. Prior to leaving the NICU, collect together the drug (not drawn up), all equipment needed for its administration (i.e. syringes and needles), and a copy of the drug monograph (from the NICU drug formulary).

All infants must have their drug chart double checked and, where appropriate, all other routine drugs should be administered prior to leaving the ward.

### **For scans without routine sedation**

- It is important that, as far as possible, the timing of the scan fits into the baby's normal sleeping regime.
- The baby should be swaddled and normothermic. If he/she uses a pacifier this can be taken into the MR scanner providing that it has no metal parts / chains / clasps and subject to permission/approval of the MR radiographer.
- Effective auditory protection should be applied.
- Stagger feeds so that the baby is due a feed immediately prior to the MR scan. If the baby is very unsettled or there is a delay in timing of scan then 1/3 of feed may be given to settle baby. Baby will be fed in MR unit after all MR conditional monitoring leads and probes have been applied. As no sedation will be given, it is very important that baby gets a full (or close to full) feed just before the scan and after all leads have been applied.

Neonatal nurse should please stagger feeds accordingly.

The acquisition of optimal diagnostic images is reliant upon an infant remaining still. Swaddling or 'feed and wrap', promoting natural sleep following a feed, can often suffice for enabling images of diagnostic quality to be obtained. The MedVac® immobilisation device in conjunction with optimisation of other non-pharmacological measures has been shown to improve chances of successful non-sedated scans ([Mathur et al., 2008](#)). We have the MedVac® immobiliser available for infant use in our MR department. Irrespective of whether sedation is used, non-pharmacological measures should be optimised.

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## Departure from the neonatal unit

- Phone the MRI department 5-10 minutes before scheduled leaving time to confirm that there are no delays in the MR department and to update radiology staff (tel. extension: 5225/5226).

## **Preparation for MR within the MRI waiting area and routine monitoring before, during, and after the scan**

### Monitoring

#### Heart rate and O2 saturation

All infants transported to and from the MRI scanner and during the procedure should have continuous monitoring (oxygen saturations and heart rate as a minimum). Infants who receive sedation must have their heart rate and oxygen saturation recorded every 5 minutes from the time of drug administration until the infant is safely back on the NICU and the all effects of sedation have worn off.

In the MRI department, monitoring equipment must be changed from the standard, non MRI compatible neonatal equipment to MRI conditional (compatible) monitoring equipment. For a 1.5T scan, the infant will be prepared in the anaesthetic bay which is outside of the MRI department. For a 3T scan, the infant will be prepared in the anaesthetic bay/patient preparation area which is within the 3T outer-controlled area.

The MR conditional neonatal/paediatric portable saturation monitor that will be used in the MR department (either 1.5T or 3T scanners as required) is the Nonin 7500FO Fiber Optic Tabletop Pulse Oximeter, which is rated as 3T compatible. This monitor will be attached to the neonate using the dedicated neonatal fibre optic sensor (PureLight® Infant/Pediatric) with 30- foot (9.1 metre) long sensor cable trailed through the waveguide. At the discretion of the supervising radiographer in the MR department, the Invivo Expression wireless system may alternatively be used for patient monitoring during the scan.

#### Temperature

The infant's axillary temperature should be recorded by the neonatal nurse before the scan and at the end of the scanning, and this will be done in the MR control room before entering the scanner. If the infant's pre-scan axillary temperature is  $>38.0^{\circ}\text{C}$  then commencement of the scan should be postponed.

A recent study done in 25 neonates in our department has shown that there was no significant risk of hyperthermia associated with MR brain scanning at 3 Tesla in the GE Discovery MR750w scanner. (Cawley et al., 2016) With the reassurance from this published series, the need for undertaking continuous invasive rectal temperature monitoring during scanning has been reviewed. It is no longer considered necessary to perform routine continuous rectal thermometry during neonatal MR brain scanning in the 3T scanner.



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### Actions of attendant personnel

- Neonatal staff (doctor/ANNP and nurse) are to remain in attendance (in MR control room) for the duration of the infant's scan
- On arrival in the waiting area, apply brakes to the transport incubator. Plug into the mains electricity supply.
- Radiographer will complete metal checks and safety questionnaires for the patient and all attendant staff, and for parents if necessary.
- Radiographer will supply and fit appropriate ear protection for the infant (Mack's® silicone putty plugs, plus Mini Muffs®/ Ear Defenders for 3T scanning).
- Radiographer will fit MedVac infant immobiliser splint (if not already fitted on NICU)
- Transfer infant onto MRI trolley. Position as per radiographer's instructions.
- Attach portable MRI compatible monitoring equipment as above.
- Record baseline heart rate and SaO<sub>2</sub> for all infants prior to scan.
- Remove **all** MRI non-compatible monitoring equipment from the infant, including metallic adhesive sticker for temperature probe and/or ECG lead skin tabs.
- Transfer bag-valve-mask to foot end of bed.
- Radiographers to fit MRI coil.
- Visually inspect the MRI trolley to ensure that there are no metallic items other than bag-valve-mask. There is a small metallic spring in the bag-valve-mask however this has been passed as MRI conditional.
- Ensure the infant is stable prior to transport into the scan room and that baseline observations have been recorded.
- The MRI transfer bag must be kept in the scan preparation room/control room at all times and **must not** be taken into the scan room/examination room.

### Moving into the MRI unit

- Infant and MRI bed should be disconnected from all cables and equipment attached to the transport incubator.
- Radiographer to direct the movement of portable monitoring equipment and MRI bed
- MRI bed and monitor to be moved towards the Inner Controlled Area (MRI scanning room).
- At the scan room door the Radiographer will perform a final verification to confirm that the infant, and everyone accompanying the infant is safe to

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enter the Inner Controlled Area (MRI scanning room), thus allowing the infant to be moved into the scan room and positioned within the magnet.

- Neonatal staff should remain with the infant inside the MRI scanning room until such a time that the infant has been positioned within the MRI scanner and stability of the infant has been verified
- Bag-valve-mask to remain at the foot end of the bed unless required.

### **Scan completion**

- MRI bed and monitor to be moved from Magnet scanning room into the waiting area.
- MRI Coil, MedVac®, and ear protection to be removed by radiographer.
- Remove MRI monitoring equipment and replace with NICU standard equipment.
- Record and document infant's temperature at the end of scan if infant was scanned in 3T magnet (not required for infants scanned in 1.5T scanner).
- Transfer infant into transport incubator.
- Transfer infant back to NICU if stable.

### **In the event of an emergency/ infant collapse during MRI scan**

- In the event of any emergency, infant collapse, or concern about the infant's well-being or stability during a scan, the radiographer will stop the scan.
- The radiographer will open the door to the MRI scanning room and will then immediately enter the scanning room, followed by the attendant authorised neonatal staff.
- The radiographer will pull the bed out of the scanner to allow an initial assessment of the infant to be made by neonatal staff.
- **NB Resuscitation must not occur within the scanning room!**
- If further assessment/ resuscitation is required, the radiographer will move the MR bed to outside the scanning room to the Outer Controlled Area and will shut the door to the MR scanner unit. Resuscitation equipment from the MR transfer emergency bag must not be used near the entrance to any scanner.
- If the clinical decision is made for extended treatment / resuscitation, this must occur in or outside of the Outer Controlled Area and must not under any circumstances occur within the MR scanning room.
- Extended treatment/resuscitation will be commenced by attendant qualified neonatal staff.
- MRI staff to make crash call for the neonatal resusc. team on 2222.

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- MRI staff to contact NICU to inform on-call consultant and/or nurse in charge – ext. 2868/ 2866.
- The radiographer's role will be to ensure that overall safety is maintained within the MRI department and will not be to assist directly with the resuscitation.

### **Reporting of MRI scans**

All clinical MRI scans will reported locally by at least one consultant paediatric radiologist.

### **Communicating MR scan results to parents**

The days and weeks following birth of a baby with HIE is a very stressful time for parents and uncertainty about their child's long-term prognosis adds to this. Timely and repeated communication with parents and family is a key aspect of caring for these sick infants. With regard to imaging, it is important to discuss beforehand what information may be obtained by imaging the infant at that particular time and the limitations of the imaging modality. Whilst MR imaging can provide reliable prognostic indicators, it is important to also consider all neurological assessment tools and information when discussing long-term prognosis (including clinical examination and course, resistive index on cranial ultrasound scan (CUSS) and aEEG/ conventional EEG findings). It is also important to stress the need for long-term neurodevelopmental follow up and support for these infants.

It is vital that results of imaging are communicated to parents at the earliest opportunity by the most senior clinician available (usually consultant neonatologist). Prior to the scan it is good practice to inform the parents that the scan will be reported by paediatric radiologists and that the reported results should be available within no more than 1 week.

If the infant is discharged home before the result is back, the discharging consultant should arrange to speak to the parents by telephone, or nominate a colleague to speak to the parents when the scan result is available. If the infant is transferred to their referring local unit before the result is back, the discharging consultant will be responsible for forwarding the MRI scan images and/or report to the receiving paediatrician at the local unit.

### **Clinical Audit Standards**

100% of babies who receive sedation for their MR brain scan are transferred by the required qualified personnel stated in this guideline.

100% of babies who receive sedation for their MR brain scan have documentation in their case notes stating that the use of sedation has been discussed with parents beforehand and that they have given verbal consent for its use.

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100% of NICU personnel involved in neonatal transfer between NICU and scan room have completed an up to date safety questionnaire, and received a safety brief from an MRI Authorised Person.

### **Clinical Governance**

- In the event of any incident requiring interruption of a scan and assessment/ treatment of a child, full details must be recorded in the casenotes and a careful explanation should be given to the parents.
- The staff involved should discuss the incident and decide whether it is appropriate to complete a Clinical Incident Form. A low threshold to complete Clinical Incident Forms and reporting should be adopted.
- The senior neonatal nursing and medical team will be responsible for monitoring the effectiveness and compliance with this policy by review of completed transfer paperwork, all reported incidents, and any complaints received or concerns raised by staff. These will be reviewed on a regular basis and presented at the monthly neonatal governance meeting. Any shortcomings highlighted will be addressed and remedies will be put into place to avoid recurrence. These results/ remedies will be communicated to all neonatal staff through the regular communication meeting.

### **Summary of development and consultation process undertaken before registration and dissemination**

The authors listed above drafted this guideline on behalf of the neonatal intensive care unit and the Department of Radiology. These departments have reviewed the guideline and agreed the final content. During its development it was circulated for comment to Consultant Neonatologists, senior Advanced Neonatal Nurse Practitioners, Neonatal Practice Development Nurses, Consultant Paediatric Radiologists, Lead Consultant Paediatric Anaesthetist for MR, and MR radiographers.

It was also presented to the Neonatal Unit Clinical Guidelines Meeting. Comments and suggestions received were incorporated into the final version. Revisions in this version were agreed in the consultant clinical management meeting in June 2017.

This version has been endorsed by the Clinical Guidelines Assessment Panel.

### **Distribution list/ dissemination method**

Trust intranet (Neonatal Trust guidelines; Radiology Trust guidelines).

### **References/ source documents**

Cawley P, Few K, Greenwood R, Malcolm P, Johnson G, Lally P, Thayyil S, Clarke P. Does MR brain scanning at 3.0 Tesla pose a hyperthermic challenge to term

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neonates? [Clinical and Laboratory Observations]. *Journal of Pediatrics* 2016 Aug;175:228-230.e1. doi: 10.1016/j.jpeds.2016.05.014. Epub 2016 Jun 15. Available at: [http://www.jpeds.com/article/S0022-3476\(16\)30222-0/pdf](http://www.jpeds.com/article/S0022-3476(16)30222-0/pdf)

East of England Neonatal Neuroprotection Team website: [www.bebop.nhs.uk](http://www.bebop.nhs.uk) (Baby Brain Protection). Accessed 20<sup>th</sup> June 2013.

Finnemore A, Toulmin H, Merchant N, Arichi T, Tusor N, Cox D, Ederies A, Nongena P, Ko C, Dias R, Groves A, Edwards D. Safety profile of chloral sedation for MRI in term and preterm neonates [Abstract]. *Pediatric Research*. 2011; **70**(5):646.

Gale C, Jeffries S, Logan KM, Chappell KE, Uthaya SN, Modi N. Avoiding sedation in research MRI and spectroscopy in infants: our approach, success rate and prevalence of incidental findings. *Arch Dis Child Fetal Neonatal Ed*. 2013 May;**98**(3):F267-8.

Ibrahim T, Few K, Greenwood R, Smith C, Malcolm P, Johnson G, Lally P, Thayyil S, Clarke P. 'Feed and Wrap' or Sedate and Immobilise for neonatal brain MRI? *Archives of Disease in Childhood Fetal & Neonatal Edition* 2015;100(5):F465-6.

Mathur AM, Neil JJ, McKinstry RC, Inder TE. Transport, monitoring, and successful brain MR imaging in unsedated neonates. *Pediatr Radiol*. 2008 Mar;**38**(3):260-4.

MRI of the Neonatal Brain Online textbook by Professor Mary Rutherford. <http://www.mrineonatalbrain.com/index.php> Accessed 2nd September 2020.

Rennie, J.M., Ed. (2005). *Robertson's Textbook of Neonatology*. 4th Edition, Elsevier Churchill Livingstone.

Shanmugalingam S, Dattani M, Austin T, Clarke P. (Original Authors). Merchant N, Austin T (Revision Authors). Imaging the encephalopathic infant, neuroprotection guidelines for the East of England. East of England Perinatal Network Guideline. (dated 25<sup>th</sup> May 2017). Available at <https://bebop.nhs.uk/healthcare-professionals/documents/guidelines/imaging-encephalopathic-infant/> Accessed 2nd September 2020.

Srinivasan L, Rutherford M. MRI of the newborn Brain. *Paediatrics and Child Health* 2008; **18**(4): 183-195.