



Safe and Snug without Sedation: MRI Imaging of Neonates and Young Infants with the Use of an Immobilizer

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INTRODUCTION

Magnetic resonance imaging (MRI) can be used to obtain detailed, high-resolution images, providing key clinical and diagnostic information. Patient immobility is mandatory, as movement during the scan will distort the images. Neonates and young infants often require sedation in order to achieve the immobility necessary for the scan. An immobilizer device is being used at The Children's Hospital of Philadelphia (CHOP) to reduce the use of sedation in neonates & young infants – a vulnerable population at risk for sedation complications.

OBJECTIVES

Identify:

- Criteria used for patient selection
- Nursing implications/responsibilities
- Advantages of immobilizer versus sedation
- Future plans/research

CRITERIA FOR IMMOBILIZER USE

- Infants up to 90 days of age
- Infants who weigh at least 2 kg but no more than 6 kg
- Sedation Service has determined patient is medically appropriate for the immobilizer (ie: No umbilical lines/ no arterial lines, infant able to be calmed, etc.)
- MRI scan time may not exceed 60 min
- Radiologist has determined study is appropriate for immobilizer use (predetermined list of studies or by individual consultation)
- Study is scheduled during sedation service hours

NURSING IMPLICATIONS/RESPONSIBILITIES

- Clean equipment before each use and inspect for broken or missing parts. (Replacement straps are available)
- Attach monitoring equipment to infant prior to wrapping in the immobilizer. (Placing pulse oximeter on infant's foot allows easy access should readjustment of the probe be necessary during the scan)
- Place hat on infant and swaddle in a single blanket. (Over bundling can lead to hyperthermia)
- Verify that scanner speaker volume is sufficient for easy recognition of infant crying
- Before or during the scan, a restless or crying infant may be held and gently rocked while in the immobilizer. Pacifiers may also be used to promote a return to a quiet, comfortable sleep
- Do not permit infant to cry for a prolonged period of time. Stop scan and take infant out of the immobilizer if unable to calm and settle to sleep
- Monitor vitals for any signs of distress.

ADVANTAGES OF IMMOBILIZER VERSUS SEDATION

- Reduce risks/side effects associated with sedation (hypoventilation/apnea, oxygen desaturation, bradycardia)
- Infant may be fed versus NPO for sedation
- Eliminate the 23 hour admission required for post-sedation monitoring of full term infants < 28 days of age or ex-premies who are < 60 weeks post conceptual age (CHOP protocol)
- Decreased costs: medications, nursing & recovery time
- No sedation = less stress for parents

FUTURE PLANS/RESEARCH

- Ongoing data collection in the following areas:
 - Parent satisfaction
 - Nursing staff satisfaction & ease of use
 - Technologist satisfaction & need for repeated image sequences
 - Neuroradiologist satisfaction with diagnostic quality of images
- Expand use of immobilizer to a wider population:
 - Infants up to 4 months of age
 - Outpatient population

CONCLUSION

The immobilizer offers a safe and effective option to successfully obtain MRI imaging in the neonate/young infant population without the need for sedation. Nursing staff have primary responsibility for proper use of the immobilizer and ensuring the safety and comfort of the infant.



Feed the infant approximately 30-45 minutes before the scan



Place MRI compatible leads, pulse oximeter probe and ear protection pads. Complete metal screening process.



Set up the immobilizer. Rotate the valve on the bag clockwise to close it.



Wrap the infant snugly in 1-2 lightweight blankets, leaving only his head and one foot (the one with the pulse oximeter probe) exposed. Place him on the open immobilizer bag.



Wrap the bag firmly around the infant's body. Secure the straps.



Attach the pump (end of the hose to the valve). Evacuate the air from the immobilizer bag



Secure all straps, including the head strap.



The infant is ready to be scanned.



If the infant begins to cry, you can pick him up to calm him while in the immobilizer device, then resume scanning. When the scan is complete, remove the infant from the coil, unbuckle the straps and rotate the valve on the immobilizer bag until the bag refills with air. Remove the infant from the immobilizer bag.