

Setting up a paediatric nuclear medicine service

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Setting up the nuclear medicine department to accommodate children is essential in order to obtain studies of adequate diagnostic quality. Paediatric studies should be performed either in a dedicated paediatric nuclear medicine department (typically within a children's hospital) or in general nuclear medicine departments with a dedicated paediatric service.

Imaging children, especially infants and young children, is a challenging task. Administered paediatric doses are much lower than adult doses requiring longer acquisition times for adequate image quality. Multi-phase studies, such as the 3 phase bone scan are more common than in adults. Typical paediatric studies such as, "milk scans", hepatobiliary scans, salivagrams, MIBG scans etc. require lengthy imaging times of 60 minutes or more. Imaging findings in children are often subtle and the size of the imaged organs in infants is sometimes close to the limit of spatial resolution of the camera. Under these conditions high quality studies are mandatory for adequate interpretations.

A major difficulty in imaging young children is their inability to follow instructions and their high level of anxiety resulting in lack of cooperation and crying leading to severe motion artefacts. Alleviating the fears and anxieties of the children and of their accompanying caregivers is essential. This can be achieved by creating a "child friendly" environment in the waiting and imaging rooms and by explaining the procedures with patience and empathy. A child friendly environment consists of separate waiting rooms for children (in general NM departments). The walls of the waiting and imaging rooms can be decorated with wall posters and paintings. Games, toys, books and TVs in the waiting rooms are effective in entertaining the children and in reducing anxiety. They should be compliant with the local radiation safety regulations. Imaging rooms can be equipped with large screen TVs overlying the imaging bed allowing broadcast of age appropriate clips and movies at the time of imaging. Audio-visual entertainment is both relaxing and distracting significantly reducing the number of motion artefacts. Parents should be allowed to sit by their children during acquisition. They can help the technologists in relaxing the children as well as in holding their heads in for selected views. It is important to secure the children to the imaging bed in such a way that will limit motion and at the same time be comfortable for the child. There are many devices such as Velcro stripes, sand bags and vacuum mattresses that can achieve this goal.

Venipunctures and insertion of IV cannulas should be performed by expert personnel. Injection rooms should be part of the child friendly environment. Administration of a local anesthetic cream prior to venipuncture is recommended.

Sedation and or general anesthesia are sometimes required when imaging children. They should be performed by qualified personnel and comply with the local regulations. Arranging sedation and/or anesthesia can be logistically challenging and requires cooperation of sedation nurses or anesthesiologists. Oxygen, suction devices, monitoring devices and a paediatric resuscitation cart should be available. Sedation and anesthesia are not often employed in dedicated paediatric nuclear medicine services. They are mostly used for hybrid studies (SPECT/CT, PET/CT, PET/MR) and occasionally in extremely uncooperative children or older children with mental retardation.

References:

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