Case Report

A case report: 2-year male, case of meningomyelocele posted for MRI

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Abstract

The magnetic resonance imaging (MRI) room is a special environment. There is the strong magnetic force around the magnetic gantry at all times, even if the MRI scanner is not turned on. The required intense magnetic fields create unique problems with the use of standard anesthesia machines, syringe pumps, and physiologic monitors. The scanning procedure lasts for an hour and the patients requires complete immobilization during the scanning for obtaining high-quality images for the best diagnosis. Hence, intravenous Sedation was preferred for management of this case. Dexmedetomidine was an excellent choice in effective sedation and easy titration for required sedation level and shorter recovery times. We present a successful management of a case of 2-year patient of Meningomyelocele posted for MRI scan.

Key Words: MRI, Meningomyelocele, Dexmedetomidine, Pediatric age group, Dexmedetomidine.

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INTRODUCTION

MRI is used to obtain specific diagnostic information not already provided by other imaging technologies such as CT, nuclear medicine, ultrasound, and X-ray.MRI Scan usually consists of multiple image sequences, each taking up to 10 min to acquire, and any movement during this time will produce profound distortion of the final images, thus, necessitating sedation for many patients (particularly children).While Sedation is helpful not only for children, but also for developmentally delayed individuals, and claustrophobic or anxious adults failing to lie down still. The magnet bore itself is a small enclosed tube which causes anxiety for many patients and prevents easy access in emergencies. The aims of anaesthetist are therefore to provide immobility to obtain the best possible images, while maintaining patient safety and comfort throughout.

CASE REPORT

A 2-year male, 6 kg of weight, presented with a swelling in lumbar region diagnosed as lumbar meningomyelocoel. It was of size around 10X10 cm, with irregular surface and unhealthy skin covering it (Figure 3). The patient had grade 0 power in both lower limb. He was posted for a MRI scan Brain and Spine (plain). After a thorough pre-operative evaluation, patient was accepted under ASA grade 3. The challenge in our case was performing a lateral MRI scan in this patient with risking of not securing the airway with an endotracheal intubation. Patient was nil by mouth for 6 hours. Intra-venous line was secured using 24 G cannula. Patients was transferred into the scanning room on an MRI-safe non-ferrous trolley. Pre-operatively, patient had a HR of 120/min with normal heart sounds and air entry bilaterally equal and no conducted sounds. A restrainer which was on board with straps was used to immobilize the patient during scanning. Pre-medication with Inj. Glycopyrollate. 0.03 mg, Inj. Midazolam 0.02mg and Inj. Ondansetron 0.5 mg was given. Induction was done on Inj. Ketamine 2mg IV and Loading dose of 1mcg/kg of Dexmedetomidine over 10 min. Ketamine top-up of 2mg was required once

during the procedure. During the scanning, pulse volume and body temperature were checked by palpation. Battery operated, fibre-optic probe connectionpulse oximeter was used, shown in figure2. The entire scan was successfully performed with good quality images. In the entire intra-procedure, the heart remained between 95 bpm to 105 bpm. And SpO2 remained between 99% to 100%. Anesthesia time in the MRI room was 40 min.

The patient was diagnosed with non-communicating hydrocephalus with complete callosum agenesis suggestive of Arnold Chari malformation II. MRI spine revealed defect in posterior element at L2, L3, L4 and L5 vertebral level with CSF filled cyst containing nerves suggestive of Meningomyelocele.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Legend

Figure 1: MRI scan room; **Figure 2:** MRI compatible laryngoscope; **Figure 3:** Meningomyelocele; **Figure 4:** MRI compatible Pulse Oximeter; **Figure 5:** Lateral Position of patient with Meningomyelocele for MRI scan

DISCUSSION

Magnetic resonance imaging (MRI) is a frequently used technique that produces particularly good images of soft tissue, providing greater contrast between different types of tissue. The MRI suite is a hazardous location because of the presence of a very strong static magnetic. A strong magnetic field and high frequency area are expected to impair monitoring equipment functions, pull the equipment to the magnetic gantry, and burn the skin due to radiofrequency heart-monitoring cables. Hence, devices for anesthesia to be used in the MRI room such as an anesthesia machine, medication pumps, and vital sign monitor required must be of nonmagnetic materials. The MRI system in our Hospital is 1.5T Multiva Philips with all standard accessories (figure 1). During MRI scanning, immobilization is required for approximately 1 hour in an enclosed space with a 90 dB or louder noise, which is stressful even for healthy adults. Hence the concern about cooperation while scanning is all the more in pediatric patients. Complete immobilization is required as respiratory assistance is difficult during cephalic imaging and the movement of even soft tissue may lead to blurred images. Therefore, intravenous sedation for this case was selected. The airway of the patient where head goes first into the magnet makes restricted access to the airway during head scans. So, our concern as aanaesthetist was security of the airway before the commencement of the scan, especially because of the lateral position of the patient. Anesthesia regimens range from anxiolytics such as midazolam, to propofol infusion based regimens, to general anesthesia with volatile gas. With deeper levels of sedation, monitoring airway patency is necessary. The goals of sedation for diagnostic and therapeutic procedures are to guard the patient's safety and welfare, minimize physical discomfort and pain, control anxiety, maximize the potential for amnesia, and control behavior and movement. In our case, we selected Dexmedetomidine for intravenous sedation.

Dexmedetomidine is alpha-2 adrenoceptor agonist, providing sedation, hypnosis, anxiolysis, amnesia and analgesia. It's profound anesthetic actions have been described, leading to the suggestion that dexmedetomidine could be used as a total intravenous anesthetic. Some similarity with natural sleep was observed with dexmedetomidine-induced sedation. It is associated with only limited respiratory effects. The induction dose used is 1 mcg/kg over 10 min and maintenance dose is 0.2 to 0.5 mcg/kg/hr. Hence, Dexmedetomidine was an excellent choice in effective sedation and easy titration for required sedation level and shorter recovery times. MRI-compatible infusion pumps have become advanced enough to be remotely controlled from outside the scan room, so that the level of sedation can be easily titrated. This MRI compatible pumps are unavailable in our institute. Considering the closed nature of the MRI room with minimum air circulation, use of intravenous anesthesia with Dexmedetomidine and Ketamine and 100% oxygen was felt to be preferable.

CONCLUSION

We, thus, report a successful case report of a patient with lumbar meningomyelocoel in a MRI scan under intravenous sedation. The image quality was markedly improved and scan times may be reduced.

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