

Anaesthetic management of a child with programmable magnetic ventriculo-peritoneal (VP) shunt in the MRI suite

Sir,

Codman–Hakim shunt (Codman/Johnson & Johnson, Raynham, Massachusetts) is a new generation magnetically programmable ventriculoperitoneal (VP) shunt, which provides constant intraventricular pressure and drainage of cerebrospinal fluid (CSF) for the management of hydrocephalus.^[1,2] The valve opening pressure can be modified externally in a non-invasive manner. It may show mild-to-moderate field interactions or reprogramming during magnetic resonance imaging (MRI).^[3,4] We want to provide simple but less reported information on the anesthetic management of such cases in the MRI suite.

The child diagnosed with medulloblastoma had VP shunt *in situ* following a craniotomy 1 year back. In the induction area, after ensuring fasting status, standard MRI compatible monitors were attached, and additionally, as the shunt was felt subcutaneously behind the head, the shunt was covered with a cotton pad. Following induction with inhaled sevoflurane, intravenous (i.v.) access was secured. After attaching Isolyte P (B. Braun, Melsungen, Germany) infusion, injection propofol 1 mg/kg, fentanyl 2 mcg/kg, and atracurium 0.5 mg/kg was administered i.v. to secure the airway with an endotracheal tube. After shifting into the MRI suite and positioning, anesthesia was maintained with 2% inhaled sevoflurane in an air–oxygen mixture and intermittent atracurium 0.1 mg/kg i.v. At the end of the procedure (160 min), the child was brought

out of the MRI suite to the induction area on ventilation with 100% oxygen. Muscle paralysis was reversed with intravenous neostigmine 0.05 mg/kg and glycopyrrolate 0.01 mg/kg and the trachea was extubated. The manufacturer-certified technologist checked the shunt programming for its function.

In pre-anesthesia check-up, as the pressure setting of this magnetically programmable VP shunts may accidentally change if it comes too close to a magnet depending on the model of the shunt, details need to be ascertained.^[2] Prior opinion from neurosurgeons must be taken regarding precautions for proximity to magnets. Warning signs indicating raised intracranial pressure due to non-functioning of the shunt, if present, should be optimized by the neurosurgeon.^[3]

Some general rules for all programmable shunts are 1. Keep the magnetic source at least 2 inches away from the valve. 2. Do not use magnetic therapy pads and audio headsets without checking the manufacturer's guidelines.

MRI technologists need to know the details of the shunt's guidelines regarding how to identify and manage if there is a change in the shunt's pressure setting. An X-ray may have a role to identify it. The valve unit made of titanium and 316L stainless steel may produce an insignificant force and torque, which can produce artifacts when tested with MRI magnets of up to 1.5 Tesla.^[3] Physicians must determine whether the location of the artifact will affect the area of interest. In such systems, the valve may become hot and evoke an epileptic attack. This valve unit may become hot and evoke an epileptic attack, thus it needs to be covered with a cotton pad, and emergency drugs should be in hand to manage the post-emergence epileptic attack.^[5,6] As the Codman–Hakim shunt is a popular choice for neurologists, anesthesiologists equipped with the knowledge of these unique implants can conduct anesthesia safely.

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Conflicts of interest

There are no conflicts of interest.

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