

[NM-240] General anesthetic approach for deep brain stimulator placement in a patient with pantothenate kinase deficiency

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Anesthesia for deep brain stimulator placement presents a unique challenge in balancing a safe, comfortable anesthetic and precise neurosurgical placement of electrodes without disrupting neuro-physiologic monitoring. Deep brain stimulation (DBS) is used to treat a number of functional neurologic disorders, including Parkinson's disease, dystonia, and refractory epilepsy. Although the current data is mainly from case reports, it appears that commonly used anesthetic agents interfere with microelectrode recordings (MERs) used to guide DBS leads. In addition, some surgeons prefer patients be able to participate in intraoperative testing, requiring an awake and cooperative patient. This has led to a variety of anesthetic techniques for functional neurosurgery, including local anesthesia, sedation, and general anesthesia.

Anesthetic management of DBS placement is particularly complex in children, especially those with dystonic conditions who are unable to cooperate with awake anesthesia. There are limited reports of anesthetic approaches used in children. We are presenting a general anesthetic approach using dexmedetomidine for DBS implantation in a child who was not a candidate for awake or sedation techniques.

The patient is a 9 year old male who developed a secondary progressive dystonia due to pantothenic kinase deficiency (PKAN). From his time of diagnosis, he had painful neurodegeneration with worsening dystonia, unresponsive to therapy. He was unable to talk or walk although cognition remained intact. He was able to follow instructions and indicate his understanding through non-verbal cues.

General anesthesia was induced via inhaled induction and he was orally intubated. Anesthesia during stereotactic CT scan was maintained with sevoflurane, propofol infusion, and dexmedetomidine infusion at 0.3 mcg/kg/hr. On return to the operating room, inhaled anesthesia and the propofol infusion were discontinued, and remifentanyl infusion was initiated at a rate of 0.05 mcg/kg/min. Local anesthesia was injected at the burr hole sites, and the patient was maintained on dexmedetomidine and remifentanyl infusions throughout the case. Testing included MER guidance and macrostimulation with hand-held pulse generator. MER signal quality was excellent and macrostimulation was successful in elucidating tongue contractions. Both the surgeon and the neurophysiologist reported high levels of satisfaction with the anesthetic approach. At the end of the procedure, he was extubated and transferred to the PICU.

On subsequent clinic visits, the family reported no concerns postoperatively. The patient did not endorse any recall of the procedure. After uneventful generator implant, his DBS was turned on and he has been showing signs of improvement with neck mobility, arm extension, and gaze.

#### References

- 1.Venkatraghavan L, Luciano M, Manninen P. Anesthetic management of patients undergoing deep brain stimulator insertion. *Anesth Analg* 2010;110:1138-45
  - 2.Venkatraghavan L, Manninen P. Anesthesia for deep brain stimulation. *Curr Opin Anesthesiol* 2011;24:495-499
  - 3.Maurtua M et al. Dexmedetomidine for deep brain stimulator placement in a child with primary generalized dystonia: case report and literature review. *J Clin Anesth* 2009;21:213-216
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