

INTRODUCTION

Intramedullary spinal cord tumors are rare in the pediatric population. Lesions typically present in the cervical spine and span multiple levels. These tumors are usually low grade, with high survival rates. Resection is first line therapy and a predictor of long-term survival. Post operative complications include hydrocephalus and neurologic decline.

CASE DESCRIPTION

15 year old previously healthy male presented with a six month history of progressive left upper and lower extremity weakness leading to ataxia with associated falls. Imaging demonstrated C2-T3 intramedullary spinal cord tumor. He presented for resection.



After IV midazolam, anesthesia was induced with lidocaine, fentanyl, ketamine and propofol. Deep intubation was performed without muscle relaxant. IV access was obtained. Arterial line and pacer pads were placed. Patient was pinned in the mayfield frame and then carefully transitioned to the prone position. Total intravenous anesthesia (TIVA) was initiated using propofol, remifentanyl, ketamine, and dexmedetomidine infusions. BIS monitoring was employed to assess depth of anesthesia. Tranexamic acid was used for antifibrinolytic therapy and dopamine was titrated to maintain spinal cord perfusion. The patient was spontaneously breathing during the tumor resection.

All signals remained stable throughout the case. At the conclusion, the patient was returned to the supine position and successfully extubated without new neurologic deficit.



MRI of tumor from C2-T3. T1 & DWI sagittal images

NEUROMONITORING

- ❖ D Waves are motor evoked potentials recorded directly from the epidural space
- ❖ Greater than 50% decrease in amplitude has a high correlation with post-operative neurologic deficit
- ❖ Predictive of good motor outcome even if SSEPs are lost
- ❖ Less sensitive to inhalation agents compared to other neuromonitoring modalities

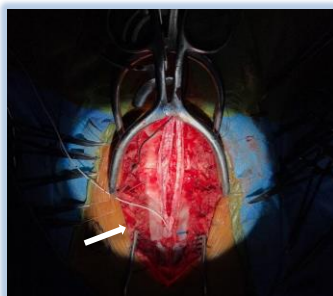


Image 1. (left) D wave neuromonitoring.
Image 2. (above) Epidural electrode placement.

DISCUSSION

The ideal anesthetic would achieve adequate depth of anesthesia without muscle relaxant, maintain spontaneous breathing, stable hemodynamics, optimize IOM and allow for extubation.

CHALLENGES

1. Tumor proximity to the phrenic nerve fibers along C3-5
2. Tumor proximity to the cardiac accelerators along T1-4

We employed a combination of remifentanyl, propofol, dexmedetomidine and ketamine. Remifentanyl provided stable analgesia that could be quickly titrated and blunt the response to surgery. Propofol, ketamine, and dexmedetomidine were used in low doses to provide a deep plane of anesthesia while maintaining spontaneous respirations.

Specialized D wave monitoring allowed for direct monitoring of the corticospinal tract during tumor debulking. We maintained spontaneous respirations as a surrogate marker for diaphragmatic function. Pacer pads were placed in anticipation of damage to the cardiac accelerator nerves (T1-4).

We achieved safe conditions for adequate resection, specialized intraoperative monitoring, and a positive outcome by using a tailored, multi-modal technique that combined several anesthetic agents at low doses.

REFERENCES

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