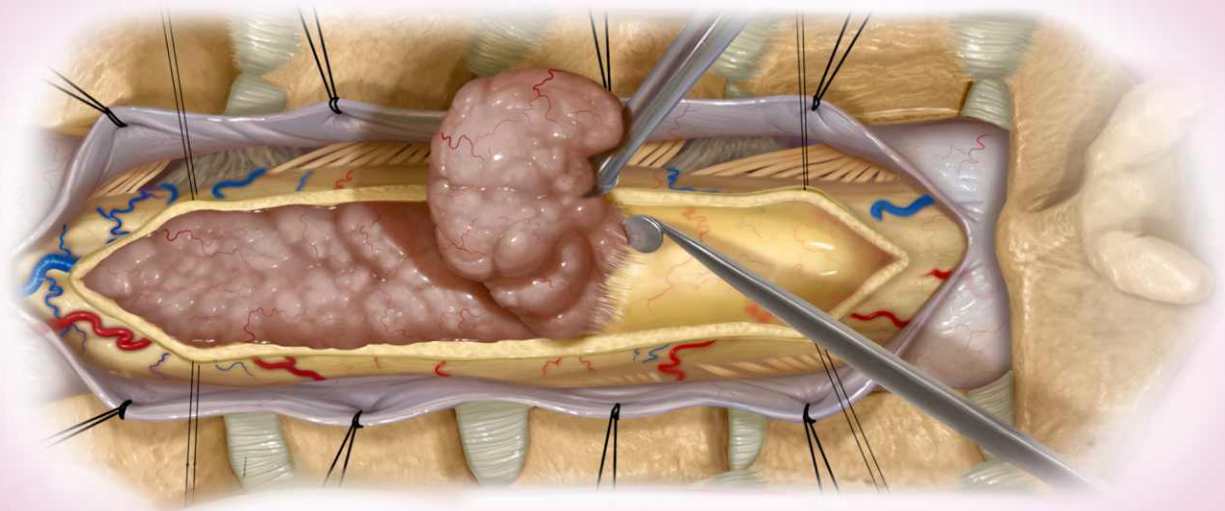


# Neuron

*Newsletter from Neuro One Hospital*

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## Navigating the Depths of Spinal Tumor Surgery

By

**Dr. S. VIJAY KUMAR MCh.,**  
Keyhole Brain and Spine Surgeon

Neuron - A Newsletter from



**Neuro One Hospital**

*Leaders in neuro care*



Dear Readers,

Welcome to the latest edition of the NeuroOne Hospital Newsletter. In this installment, we invite you on a journey through five compelling cases, each a testament to our unwavering commitment to excellence in spinal tumor surgeries.

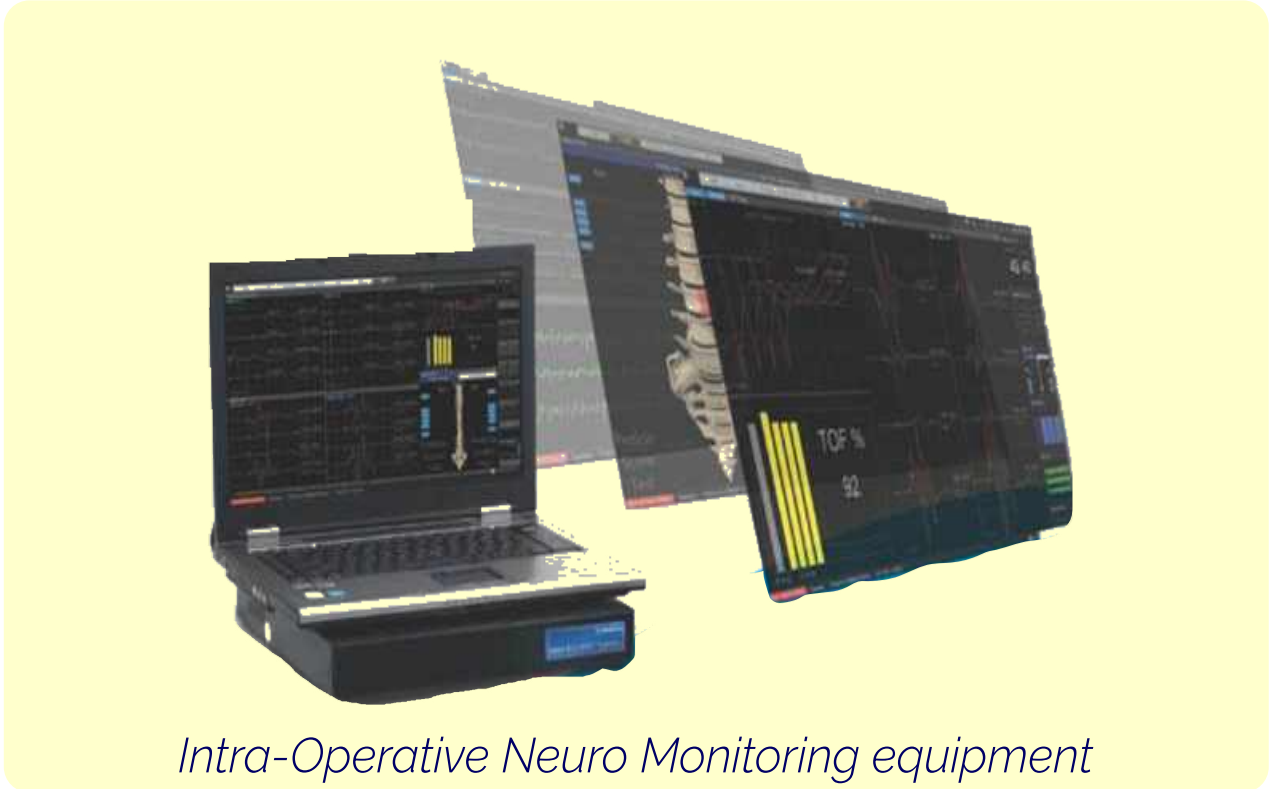
As we delve into the intricacies of these cases, we'll explore the pivotal role of intraoperative neuromonitoring (IONM) and the strategic use of laminar flap laminotomy in shaping safe and successful outcomes.

Join us as we navigate the depths of spinal tumor surgery, pioneering innovative techniques to redefine the standards of care.

Regards,

Dr **S.Vijay Kumar** MCh.,  
Keyhole Brain and Spine Surgeon

# Elevating Safe Spinal Cord Surgery with Intraoperative Neuromonitoring



*Intra-Operative Neuro Monitoring equipment*

## Transformative Innovations in Spinal Tumor Surgery

Welcome to a comprehensive journey through five remarkable cases where the integration of intraoperative neuromonitoring has been instrumental in achieving safe and successful outcomes in spinal cord surgeries.

At NeuroOne Hospital, our commitment to advancing patient care is exemplified by the strategic utilization of this cutting-edge technology.

# Case 1

## Ependymoma Unveiled

### Patient Presentation

- ◆ 3 months of upper thoracic pain radiating to the right rib cage.
- ◆ Examination revealed brisk knee reflexes and an extensor plantar response.
- ◆ MRI revealed an intramedullary ependymoma from D1-D4.



(Pic 1A)  
Pre OP



(Pic 1B)  
Operative specimen  
of Ependymoma



(Pic 1C)  
mid sag CT postop

### Surgical Intervention

- ◆ D1-D6 laminar flap laminotomy and microsurgical excision.
- ◆ Successful removal despite challenges.
- ◆ Histopathology: Anaplastic ependymoma WHO grade III.

### Role of Lamina Flap Laminotomy

- ◆ Creation of a meticulous lamina flap during surgery.
- ◆ Facilitates access to the intramedullary tumor without compromising stability.
- ◆ Reduces the risk of postoperative adhesions and spinal deformities.



(Pic 1D)  
3D CT



(Pic 1E)  
Post OP MRI

### Postoperative Course

- ◆ Decrease in leg power, managed with methylprednisolone and physiotherapy.
- ◆ Postoperative MRI confirmed complete tumor excision.

### Intraoperative Neuromonitoring (IONM) Impact

- ◆ Continuous monitoring of motor and sensory evoked potentials.
- ◆ Real-time feedback during dissection, ensuring preservation of vital neural pathways.
- ◆ Safeguarding against neurologic compromise, especially in challenging cases.

### Outcome

- ◆ Despite challenges in defining the tumor-cord plane, IONM facilitated precise excision.
- ◆ Immediate feedback helped manage MEP reduction during maneuvers.

### Result:

- ◆ Successful removal of anaplastic ependymoma, WHO grade III.



Mr Arun  
UHID : 75908

## Case 2

# Battling Progressive Myelopathy

### Patient History

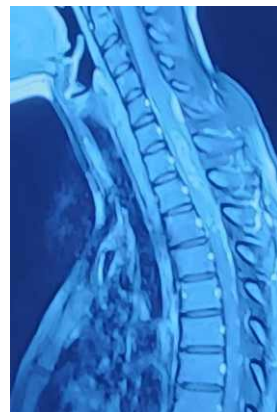
- ◆ Gradual onset of difficulty walking and bilateral hand weakness.
- ◆ Previously treated for inflammatory myelitis with no improvement.

### Surgical Approach

- ◆ C5 to T1 laminectomy and excision of the lesion with neuromonitoring.
- ◆ Longitudinal dissection with ultrasonic surgical aspirator.
- ◆ Histopathology: Diffuse midline glioma, H3 K27: altered, CNS WHO grade 4.



(Pic 2A)  
Pre OP MRI Spine



(Pic 2B)  
Pre OP Contrast

### Postoperative Journey

- ◆ Slight decrease in left leg power post-surgery.
- ◆ MRI displayed complete tumor excision with minimal enhancement.



(Pic 2C)  
Post OP MRI

## **IONM Advantages**

- ◆ Monitoring upper and lower limb MEPs and D wave integrity throughout the procedure.
- ◆ Identification and preservation of critical neural structures.
- ◆ Ensuring minimal electrophysiological deterioration during tumor resection.

## **Result**

- ◆ Despite initial challenges, IONM ensured safe dissection.
- ◆ Immediate decrease in left leg power managed with postoperative care.
- ◆ Final outcome: Complete tumor excision with minimal enhancement on MRI.

## **Late Follow-up**

- ◆ The patient experienced worsening of symptoms 8 months after the surgery due to tumor recurrence.

## Case 3

# Precision in Cervical Cord Surgery

### Patient Profile

- ◆ 6 months of paresthesia in the left hand.
- ◆ MRI revealed an intramedullary mass lesion in the cervical cord.



(Pic 3A)  
Pre OP  
MRI



(Pic 3B)  
Post OP  
Contrast MRI



(Pic 3C)  
Post OP  
T2

### Surgical Precision

- ◆ C3 to C6 laminectomy and excision.
- ◆ Longitudinal dissection with ultrasonic surgical aspirator.
- ◆ Histopathology: Ependymoma, WHO grade III.



## **Postoperative Outcome**

- ◆ Immediate improvement in all four limbs.
- ◆ MRI confirmed complete tumor excision.

## **Integration of IONM**

- ◆ Continuous monitoring of upper and lower limb MEPs and SEPs.
- ◆ Ensuring the well-defined plane of cleavage between the tumor and normal cord substance.
- ◆ Confirming neural integrity before, during, and after tumor resection.

## **Postoperative Success**

- ◆ Immediate improvement in all four limbs.
- ◆ IONM-guided dissection resulted in complete tumor removal.
- ◆ Postoperative MRI confirmed tumor excision without residual contrast enhancement.

## Case 4

# Decoding Cervical Myelopathy

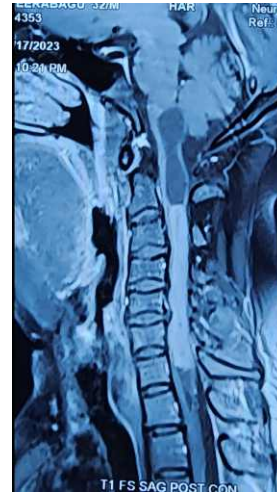
### Patient Presentation

- ◆ Gradual onset of hand weakness, difficulty using hands, and spastic gait.
- ◆ MRI revealed cervical intramedullary mass with cyst.



(Pic 4A)

Preop MRI



(Pic 4B)

Preop  
Contrast MRI

### Surgical Mastery

- ◆ C2 to C7 laminar flap laminotomy and microsurgical total excision.
- ◆ Ependymoma WHO grade II.
- ◆ Immediate decrease in power, followed by gradual improvement.



(Pic 4C)

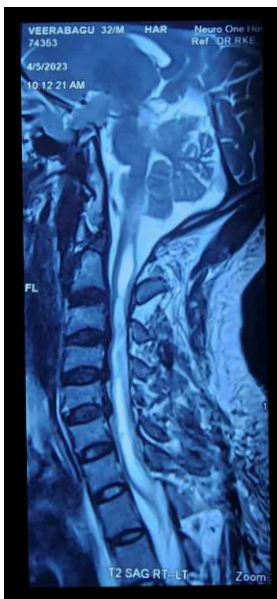
Excised specimen

## Essential Role of Laminar Flap Laminotomy

- ◆ C2 to C7 laminar flap laminotomy and microsurgical total excision.
- ◆ Safeguarding against postoperative complications like adhesions.
- ◆ Preserving spinal stability for improved long-term outcomes.

## IONM: An Essential Tool

- ◆ Monitoring upper limb MEPs and D wave throughout the dissection.
- ◆ Safeguarding against electrophysiological compromise.
- ◆ Ensuring the integrity of neural pathways during tumor removal.



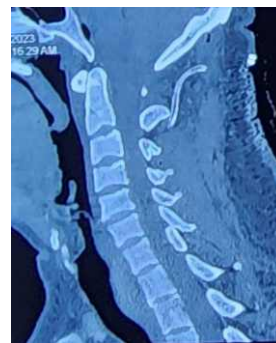
(Pic 4D)

Postop  
T2 MRI



(Pic 4E)

Postop  
Contrast



(Pic 4F)

Postop  
Spine Sag



(Pic 4G)

Postop  
Spine 3D



Mr Veeraghagu  
UHID : 74353

### **Postoperative Outcome**

- ◆ Immediate decrease in power managed with ongoing physiotherapy.
- ◆ Gradual improvement in upper and lower limb power.
- ◆ Final result: Successful total excision of ependymoma, WHO grade II.

## Case 5

# Astrocytoma Unveiled in a Child

### Patient Background

- ◆ Gradual onset of right flank pain leading to paraplegia in a child.
- ◆ MRI showed an intramedullary astrocytoma grade 4.



(Pic 5A)

Preop Spine



(Pic 5B)

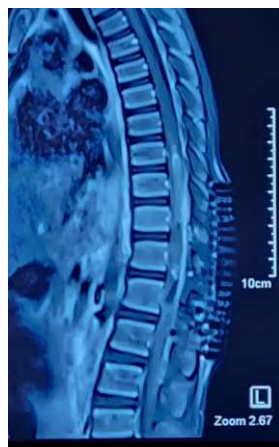
Preop  
Contrast

### Surgical Precision

- ◆ T10-L1 laminar flap laminotomy and tumor excision.
- ◆ Ultrasonic surgical aspirator used for tumor removal.
- ◆ Remarkable relief in pain, slight improvement in leg power.

## Strategic Use of IONM

- ◆ Monitoring intraoperative motor and sensory evoked potentials.
- ◆ Guiding the surgeon during ultrasonic surgical aspirator usage.
- ◆ Safeguarding against potential complications during tumor resection.



(Pic 5C)  
Postop  
Contrast



(Pic 5D)  
Postop  
T2

## Remarkable Postoperative Outcomes

- ◆ Relief in pain and slight improvement in leg power.
- ◆ Successful excision of astrocytoma, grade 4.
- ◆ No specific sensory worsening post-surgery.

## Late Follow-up

- ◆ Unfortunately, the child passed away one year after the surgery.

## **Advancing Safety and Precision in Spinal Cord Surgery**

Intraoperative neuromonitoring stands as a cornerstone in our approach to spinal tumor surgeries. Its real-time feedback and continuous surveillance empower our surgeons to navigate complexities, ensuring the preservation of neural integrity and achieving successful outcomes. At NeuroOne Hospital, we remain steadfast in our commitment to pushing the boundaries of safe and effective spinal cord surgery.

Laminar flap laminotomies can be replaced just like osteoplastic or free bone flaps and it allows anatomical reconstruction of the vertebral arches and reinsertion of interspinous ligaments .

Our journey in advancing safe spinal cord surgery continues. These cases underscore the importance of precision, innovation, and a patient-centric approach in overcoming spinal tumors.

## *Surgical Team*

Dr S Vijay Kumar

Dr Ramakrishna Easwaran

Dr Shanmugapathy

## *Anaesthesia*

Dr Ramgopal Gupta

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