

# Our clinical experience with pediatric meningioma with generalized anesthesia considerations

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## Citation

M Sarkar, D Muzumdar, Ratnesh. *Our clinical experience with pediatric meningioma with generalized anesthesia considerations*. The Internet Journal of Anesthesiology. 2007 Volume 16 Number 1.

## Abstract

Meningiomas are derived from mesoderm, probably from cells giving rise to the arachnoid granulations. These tumors are usually benign and attached to the dura. They may invade the skull but only infrequently invade the brain. Meningiomas usually occur along the sagittal sinus, over the cerebral convexities, in the cerebello pontine angle, and along the dorsum of the spinal cord. They are more frequent usually in women than men with a peak incidence in middle ages. Pediatric meningiomas are those which occur in individuals less than 18 years of age and are relatively rare in this age group. We hereby present an insight into meningioma in pediatric population observed over a period of 20 years (1986-2005) at Seth GS Medical College & KEM hospital with a contemporary focus on general anesthetic management.

## INTRODUCTION

Types: the following types were encountered, localized by CT, MRI ANGIOGRAPHY, and VENOGRAPHY.

### Figure 1

Table 1: types of pediatric meningiomas

TYPES	NO. OF CASES
CERVICAL	7
ORBITAL	4
SPHENOID WING	5
PARIETAL	7
PARAFALCINE	3
MIDDLE FOSSA	1
INTRADIPLOIC	1
PETROCLIVAL	2
PARASAGITTAL	1
PARASELLAR	1
SPINAL EPIDURAL	3
TENTORIAL	1
OCCIPITAL	2
TEMPORAL	2
FRONTAL	2

In our series the most common are parietal (15.4%) and cervical tumors (15.4%). Of the total cases 65% occurred in male and 35% in female pediatric patients.

## PATHOPHYSIOLOGY

Meningiomas arise from arachnoidal cells, most of which are near the vicinity of the venous sinuses, and this is the site of greatest prevalence for meningioma formation. They are most frequently attached to the dura over the superior parasagittal surface of frontal and parietal lobes, along the sphenoid ridge in the olfactory grooves, the sylvian region, superior cerebellum along the falx cerebri, cerebello pontine angle, and the spinal cord. The tumor is usually gray, well-circumscribed, and takes on the form of space it occupies. They are usually dome-shaped, with the base lying on the dura.

Histologically, the cells are relatively uniform, with a tendency to encircle one another, forming whorls and psammoma bodies (laminated calcific concretions). They have a tendency to calcify and are highly vascularized.

## DISCUSSION ON FOUR MOST COMMON TUMORS

Cervical: looking on the cervical meningioma profile the presenting features in decreasing order of incidence are extensor plantar(4), respiratory embarrassment(3), sensory involvement(3), quadriplegia(2), hypertonia(2), wasting of thenar and hypothenar and lastly clonus.

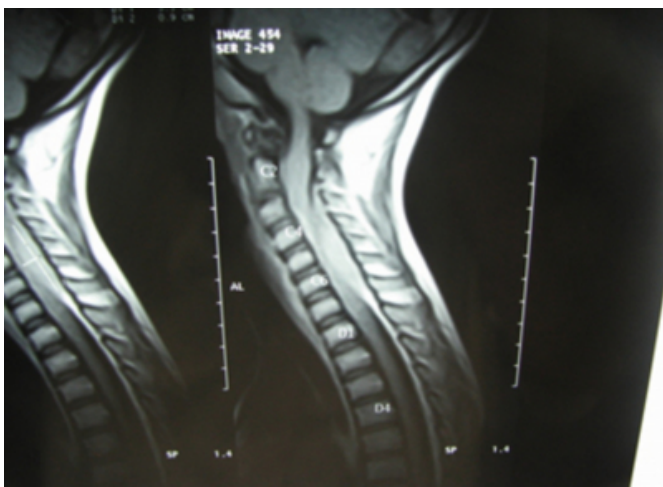
The patient presenting with clonus had acoustic neuroma having extracerebellar signs and neurocutaneous markers.

A variety of surgical approaches were performed with lateral approach to excision –

- C1-C2 laminectomy with total excision was followed with improvement in respiratory embarrassment but also with loss of power.
- Retromastoid craniotomy sub total excision was followed by nystagmus and lower motor neuron (LMN) paresis.
- Excisions at foramen magnum lead to dramatic return of power in all four limbs.
- Partial excision and laminoplasty leads to decrease in spasticity and increase in weakness.
- Radical excision approach was also quite successful as the patient who preoperatively walked with support walked postoperatively without support with increase in power in upper limb but remaining same in lower limb.

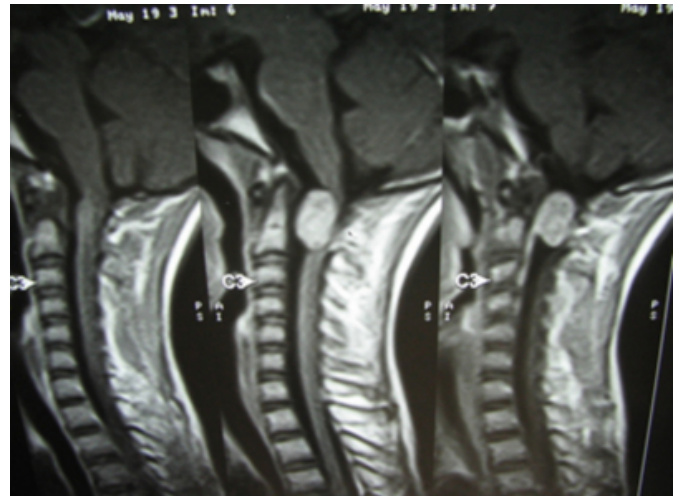
**Figure 2**

Figure 1: cervical meningioma



**Figure 3**

Figure 2: cervical meningioma (c1-c2)



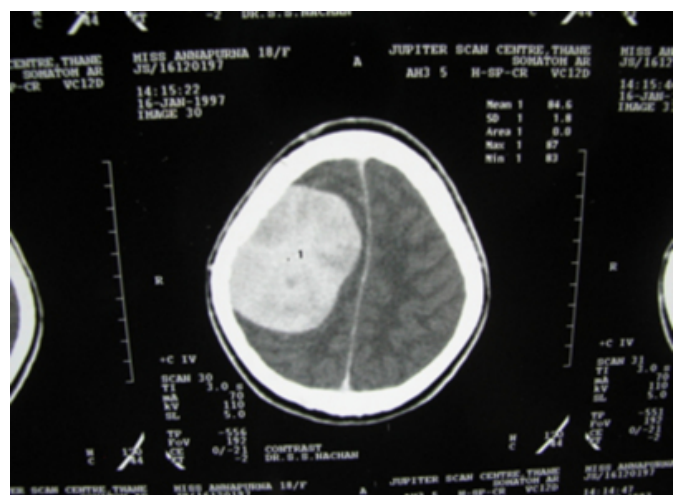
Parietal: presented in decreasing order of incidence with focal seizures (2), pappiledema (2), tonic clonic seizures(1), headache(1), hemiparesis(1), facial nerve palsy(1), decreased power with spastic hemiparesis(1), and (R) Nasal visual field restricted(1).

The surgical approach to all parietal meningioma was total excision with physiotherapy referral post operatively.

We came across an interesting case where malignant changes were seen confirmed by histopathology which was radically excised with worsening left hemiparesis and recurrent convulsions in post operative period.

**Figure 4**

Figure 3: parietal meningioma



Orbital: the presenting symptoms in decreasing order of frequency are visual field impairment, diminution of vision, restricted eyeball movements, proptosis, disc congestion,

facial nerve palsy, headache, diplopia and swelling.

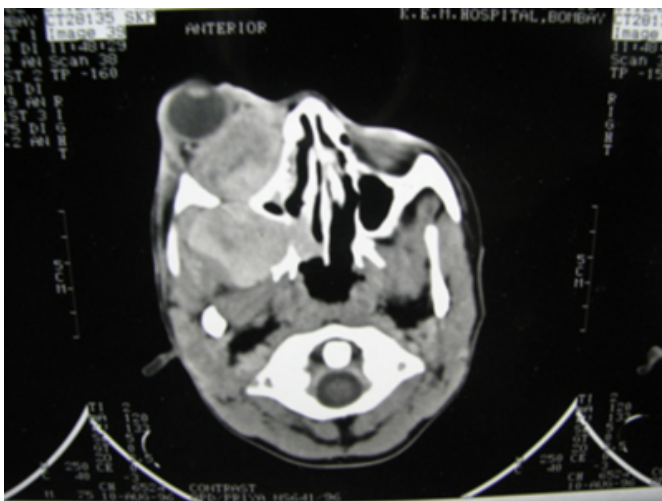
Total excision was performed with infratemporal extension and with orbital decompression which lead to improved eyeball improvement but with increased proptosis and abducent nerve paresis.

The basic approach in orbital surgeries is to preserve optic nerve but when optic nerve sheath is encased in tumor with infiltration the nerve needs to be excised as fear of recurrence dominates over preservation of eyesight.

Tumors having intraorbital and extraorbital component was surgically managed by resection of the extraorbital part. However postoperatively the patient presented with optic atrophy, pupil non reactive to light, and total ophthalmoplegia.

**Figure 5**

Figure 4:left orbital meningioma



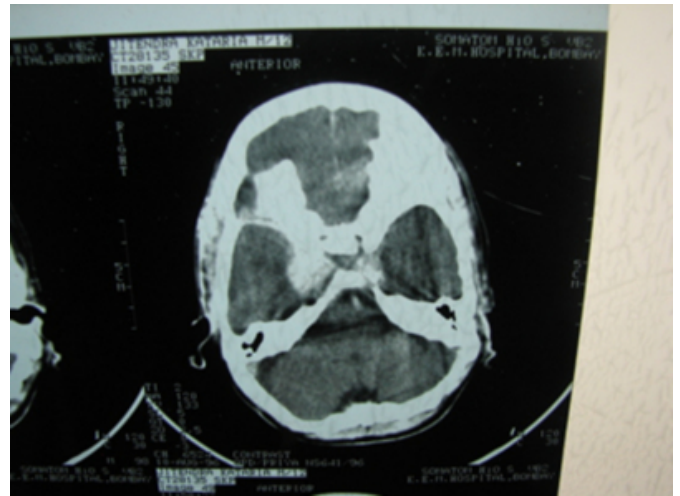
### **SPHENOID WING MENINGIOMA**

The presenting symptoms are headache, memory lapses, facial nerve paresis, photophobia, automatism, decreased vision and nystagmus.

Total excision was performed which was complicated by CSF leak.

**Figure 6**

Figure 5: sphenoid wing meningioma



### **ANESTHESIA CONSIDERATIONS FOR MANAGEMENT OF PEDIATRIC MENINGIOMAS**

1. Take care of air embolisms
2. Chances of massive blood loss
3. Keep adequate blood and blood products ready.
4. Take care of cerebral edema.
5. Avoid dextrose
6. Hyperventilation
7. Mean blood pressure to be maintained
8. Use mannitol if required.
9. Steroids.
10. Maintain. C S F pressure
11. Appropriate choice of anesthetic drugs so intracranial pressure should not increase
12. Take care of all the anesthesia consideration of pediatric age group.

### **COMMON COMPLICATIONS**

1. Massive blood loss
2. Arrhythmias
3. Air embolisms

Dealing with pediatric meningiomas needs constant

vigilance, accurate monitoring, deep knowledge, good infrastructure, better communication between surgeon , anesthetist nursing staff and relative's .It is not difficult to manage pediatric cases if you have good understanding of

path physiology and hemodynamic changes in the body because of disease .The incidence of complications depend on sit and size of the meningiomas.

### **References**

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