

## A Study On Posterior Fossa Tumours In Children

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### Abstract

#### Background

Posterior fossa tumours are common cause for morbidity and mortality in children. This study was mainly undertaken in order to study the clinical characteristics with outcome of posterior fossa tumours.

#### Material and methods

An ambispective study was undertaken in department of neurosurgery from January 2017 to December 2019 for 3 years in a tertiary care centre. About 50 cases were subjected for detailed history including clinical and radiological examination. The patients were observed for their prognosis. The data thus obtained was compiled and analyzed using suitable statistical tests.

#### Results

According to this study, posterior fossa tumours typically affect female youngsters between the ages of 5 and 10. In 48.0% of the cases, elevated intracranial pressure was the most common symptom, followed by cranial nerve palsy, papilledema, and cerebellar symptoms. The posterior fossa's fourth ventricle was the area of the research that was most frequently damaged. In 8.0% of instances, there was a tumour bleed, and in 12.0% of cases, hydrocephalus was detected. 6.0% of the cases had recurrence/remainder, cerebellar mutism, meningitis, shunt revision, tracheostomy, post-operative chemotherapy and radiation, hemi/quadrupalgia, and visual loss.

#### Conclusion

This study had shown that, posterior fossa tumours manifests as raised ICP and recurrence and mortality are the main outcomes of the study.

### Introduction

A region situated above the foramen magnum and below the tentorium cerebelli, the posterior fossa is home to several significant anatomical features, including the brainstem, the fourth ventricle, the dura matter, the vertebralbasilar arteries, the cranial nerves CV–CXII, and the fourth ventricle, which is situated between the brainstem and the cerebellum in the infratentorial cranial area known as the posterior cranial fossa.

To plan the surgical approach for tumour excision, a detailed radiological examination involving an MRI scan with angiography and venogram, and in some circumstances a CT scan, is necessary to examine the nature, size, and extent of the lesion and its relationship to the surrounding neurovascular structures.<sup>1</sup>

The posterior cranial fossa is home to 54–70% of brain cancers in children and 15–20% of brain tumours in adults.<sup>2</sup>

The most frequent posterior fossa lesions in children are medulloblastomas, ependymomas, and pilocytic astrocytomas; in contrast, vestibular Schwannoma, meningiomas, hemangioblastomas, lymphomas, and metastatic lesions are more common in adults.<sup>3</sup>

When a youngster presented with signs of acute hydrocephalus, rapid surgical surgery is usually indicated. Cushing was the first to describe a significant series of posterior fossa tumors, roughly 61 patients with cerebellar medullablastoma, which were generally fatal. The prognosis has improved as a result of developments in anaesthesia, aseptic procedure, early and more accurate diagnosis made possible by enhanced radiography, and improved surgical technique.<sup>4</sup> In order to improve knowledge and develop management protocols, the purpose of this study was to examine the duration between the onset of symptoms and diagnosis, the available diagnostic modalities, available treatment options, and their correlation with the various histological types.

## Material And Methods

A prospective and retrospective study was conducted in Department of Neurosurgery of a tertiary care centre. This study included about 50 children with posterior fossa tumours admitted over a period of 3 years from January 2017 to December, 2019. Approval from institutional ethics committee was obtained before the study was started. An informed assent form was obtained from all the parents of the children. All cases of posterior fossa tumours managed surgically were included in to the study. Posterior fossa lesion children not willing for any form of intervention, who discharged against medical advice, imaging or clinical features suggestive of inflammatory pathology were excluded from the study.

Routine data was collected from them regarding patient demographics, mode of clinical presentation and time of presentation to the Neurosurgery Department, Radiological features, investigation reports, management, histopathological findings, complications, outcome and follow up. A detailed analysis was done based on clinical presentation of the patient, taking consideration of various factors like radiological features, investigation reports, management including, surgery, postoperative adjuvant treatment based on histopathology and grading, management of complication, outcome and follow up. The goal of this study was to evaluate the role of various factors and their correlation between the clinical presentation, radiological features, histology and recurrence of both posterior fossa tumors treated in a single neurosurgical department. Strict confidentiality of patient information will be maintained. The data thus obtained was compiled and analyzed using Statistical Package for Social Services (SPSS) by using suitable statistical tests.

## RESULTS

**Table 1. Distribution of the study group as per age group**

Age group	Frequency	Percent
Less than 2 years	9	18.0
2 – 5 years	13	26.0
5 – 10 years	20	40.0
More than 10 years	8	16.0
<b>Total</b>	<b>50</b>	<b>100</b>

This study had shown that, about 40.0% of the cases were aged between 5 – 10 years followed by 2 – 5 years (26.0%).

**Table 2. Distribution of the study group as per Sex**

Sex	Frequency	Percent
Male	38	76.0
Female	12	24.0
<b>Total</b>	<b>50</b>	<b>100</b>

About 76.0% of the cases were females and 24.0% were males.

**Table 3. Distribution of the study group as per symptoms**

Symptoms	Frequency	Percent
Raised ICP	24	48.0
Cerebellar signs	22	44.0
Papilledema	16	32.0
IX & X Cranial nerve palsy	10	20.0
Other cranial nerve palsy	12	24.0

This study had shown that, raised ICP was found in 48.0% of the cases, cerebellar signs were found in 44.0% of the cases, Papilledema in 32.0% of the cases, IX and X cranial nerve palsy in 20.0% of the cases and other cranial nerve palsy in 24.0% of the cases.

**Table 3. Distribution of the study group as per location, tumour bleed and hydrocephalus**

Location	Frequency	Percent
Brain stem	4	8.0
Cerebellar hemisphere	6	12.0
Cerebellar vermis	9	18.0

	<b>Fourth ventricle</b>	26	52.0
	<b>Posterior fossa</b>	5	10.0
<b>Tumour bleed</b>	<b>No</b>	46	92.0
	<b>Yes</b>	4	8.0
<b>Hydrocephalus</b>	<b>No</b>	44	88.0
	<b>Yes</b>	6	12.0

Fourth ventricle was found in 52.0% of the cases followed by cerebellar vermis in 18.0% of the cases. The tumour bleed was present in 8.0% of the cases and hydrocephalus was found in 12.0% of the cases.

**Table 4. Outcome of posterior fossa tumours**

<b>Outcome</b>	<b>Frequency</b>	<b>Percent</b>
<b>Recurrence/ Residual</b>	3	6.0
<b>Cerebellar mutism</b>	14	28.0
<b>Meningitis</b>	6	12.0
<b>Shunt revision</b>	2	4.0
<b>Tracheostomy</b>	7	14.0
<b>Post op chemo radiation</b>	7	14.0
<b>Hemi/ Quadriplegia</b>	7	14.0
<b>Loss of vision</b>	3	6.0
<b>Mortality</b>	18	36.0

Recurrence / Residual was present in 6.0% of the cases, cerebellar mutism was found in 28.0% of the cases, meningitis in 12.0% of the cases and mortality in 36.0% of the cases.

## DISCUSSION

This study was undertaken in order to study the posterior fossa tumours in children. This study had shown that posterior fossa tumours commonly affected children of 5 – 10 years and male children. In a study by Shah et al, Majority of the cases with posterior cerebral fossa tumours were adults.<sup>5</sup> A study by Abu et al also noted similar findings.<sup>6</sup> In a study by Salami et al, majority of the posterior fossa tumours were seen in adults than children similar to the findings of this study.<sup>2</sup> A study by Shah et al also shown that, males outnumbered females.<sup>5</sup> A study by Khokar et al reported contrast results that, females were more than males.<sup>7</sup>

Raised intra cranial pressure was the most common symptom in 48.0% of the cases followed by cerebellar signs, papilledema and cranial nerve palsy. In a study by Abu et al, Hydrocephalus, Cerebellar dysfunction and motor deficits were present in the cases.<sup>6</sup> In a study by Bhat et al, the symptoms of disease progression were found in 5.1% patients of vestibular schwannoma and 14.2% of hemangioblastoma.<sup>8</sup>

Fourth ventricle was the commonly affected region of the posterior fossa in this study. Tumour bleed was present in 8.0% of the cases and hydrocephalus in 12.0% of the cases. A study by Salami et al had noted that, about 83.1% of the cases had supratentorial lesions. Majority of the tumours were present in Cerebellar Hemisphere followed by CP angle, 4<sup>th</sup> ventricle, vermis and Brainstem.<sup>2</sup>

Recurrence/ residual, cerebellar mutism, meningitis, shunt revision, tracheostomy, post op chemo radiation, Hemi/ Quadriplegia and loss vision was found in 6.0% of the cases. About 36.0% of the cases died during the course of disease and treatment. In a study by Bhat et al, recurrence was found in Schwannomas, Meningiomas, Hemangioblastomas, Medulloblastomas, Astrocytomas and Ependymomas.<sup>8</sup> In a study by Abu et al, the outcome was excellent in 12.7% of the cases, Good in 57.1% of the cases and poor in 6.3% of the cases.<sup>6</sup> In a study by Bhat et al, mortality of the metastatic lesions was 66.6%, brainstem gliomas (43.7%) and medulloblastomas (30.5%). No mortality was seen in pinealoblastomas and pilocytic astrocytomas.<sup>8</sup>

## CONCLUSION

This study had shown that the adult age is commonly affected with posterior fossa lesions and males are often affected. The recurrence and death was specific to the type of tumours in this study.

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