

Spectrum of Posterior Fossa Lesions: Experience at Tertiary Care Unit

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ABSTRACT

Objective: *The objective of our study was to evaluate the frequency and surgical outcome of patients with posterior fossa lesions.*

Material and Methods: *This observational, descriptive study was conducted in the department of neurosurgery at lady reading hospital Peshawar and PUMH Nawabshah from Jan 2014 - June 2018. A total of 163 patients were observed during the study period. All those patients who undergone surgery for intra-axial posterior fossa tumors were included in the study. We included patients of both the genders and all age groups. We took approval of the study from the hospital ethical committee and informed consent was taken from the patients or their relatives. The data was entered in a specially designed Performa. Patients' data was analyzed using SPSS version 21.*

Results: *We had total 163 patients during the study period who fulfilled the inclusion criteria. Most (80.4%) of the patients were in the pediatric age groups and male (57%). Age of the patients ranged from 1-65 years with the mean age 17.4 years. The most common tumors in our study were Medulloblastoma (33.1%), Ependymoma (22.7%) and Astrocytoma (19%) in descending orders. Hemangioblastoma and metastasis were seen in 6.1% cases each. The most common clinical features were headache (87.1 %) and vomiting (64.4%) cases. Most (74.8%) of the patients undergone sub-occipital tumor excision. The most common post-operative complications in descending orders were tumor bed hematoma (6.7%), wound infection (4.9%) and cerebrospinal fluid (CSF) leak (4.9%). Total mortality was observed in 12.3% cases.*

Conclusion: *We conclude from our study that posterior fossa tumors are more common in male children. The most frequent tumors in posterior fossa are Medulloblastoma, Ependymoma and Astrocytoma. Tumors excision (66%) is the main treatment option. The rest need CSF diversion procedures. The main post-operative complications are tumor bed hematoma, wound infection and cerebrospinal fluid leak. Mortality is high in such patients. Most patients had good and satisfactory outcome after surgery.*

Keywords: *Brian tumors, Craniectomy, Ependymoma, Medulloblastoma, Pilocytic Astrocytoma, Posterior fossa, Ventriculo-peritoneal shunt.*

INTRODUCTION

Patients with Posterior fossa tumors are critical because of decreased space available and compression of brain stem nuclei by the tumors.¹ Posterior fossa tumors may be intra-axial or extra-axial. These tumors may be primary or secondary. The most common

primary intra-axial posterior fossa tumors are Ependymoma, Astrocytoma and Medulloblastoma while meningioma and acoustic neuroma are the most common extra axial tumors. Primary intra-axial tumors are more common in children.^{2,3}

The 1st large series of posterior fossa tumors was

published by cushion.⁴ Tumors in the posterior fossa comprise 54-70% of childhood tumors and 15 – 20% in the adult brain tumors.⁵ The most common intra-axial posterior fossa tumors in children are Astrocytoma while those in adults are metastasis.⁶

Patients with posterior fossa tumors may present with signs and symptoms of raised intracranial pressure or compression of cerebellum, brain stem and cranial nerves. Such patients mostly, presents with headache, vomiting, ataxia and long tract signs as motor weakness.^{5,7} Diagnosis is made by clinical features and neuroimaging (CT scan and MRI brain). Magnetic resonant imaging (MRI) is the investigation of choice in patients with posterior fossa lesions [⁸⁻¹⁰]. The diagnosis is confirmed with histopathology report.¹¹⁻¹³

Treatment options for posterior fossa tumors are surgical excision, shunting for hydrocephalus, and or chemo/radiotherapy. Posterior fossa surgery involves greater morbidity, mortality and the variety of complications.^{7,14}

This study will help us to evaluate the common type of posterior fossa tumors in our population, their clinical features and management.

MATERIAL AND METHODS

This observational, descriptive study was conducted in the department of neurosurgery at lady reading hospital Peshawar and PUMA Nawabshah from Jan 2014 to June 2018. A total of 163 patients who undergone surgery for intraaxial posterior fossa tumors were included in the study irrespective of their gender and age. We excluded those patients with recurrent intra-axial tumors and with extra-axial tumors (meningioma and acoustic neuroma) from our study. We took approval of the study from the hospital ethical committee and informed consent was taken from the patients or their relatives. Our patients with posterior fossa tumors were subjected either to surgical excision of tumors, ventriculoperitoneal (VP) shunt or endoscopic third ventriculostomy (ETV). Hospital record of the patients was evaluated for patients' data regarding gender, age, clinical symptoms, radiology and operative notes. Post operatively the patients were followed up for one month for complications and mortality. All the data was entered in a specially designed Performa. Patients' data was analyzed using SPSS version 21.

RESULTS

We had total 163 patients with posterior fossa tumors who undergone surgery during the study period.

Gender Distribution

Most of the patients were male. There were 93 (57%) male and 70 (43%) female patients in our study with the male to female ratio of 1.3:1.

Age Distribution

Age range was 1-65 years with mean age 17.4 years. Most of the patients were in the pediatric age group as given in table 1.

Table 1: Age distribution of patients.

Age	Number of Patients	% age
< 15 years	131	80.4%
>15 years	32	19.6%
Total	163	100

Type of Posterior Fossa Tumors

Are given in table 2.

Table 2: Types of tumors.

Type of tumors	Number of Patients	% age
Medulloblastoma	54	33.1%
Ependymoma	37	22.7%
Astrocytoma	31	19%
Tuberculoma	11	6.7%
Abscess	5	3.1%
Brain stem Glioma	5	3.1%
Hemangioblastoma	10	6.1%
Metastasis	10	6.1%
Total	163	100

Clinical Features

Headache 87.1% (142), vomiting 64.4% (105) cases, decrease vision in 44.8% (73) and neurodeficit in 36.8% (60) cases.

Surgical Treatment

Almost 74.8% (122/163) of the patients undergone sub occipital resection. Gross total resection (GTR) was possible in 90 (73.8%) cases. Sub-total (partial) resection was done in 32 (26.2%) patients. Thirty six (22.1%) patients were subjected to endoscopic third ventriculostomy (ETV) and the rest 20 (12.3%) undergone ventriculoperitoneal shunt (VP shunt).

Post-operative Mortality and Complications

We observed total mortality in 12.3% (20) cases within 1 month of surgery. The post-operative complications are given below in table 3.

Table 3: Post-operative complications.

Post-operative Complication	No of Cases	% age
Cerebral edema	6	3.7%
Hydrocephalus	5	3.1%
Hematoma	11	6.7%
CSF leak	8	4.9%
Meningitis	5	3.1%
Wound infection	8	4.9%
Total	43	26.4%

DISCUSSION

Posterior fossa tumors are the most devastating forms of human illnesses. These tumors are significant because of the associated morbidity and mortality. In addition the surgical excision of these tumors has always been a challenge.^{1,7}

It has been reported that posterior fossa tumors are more common in men.^{1,15,16} In a study there were 59.5% male and 40.5% were female.¹ We also observed in our study that most of our patients were men. However, some studies had reported that posterior fossa tumors are common in female than male population.¹⁷ The reason that posterior fossa tumors are common in men is not clear, but may be because of hormonal difference.

Posterior fossa tumors are more common in children in the 1st decade of life.^{15,18,19} The most common posterior fossa tumors in children are Pilocytic Astrocytoma, Ependymoma and

Medulloblastoma. While in adults the most common intraaxial posterior fossa tumors are metastasis.^{2,7,20,21} In a study of posterior fossa tumors in children it was reported that Medulloblastoma were in 36% cases, Astrocytoma in 28% cases, brain stem Glioma in 9% patients and Ependymoma in 4% patients.¹⁵ In another study in 81% cases, posterior fossa tumors were observed in 81% in the 1st decade of life¹. Yamauchi et al¹⁷ Studied 27 patients with posterior fossa tumors, of which 22.2% (6/27) were Pilocytic Astrocytoma, 18.5% (5/27) were high grade Gliomas, Medulloblastoma were 11.1% (3/27), Hemangioblastoma (22.2% (6/27), metastatic tumors 11.1% (3/27) and malignant lymphoma in 14.8% (4/27). In our study, we have almost the same results. In our study, these tumors were more common in pediatric age group in 80.4% cases. The most common tumors in our study were Medulloblastoma (33.1%) followed by Ependymoma (22.7%) and Astrocytoma (19%). We had metastasis and Hemangioblastoma each in 6.1% cases and brain stem Gliomas in 3.1% cases.

Patients with Posterior fossa tumors have raised intracranial pressure and compression of surrounding brain structures as the brain stem and cerebellum. Therefore the most common symptoms are headache (80-92%) and vomiting (60%) followed by gait disturbance.¹¹ In another study, patients with headache (54%), vomiting (45.9%), seizures (27%) and cranial nerve palsy (45.9%).²² Here again our results are comparable to other studies. We had headache (87.1%) and vomiting (64.4%) the most common clinical presenting features.

The main aim of surgical excision of posterior fossa tumors is safe total removal. Prognosis is good in patients with total excision. However, total excision is not always possible because of invasion of vital structures as brain stem by the tumors.¹ In our study gross total removal was possible in almost 74% cases. Different studies have various reports. In a study of 50 cases gross total removal was done in 91.4% cases. Here we had lesser complete removal of tumor. This may be because of late presentation of our patients. By the time patients present to us have wide extension of lesions.

Posterior fossa tumors are known for their surgery related mortality and morbidity. These postoperative complications may be dangerous and sometimes fatal. Dubey et al²³ studied 500 patients for posterior fossa complications and observed post-operative mortality and morbidity in almost 45.6% cases. In their study the

most common complications were meningitis (9.2% cases) and wound infection (7% cases). In their study total mortality was in the 2.6% (13/500) cases.

In our study, we observed total postoperative complications in 26.4% cases and the most common complications were tumor bed hematoma in 6.7% cases, followed by wound infection and cerebrospinal fluid leak each in 4.9% cases. Meningitis was noted in 3.1% of our cases. Here our total complications were less than what Duby et al observed in their study, however, our mortality rate (12.3%) was higher than their study. The higher mortality in our study is not clear, but may be because of late presentation of the patients.

After surgery the patients were treated according to the histopathology report and age of the patients. Those with age less than 3 years and malignant lesions were sent for chemotherapy only. The rest with malignant lesions were subjected to chemoradiation.

CONCLUSION

We conclude from our study that posterior fossa tumors are more common in male children. The most frequent tumors in the posterior fossa are Medulloblastoma, Ependymoma and Astrocytoma. Tumors excision (66%) was the main treatment option. The rest needed CSF diversion procedures. The main post-operative complications are tumor bed hematoma, wound infection and cerebrospinal fluid leak. Mortality is high in such patients. Most patients had a good and satisfactory outcome after surgery.

Additional Information

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