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Original Research Article.

Posterior Fossa Lesions: An Experience of 32 Cases Over 1 Year

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ABSTRACT

Introduction: Posterior fossa tumours are common in paediatric population; however their occurrence in adults is not rare. They form a major cause of morbidity and mortality in either population. Some of these tumours like pilocytic astrocytomas are rewarding, others, like medulloblastomas may have a poor outcome. This study aims to analyse the epidemiology and surgical outcomes of posterior fossa lesions.

Materials and Methods: This is a retrospective study done at Department of neurosurgery S.M.S Medical college Jaipur from January 2017 to December 2017. It included 32 patients with posterior fossa lesions. Cerebellopontine angle lesions-schwannomas, epidermoids were excluded. Only lesions involving the cerebellum or occupying the fourth ventricle were included in the study. Their surgical outcome in terms of complications and mortality were analysed.

Results: Thirty –two patients, in the age group of 2years to 68 years were included in the study. Cerebello-pontine angle lesions were excluded. Only lesions involving the cerebellum or occupying the fourth ventricle were included in the study. Most common lesion was medulloblastoma, followed by pilocytic astrocytoma, cerebellar abscess, haemangioblastoma, arachnoid cyst, exophytic tectal gliomas, tuberculoma, metastasis, epidermoid. They underwent surgery depending upon the nature of lesion. Overall mortality was found in 9 of 32 patients. Mortality was especially high in medulloblastoma patients (54.55%).

Conclusions: Various lesions may affect the posterior fossa, varying from neoplastic malignant or benign lesions to infective and developmental lesions. Medulloblastoma is a common tumour in the paediatric population and carries a bad prognosis.

Keywords: Posterior Fossa Lesion, Medulloblastoma, Haemangioblastoma.

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INTRODUCTION

Posterior cranial fossa is a small space between the foramen magnum and tentorium cerebelli.[1] It is a common site of certain malignancies in children like medulloblastoma, ependymomas, atypical teratoid/ rhabdoid tumor, cerebellar pilocytic astrocytoma, and brainstem glioma.[2] In adults, subacute stroke is the most common lesion in the posterior fossa, the most common neoplastic lesion being cerebellar metastasis (intra-axial) or vestibular schwannoma (extra-axial).[3,4] Surgical outcome varies depending upon the nature of lesion with pilocytic astrocytomas having a very good prognosis in contrast to medulloblastomas which have a poor prognosis even after successful surgical decompression. The rarity of these tumors in addition to their heterogeneity has left the optimal treatment debatable.

MATERIALS AND METHODS

This a retrospective study done at Department of Neurosurgery, S.M.S Medical College, Jaipur from January 2017 to December 2017. The study included patients with posterior fossa lesions excluding those in the Cerebello-pontine angle like schwannomas, meningiomas, epidermoids. Only lesions arising from the cerebellum or occupying the fourth ventricle were included in the study, making a total of 32 patients. The mean age was 19 years with a range of 2 years to 68 years. Of these 17 were male and 15 female. Most of the patients were in paediatric age group (17/32). Most common presenting symptoms were that of raised intracranial pressure -headache, vomiting, blurring of vision, double vision, followed by cerebellar symptoms of difficulty in walking. All these patients were evaluated with both CT scan and MRI with contrast. Depending upon the nature of lesion they underwent various surgical procedures. Midline suboccipital craniotomy and decompression of lesion with an EVD placement was done for most of them including all patients with medulloblastoma, cerebellar astrocytoma, haemagioblastoma, brainstem glioma, metastasis, tuberculoma, epidermoid. All these patients also had an associated obstructive hydrocephalus. Two of the arachnoid cyst patients underwent ETV and one ETV followed by VP shunt placement. All the four patients with abscess underwent burrhole and aspiration of abscess followed by antibiotic therapy. Post-operative surgical outcome and complications were noted. Patients were followed up in OPDs.

Table 1: Results of present study

Pathology	Number of Patients	Age Range	Mortality
Meduloblastoma	11	2-48	6/11(54.55%)
Pilocytic Astrocytoma	4	15-17	0/4(0%)
Abscess	4	9-15	¼(25%)
Hemangioblastoma	3	28-47	1/3(33.33%)
Arachnoid Cyst	3	17-31	1/3(33.33%)
Brain Stem Glioma	2	5-47	0/2(0%)
Tuberculoma	2	14-47	0/2(0%)
Metastasis	2	68	0/1(0%)
Epidermoid	1	54	0/1(0%)

RESULTS

There were 11 patients with medulloblastoma in the study population. All of them underwent midline suboccipital craniotomy and decompression of tumour. EVD placement was done and was kept in situ for an average of 72 hours. Mortality rate in these patients was found to be very high, 6/11 (54.55%) VP shunt was done in one patient who developed hydrocephalus later on. CSF leak from wound was found in 5 /11 patients. Cranial nerve palsies were seen in 5 patients, Meningitis developed in one patient who succumbed to it. Remaining patients were sent for adjuvant treatment.

In the study population there were 4 patients with pilocytic astrocytomas, who underwent midline suboccipital craniotomy and decompression of tumour with EVD placement, which was removed after about 48 hours. All 4 of them developed initial few days of gait disturbances which soon resolved. No other complications were noted. Post-operative MRI after 2 months showed no residual or recurrent lesion.

There were 4 patients with cerebellar abcessess, all more than 3 cm in diameter. All of them underwent burrhole placement and aspiration of abscess, followed by culture based i.v. antibiotics for 4 weeks and oral for another 6 weeks. 1 of these patients developed ventriculitis and died.

Three patients with haemangioblastoma underwent midline suboccipital craniotomy and decompression of tumour. EVD placement was also done and kept for 48 hours. One of these patients had a prolonged post-operative period on ventilator and finally succumbed to chest infection. Other 2 patients did well. Post op scan after 2 months did not show recurrent or residual lesion. There were three patients with posterior fossa arachnoid cyst. All three of them underwent Endoscopic third ventriculostomy. Two of these did well. One of these returned with increase in size of hydrocephalus as well as the arachnoid cyst within 6 months in a drowsy state. VP shunt placement along with midline suboccipital craniotomy and cyst fenestration was done. Post operatively patient remained in a vegetative state for long and finally died of chest infection.

There were 2 patients with brainstem lesions – exophytic tectal plate glioma who underwent VP shunt placement for hydrocephalus followed by midline suboccipital craniotomy decompression of tumour. Symptoms improved in both patients. One of them developed 4th nerve palsy post operatively.

There was one patient with tuberculoma and one with metastasis, both arising from the vermis. The patient with metastasis, developed mutism post-surgery.

DISCUSSION

Paediatric posterior fossa lesions are common, and the commonest among them is medulloblastoma[5,6] accounting for about 30% of all paediatric cases. Cerebellar astrocytoma accounts for between 12% and 28% of all paediatric brain tumours. Medulloblastoma are relatively rare in adults, 1-3%. In adults the most common lesion in posterior fossa is metastasis. Most of these patients present with features of raised intracranial pressure including headache, vomiting, lethargy, blurring of vision as a result of hydrocephalus resulting from Obstruction to CSF pathway. Another cause of concern in these patients is brainstem compression and invasion leading to cranial nerve palsies and poor outcomes. Nystagmus and ataxia are also frequently found. Head tilt in some patients may indicate 4th nerve palsy or herniation Medulloblastoma is a Grade- IV malignancy. It has a high propensity of CSF seeding and drop metastasis. 10% of cases are diagnosed in infancy. 75% occur in the midline; cerebellar location is associated with older age and desmoplastic histology.[7] They tend to have a bimodal distribution in age with peaks at 3- 4 and 8-9 years of age. They appear as hyperdense lesions on CT. On MRI they appear as masses that are usually T1 hypo, T2 hyper, contrast enhancing lesions with diffusion restriction, usually arising from the roof of fourth ventricle. WHO classification of central nervous system tumours identified four distinct pathological subgroups: classical (65-80%), desmoplastic / nodular (15-25%), medulloblastoma with extensive nodularity (15-25%) and an anaplastic / large cell variant (4- 5%).[8-10]

Various studies on outcomes after posterior fossa surgery have reported ataxia, dysmetria, tremors, in 85 – 100% cases, decreased tone (50%), and ocular motility disturbances (40%). In our series 11/32 patients were of medulloblastoma.[11,12] All of them underwent Midline suboccipital craniotomy and decompression of tumour. EVD was placed to reduce ICP and decrease brain bulging intraoperatively. It was keep in-situ for around 72 hour. Six out of 11 of these patients died within 10 days of surgery. Three of these patients had brainstem invasion and developed bradycardia intraoperatively on tumour handling. Postoperative CT showed

gross total removal in 7/11 patients. Intraventricular blood was found in 8/11 patients. Out of 5 who survived, gait disturbances, ocular motility disturbances, speech disturbances were seen in all. CSF leak was seen in one patient. One needed VP shunt placement. One developed meningitis and succumbed to it. One patient developed mutism.

Further adjuvant treatment of medulloblastoma depends on risk stratification as standard or high risk. Staging requires MRI of the brain and spine, without and with contrast.[13] CSF from the lumbar region is also required. Children over three at standard risk undergo craniospinal irradiation (23.4 Gy). Based on this regimen, five year event-free survival is up to 80%.[14]

The five year progression-free survival for children with high risk disease is 40%.High risk patients are treated with 36 Gy to the craniospinal axis followed by a posterior fossa boost to 54 to 56 Gy.[15]

Cerebellar astrocytomas are the second most common lesions in children. In some they have been reported to be commoner than medulloblastoma, 35%. Peak incidence is in the age group of 5-13 years[16,17] half of them are in the midline, other half in hemispheres. On CT they appear as large hypo dense cystic lesion with a mural nodule that enhances on contrast. On MRI they are T1 hypo T2 hyper with contrast enhancing mural nodule. Enhancement of the wall indicate invasion of wall. They are primarily WHO grade- I tumours. Surgery is the treatment of choice. In our patient's midline suboccipital craniotomy was done. EVD was placed. Mural nodule along with the wall was removed. Post operatively some amount of gait disturbances were note which soon resolved. Post-operative MRI after 2 months showed no residual or recurrent lesion. Studies have reported long-term follow up, to a mean of 18.4 years.[18]

Hemangioblastomas are found 1.5 to 2 times more commonly in males than in females. The symptoms occur earlier VHL patients (30 to 40 years) compared with sporadic patients (40 to 50 years) In VHL patients CNS distribution of lesion includes the brainstem, spinal cord, and cerebellum (90%). Spinal cord lesions may also be found. On imaging they appear cystic lesion with mural nodule that enhances on contrast, peritumoural cysts are common. Microsurgical resection is considered curative of these lesions. In our study three patients with haemangioblastoma underwent midline suboccipital craniotomy and decompression of tumour. EVD placement was also done and kept for 48 hours. One of these patients had a prolonged post-operative period on ventilator and finally succumbed to chest infection. Other 2 patients did well. Post op scan after 2 months did not show recurrent or residual lesion.

Posterior fossa arachnoid cyst forms an important differential of cystic lesions both in adults and children. They are well circumscribed cysts, whose wall sometimes may not be clearly seen, displacing adjacent structures, and imaging features of CSF -hypodense on CT and hyperintense on T2 with FLAIR suppression on MRI. There were three patients with posterior fossa arachnoid cyst. All three of them underwent Endoscopic third ventriculostomy. Two of these did well. One of these returned with increase in size of hydrocephalus as well as the arachnoid cyst, within 6 months, in a drowsy state. VP shunt placement along with midline suboccipital craniotomy and cyst fenestration was done. Post operatively patient remained in a vegetative state for long and finally died of chest infection.

Infective lesions are also found in the posterior fossa (13%-63%) We had 4 patients with pyogenic abscess, and 2 with tuberculomas. Pyogenic abscesses were more than 3 cm in size and associated with CSOM. Burrhole and drainage was done, one patient died of ventriculitis. Two of the tuberculoma patients underwent surgical excision and did well after surgery.

Metastasis is the most common lesions in an adult posterior fossa. We however encountered only one patient with a single posterior fossa metastasis. It was T1 hypo, T2 hyper, contrast enhancing, with perilesional edema. The patient underwent resection of tumour. HPR was adenocarcinoma. Primary was not found. Post op she developed mutism.

CONCLUSION

Posterior fossa tumours amount to morbidity and mortality in children and adults alike. Medulloblastoma is the commonest malignancy in children with a poor outcome. Pilocytic astrocytomas are also common tumours in children with benign nature and good outcomes.

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