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Original Article

Posterior Fossa Tumors in Pediatric Age Group, an Epidemiological Study

Ziauddin M[1], Arman DM[2], Ekramullah SM[3], Mukherjee SK[4], Rahman M[5], DAS S[6], Moktadir MR[7]

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Contribution of Authors : Principal Investigator- Dr. Md. Ziauddin

Manuscript preparation- Dr. D. M. Arman, Prof. Sk. Md. Ekramullah

Data collection- Dr. Sudipta Kumer Mukherjee, Dr. Moshiur Rahman

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Abstract:

Background: *There are no data so far relating posterior fossa brain tumors in pediatric age group in Bangladesh. We are dealing with this type of tumors regularly. So an attempt has been made to document these tumors in respect to their incidence in our country, mode of presentation, age and sex distribution, treatment offered to them and their complication and outcome.*

Methods: *This study was conducted in the Department of Pediatric Neurosurgery, National Institute of Neurosciences and Hospital. It was a retrospective study and cases were collected from 2013-2020.*

Result: *We dealt with 60 cases of posterior fossa brain tumors. Out of them 21 were medulloblastoma,19 pilocytic astrocytoma, 11ependymoma and rest are other tumors. Almost all patients presented with hydrocephalus and in most cases CSF diversion was done before definitive tumors surgery.*

Conclusion: *This is only a partial picture of total posterior fossa tumors in pediatric age group. This type of study should be done in a larger scale and newer modalities of diagnostics should be widely practiced for a better post-operative treatment and better prognosis.*

Key words:*Posterior fossa tumor, Pediatric, Epidemiological.*

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Intrduction:

Brain tumors are the second most common neoplasm and the most common solid tumor in children. They are the third leading cause of death in children younger than 16 years of age.[1]

Approximately 60% of these tumors occur below the tentorium, including the brainstem, cerebellum, fourth ventricle and cerebellopontine angle. The pathological features of these tumors are diverse. Prognosis ranges from excellent to dismal, depending on histopathological findings, extent of surgical resection and use of adjunctive therapies.[2]

Four tumor types comprise majority of the posterior fossa tumors- cerebellar astrocytoma, ependymoma, primitive neuroectodermal tumor/medulloblastoma and brainstem glioma.[3]

Signs and symptoms of increased intracranial pressure are the most common presentation of these tumours as they are usually sizable at presentation, causing obstructive hydrocephalus due to obstruction of the cerebrospinal fluid (CSF) pathway at the level of the fourth ventricle.[4] They charactically present with symptoms and signs of hydrocephalus which include

1. Dr. Md. Ziauddin, Assistant Registrar, Department of Pediatric Neurosurgery, NINS.
2. Dr. D. M. Arman, Assistant Professor , Department of Pediatric Neurosurgery, NINS.
3. Prof. Sk. Md. Ekramullah, Professor and Head of Department of Pediatric Neurosurgery, NINS.
4. Dr. Sudipta Kumer Mukherjee, Associate Professor, Department of Pediatric Neurosurgery, NINS.
5. Dr. Moshiur Rahman, Medical Officer, Department of Pediatric Neurosurgery, NINS.
6. Dr. Subhasish Das, Assistant Professor, Department of Paediatrics, MAG Osmani Medical College.
7. Dr. Md. Ruhul Moktadir, Registrar, Department of Pediatric Neurosurgery, NINS.

Address of Correspondence: Dr. Md. Ziauddin, Assistant Registrar, Department of Pediatric Neurosurgery, NINS. Mobile: 01716078030, E-mail: drziahasnat@gmail.com

progressively worsening morning headache and vomiting, followed by unsteadiness, double vision and papilledema.[5]

The overall 5-year survival rate of children with brain tumors has improved considerably over the past several years. Because of earlier diagnosis and better therapies, survival rates are now between 35% and 65%, depending on several factors, including tumor histology and location. Age is also an important prognostic indicator for children with CNS tumors in general. Data consistently show that 10- to 15-year-olds have the longest survival whereas those younger than 2 years have the shortest.[6]

Great technological strides have been made in regard to improving and understanding tumor biology, imaging, surgical techniques and chemotherapeutic/ radiation protocols, leading to increased survival time in these patients. However, these treatments can lead to significant morbidity to the developing brain and thus we still have more to learn from these complex and challenging tumors. Infratentorial(posterior fossa) brain tumors(60%) are:

1. Medulloblastoma
2. Brainstem glioma
3. PCA of cerebellum
4. Ependymoma
5. Dermoid
6. Epidermoid
7. Vestibular Schwannoma
8. Atypical teratoid/ rhabdoid
9. Choroid plexus papilloma.[7]

Materials and methods:

This is an observational study carried out in the Department of Pediatric Neurosurgery, National Institute of Neurosciences and Hospital. It was a retrospective study and cases were collected from 2013-2020. This study includes 60 patients. Most of the patients presented to us with headache and vomiting. Other symptoms were gait disturbance, visual disturbances, cognitive impairment and convulsion. After clinical assessment we usually first do a CT scan of brain and mark it as PFSOL with or without hydrocephalus. Then MRI with contrast is done, followed by visual assessment study including color fundus photograph to check the urgency of doing CSF diversion by seeing papilledema grade.

After proper evaluation surgery is done by either craniotomy or craniectomy. Usually if tumor is found solid and more vascular then we do craniectomy and if tumor is mostly cystic and less vascular we prefer craniotomy. If vision is in danger we often do CSF diversion before definitive surgery. Four histopathological samples are made, two sent immediately for histopathological confirmation of tumor type and other two kept to clear if any confusion about diagnosis or further immunohistochemical analysis needed. After tumor removal water-tight dural closure done by usualy by using partial thickness cervical fascial graft. Then rest of the incision closed in multilayer without using any drain.

Results:

We dealt with 60 cases of posterior fossa brain tumors. 22 of them were within 0-5 years age group, 18 were within 6-10 years age group and 20 were within 11-15 years age group. No posterior fossa tumor were found with age 16-18 years.

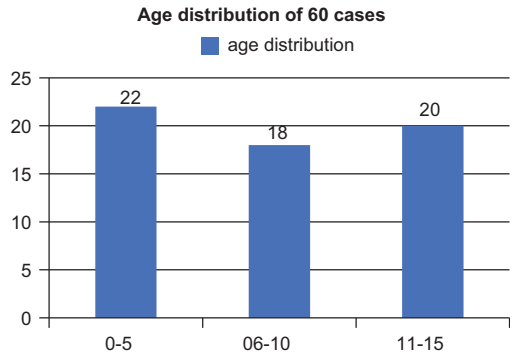

Fig-1: *Age distribution of posterior fossa tumors of 60 patients*

Most the patients were male in our series and which is 36(60%).

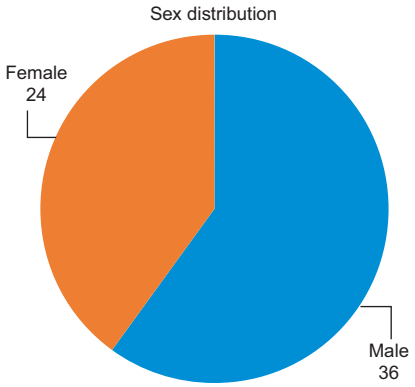

Fig.-2: *Sex distribution of pediatric patients with posterior fossa tumors*

Out of them 21 were medulloblastoma, 19 pilocytic astrocytoma, 11 ependymoma and rest are other tumors. Almost all patient presented with hydrocephalus and in most cases CSF diversion was done before definitive tumors surgery.

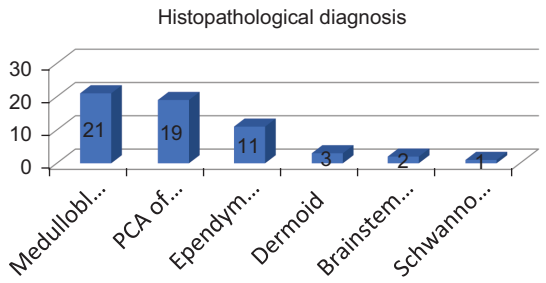

Fig.-3: *Histopathological diagnosis of patients with posterior fossa tumors in pediatric age group*

Discussion:

More boys than girls are affected depending on tumor type and patient age.[8]Among all 60 patients most were(60%) male, so PFSOL in pediatric age group in Bangladesh is mainly male predominant which correlated with international data.

They are almost equally distributed among 0-5, 6-10 and 11-15 years of age group with 0-5 years being the most(37%) followed by 11-15 years (33%) and 6-10 years(30%). Another trend is observed that with 0-5 years most histopathological diagnoses are medulloblastoma and in 11-15 years most are pilocytic astrocytoma.Bonner et.al.in n1988 found that 40% of medulloblastoma present in their first 5 years of life and 75% in their first decade.[3]

The relative incidence of posterior fossa neoplasms in pediatric population is medulloblastoma 50%, cerebellar astrocytoma 30-40%, ependymoma 10-20% brainstem glioma 10-20%. Our histopathological analysis shows21 out of 60 patients were medulloblastoma(35%), followed by 19 pilocyticatrocytoma(32%) and 11 ependymoma(18%), 3 dermoid(5%) and others like brainstem glioma, pineoblastoma, germinoma in very few numbers.'

Most of the patient with PFSOL presented with hydrocephalus and it is 88% of all cases of which is similar to the findings of Lin CT et. al. which says about 70-90% patient with posterior fossa present with hydrocephalus. Due to huge workload and unavoidable delay in definitive surgery we often do preoperative CSF diversion to save the vision. The options are mainly VP shunt or endoscopic third ventriculostomy.

It seems to diminish the rate of perioperative complications and persistent hydrocephalus after tumor resection. On the other hand, the rate of persistent hydrocephalus after tumor resection is 10–30% only and an ETVin every patient prior toposterior fossa tumor surgery would lead to an unnecessary surgical procedure in at least 70–90% of them.[9]

Most of the time we can do gross total resection ,but sometimes neartotal or subtotal resection is also done. Post operative CT scan is done in 1st POD. Surgery is followed by radiotherapy and chemotherapy as needed. Patient is usually followed up at 1 m onth after discharge, then 6 monthly for 1 year and then yearly later on. During follow up CT or MRI scan with contrast is done after patient assessed clinically.

Conclusion:

This is only a partial picture of total posterior fossa tumors in pediatric age group. This type of study should be done in a larger scale and newer modalities of diagnostics should be widely practiced for a better post-operative treatment and better prognosis.

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