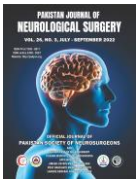

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Case Report

Sub Temporal Trans Tentorial Approach in Excision of Mid Brain Tumor: A Case Report

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ABSTRACT

This case report presents a rare case of a 28-year-old male diagnosed with mid-brain glioma and managed through sub temporal trans-tentorial approach. She was presented to the Neurosurgery department with clinical features suggestive of raised intracranial pressure such as nausea, vomiting, diplopia, and headache from the past 2 months. The patient had a history of undergoing ventriculoperitoneal shunt two years back. The examination findings revealed that the patient had bilateral ptosis with the inability to open their eyes. He was bedbound. When examined in standing the patient demonstrated symptoms of instability when moving the limbs and loss of balance. MRI brain confirmed the diagnosis of mid-brain glioma. Right Sub temporal trans-tentorial approach was performed to excise the mid-brain glioma. Mid-brain gliomas although rare, are brainstem tumors that can present in adults with symptoms of increased intracranial pressure, the management of which can be done through radiotherapy, chemotherapy, surgical resection, or a combination. Focal and low-grade glioma can be successfully resected through the Sub temporal trans-tentorial approach with improved clinical outcomes.

Keywords: Glioma, Mid Brain Glioma, Sub Temporal Trans Tentorial Approach.

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INTRODUCTION

Mid-brain glioma constitutes rare tumors affecting the brain stem which are usually low-grade and are predominately prevalent in the pediatric population. Ten to twenty percent of all primary brain tumors in childhood are attributed to brain stem gliomas, however, are present in a smaller proportion of the adult population (1%-2%).[1] Midbrain glioma encompasses a variety of different tumor types such as ganglioglioma, ependymoma, metastasis, and hamartoma, but the majority of these tumors are categorized as

low-grade astrocytoma classified according to WHO grades as I and II.[2] Ten to twenty percent of all primary brain tumors in childhood are attributed to brain stem gliomas, however, are present in a smaller proportion of the adult population (1%–2%).[3] While 80% of the brainstem gliomas are diffuse intrinsic pontine gliomas and are highly malignant, the glial tumors of the mid brain progress slowly with symptoms owing to increased intracranial pressure, and hydrocephalus such as headache, vision problems, vertical gaze deficiency, nausea, and vomiting.[4]

Due to the indolent nature of midbrain gliomas, most of the cases are treated conservatively through radiological monitoring and management of hydrocephalus through shunt or endoscopic third ventriculostomy. Many reports have shown that only 20 to 30 percent of the mid-brain or tectal gliomas demonstrated significant growth on follow-up MRIs, exhibiting increasing symptoms and requiring surgical intervention.[5-6] In radiologically progressive tumors, interventions that target the tumor itself such as chemotherapy, radiotherapy, and surgical excision are incorporated.[5] Sub-temporal trans-tentorial approach is a surgical intervention technique that is used for neoplastic and vascular disorders involving the middle incisural space and ambient cisterns and is useful in accessing the brainstem, posterior fossa, and cerebellum.[7] This case reports presents the first-ever case of midbrain glioma in Khyber Pakhtunkhwa resected through a sub-temporal trans-tentorial approach. This case report aimed to describe the clinical presentation, examination findings, surgical intervention, and outcomes of a 28-year-old patient diagnosed with a rare type of brainstem glioma.

CASE DESCRIPTION

Clinical Presentation/History of present illness

A 28-year-old male presented to Ali Institute of Neurosciences, Irfan General Hospital Peshawar with clinical features suggestive of raised intracranial pressure such as nausea, vomiting, diplopia, and headache from the past 2 months. The patient had a history of undergoing ventriculoperitoneal shunt two years back.

Examination Findings

The examination findings revealed that the patient had bilateral ptosis with the inability to open their eyes. He was bedbound. When examined in standing the patient demonstrated symptoms of instability when moving the limbs and loss of balance. The findings of the Magnetic Resonance Imaging (MRI) brain revealed an irregular enhancing lesion with a cystic component in the midbrain area pressing on the aqueduct of sylvius. The normal ventricular system was observed indicating a functional ventriculoperitoneal shunt.

Pre-Operative MRI

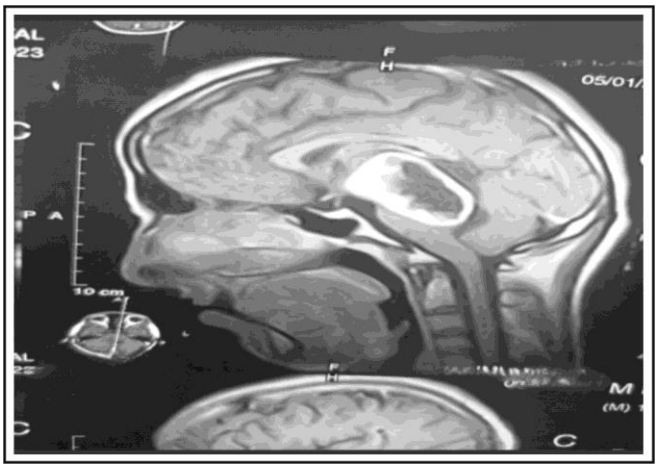

Figure 1: MRI brain illustrating irregular enhancing lesion with a cystic component in the midbrain. (Image added with patient consent).

Diagnosis and Management

The diagnosis of mid-brain glioma was made based on subjective and examination findings. Based on the location of the tumor, symptoms, and severity of the condition it was decided by the Neurosurgeons at Ali Institute of Neurosciences to excise the tumor and the surgical procedure decided was the right Sub Temporal Trans Tentorial Approach. Informed consent was taken from the patient and was briefed about the procedure.

Intervention

After giving general intubation anesthesia and a bolus dose of mannitol in the semi-supine position. The tumor was identified by first putting the brain cannula in the cyst component. After aspiration of mid-brain glioma fluid, an opening was widened, and the rest of the tumor was debulged for biopsy purposes. Maximum safe resection was possible by using Cavitron Ultrasonic Surgical Aspirator (CUSA). Hemostasis was secured and a craniotomy was closed. The specimen was sent for histopathological investigation. The patient remained in the ICU for two days and was then shifted to the ward for further care.

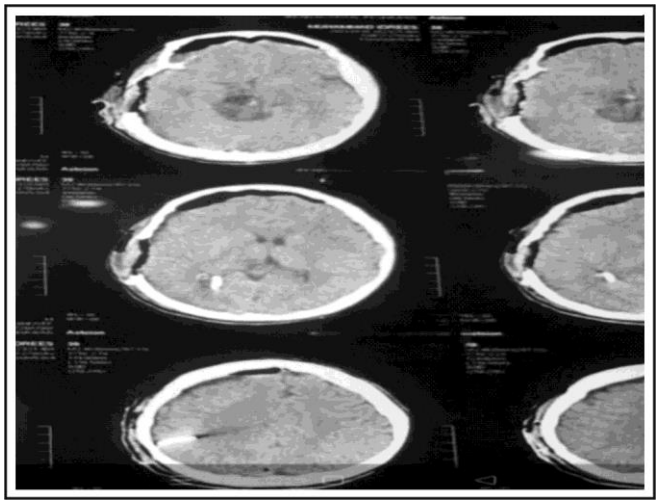

Figure 2: Post-operative MRI indicating resection rate of mid-brain tumor (Image added with patient consent).

The immediate Postoperative MRI was satisfactory indicating total resection of the tumor and the patient was neurologically intact with no sensory or gait disturbances. Although left-sided upper limb power was documented as 2/5.

DISCUSSION

Brainstem gliomas constitute a smaller proportion of tumors in the adult population. Diffuse pontine gliomas are often progressive with poor prognosis despite receiving chemotherapy and radiation therapy. Focal medullary and mid-brain gliomas are less prevalent (accounting for twenty percent of brainstem gliomas) but often benign and responsive to intervention.[8-9] This case report, therefore, presents such a rare case of glioma encountered by a 28-year-old male. To the best of the authors' knowledge, there is very limited literature available on mid-brain gliomas and their management.

Studies illustrate that although gliomas affecting the brainstem affect mostly the pediatric population in rare cases adults are also affected with a median age of mid-30s at the time of diagnosis and a slight male predominance.[10] Our case report findings are also consistent with the literature as the age of the male patient diagnosed with mid-brain glioma was twenty-eight. Sex-based differences in the prevalence of brain tumors are documented in different studies based on epidemiological and molecular factors with an average of 1.6/1 male-to-female ratio for gliomas of the brain.[11]

A study carried out on 35 cases of midbrain gliomas demonstrated that only one patient exhibited vertical gaze deficiency while in all cases the clinical symptoms due to the raised intracranial pressure such as nausea, vomiting, and headache were observed. While one patient suffered from contralateral hemiparesis. One patient had also a loss of consciousness before

being admitted to the hospital.[12] Findings of our case report are also consistent with the study as the patient had symptoms of increased intracranial pressure along with visual problems. In contrast, no loss of consciousness was reported in our case by the patient or relatives.

Magnetic resonance imaging and CT scan are used for the radiological investigation of brainstem gliomas to identify the location and severity of the tumor. Brain MRI is currently considered the most accurate and useful investigation in diagnosing brainstem tumors. MRI findings suggestive of brainstem tumor are areas of increased density on T2 and FLAIR sequence while hypointense areas of T1 weighted image.[13] Certain radiological factors are associated with poor prognosis and decreased rate of survival such as enhancement of contrast or necrosis on MRI findings.[14-15] Our study also used MRI as the main radiological outcome for assessing Sub temporal trans-tentorial approach pre and post-operatively glioma. The results of different studies identified several prognostic factors which are associated with poor prognosis in brainstem gliomas including lower KPS Karnofsky Performance Scale score (< 70), age greater than 40, and WHO grades III and IV.[15]

Advances in neuroimaging have demonstrated the variable nature of brainstem gliomas and the decision the management the tumor either through surgical resection or combined with chemotherapy and radiotherapy depends on the location, severity, and grade of the tumor as well as the surgeon's clinical experience. For tumors classified in WHO grade I, surgical resection is the best option as was in our case report in which the glioma was resected with the improvement of neurological symptoms using the Sub temporal trans-tentorial approach.[16]

This paper presented the first-ever case of mid-brain glioma excised through Sub temporal trans-tentorial approach in Khyber Pakhtunkhwa Peshawar. Future studies of the longer follow-up period and advanced study designs should be carried out to increase our knowledge of the subject.

CONCLUSION

Our case report concluded that mid-brain gliomas, although rare are brainstem tumors that can present in adults with symptoms of increased intracranial pressure, the management of which can be done through radiotherapy, chemotherapy, surgical resection, or a combination depending on the tumor characteristics and severity. Focal and low-grade glioma can be successfully resected through the Sub temporal trans-tentorial approach with better clinical outcomes.

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Additional Information

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Human Subjects: Consent was obtained by all patients/participants in this study.
Conflicts of Interest:
In compliance with the ICMJE uniform disclosure form, all authors declare the following:
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Other Relationships: All authors have declared that no other relationships or activities could appear to have influenced the submitted work.

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Mumtaz Ali	1. Study design and methodology
2.	Abdul Haseeb Sahibzada & Mumtaz Ali	2. Paper writing
3.	Ramzan Hussain, & Akram Ullah	3. Data collection and calculations
4.	Sajid Khan, Abdul Haseeb Sahibzada	4. Analysis of data and interpretation of results
5.	Arif Hussain & Amjad Ali	5. Literature review and referencing
6.	Muhammad Zubair & Mumtaz Ali	6. Editing and quality insurer