

Multicystic oligodendroglioma with calvarial destruction

Ajay Bajaj

Department of Neurosurgery, Brijlal Hospital and research Centre, Haldwani, Uttrakhand, India

ABSTRACT

Context: Calvarial erosion is known to occur with some superficially located tumors. Very few case reports of calvarial erosion associated with oligodendroglioma are reported in the literature, but calvarial destruction with oligodendroglioma is very rare.

Aim: To report an unusual case of multicystic frontoparietal oligodendroglioma with destruction of the calvaria and scalp involvement in the absence of prior surgery or radiation.

Materials and Methods: A 30-year-old male presented with the history of left focal seizure with secondary generalization for last three to four years along with left sided weakness for the past one month. There was history of slowly progressive decreased vision in both eyes leading to complete blindness in both eyes for the past one month. On neurological examination, patient had left hemiparesis of grade-2/5 with perception of light absent in both eyes. Fundus examination revealed bilateral optic atrophy. Magnetic resonance imaging (MRI) of the brain showed a large supratentorial heterogenous multicystic ring enhancing mass lesion involving right frontal lobe, right frontotemporal opercular region, and posteriorly abutting the central sulcus and anteriorly destroying the calvaria. Patient underwent right frontoparietal craniotomy and near total excision of tumor. Histopathological examination revealed oligodendroglioma WHO grade-2. Patient received postoperative chemoradiotherapy.

Results: At nine month follow-up patient neurological status was same and his seizure was controlled on single AED. There was no recurrence of seizure at nine month of follow-up.

Conclusions: Calvarial destruction in association with extra and intra axial neoplasm should include oligodendroglioma especially in patients with long history of symptoms, although calvarial destruction is very rare. However, the final diagnosis is established by means of histopathological examination.

Key words: Calvarial, destruction, multicystic, oligodendroglioma

Introduction

Oligodendroglioma are uncommon primary brain neoplasm and constitute 5-7% of intracranial gliomas.^[1,2] Superficially located tumor can cause calvarial erosion. Only few case reports of calvarial erosion associated with oligodendroglioma

are reported in the literature,^[3] but calvarial destruction with oligodendroglioma is rare. Calvarial destruction with pre-existing glial tumor has been described in the presence of prior surgery and irradiation, often along iatrogenic violations of natural barrier to tumoral growth.^[4-10] To our knowledge, invasion and destruction of the Calvaria from a oligodendroglioma, without prior surgery or radiation, and without macroscopic destruction of the dura mater, has not been described previously. Calvarial destruction with associated intraaxial lesion on imaging may prompt the diagnosis of extra-axial tumors such as aggressive meningioma, metastasis, and lymphoma. We report an unusual case of multicystic frontoparietal oligodendroglioma with destruction of the calvaria and scalp involvement in the absence of prior surgery or radiation.

Case Report

A 30-year-old male patient presented to the neurosurgical services with history of left focal seizure with secondary generalization for the last three to four years along with left

Access this article online	
Quick Response Code:	Website: www.asianjns.org
	DOI: 10.4103/1793-5482.136723

Address for correspondence:

Dr. Ajay Bajaj, Department of Neurosurgery, Brijlal Hospital and Research Centre, Haldwani, Uttrakhand, India.
E-mail: drbajajajay@yahoo.com

sided weakness for the past one month. There was history of slowly progressive decreased vision in both eyes leading to complete blindness in both eyes for the past one month. On neurological examination, patient had left hemiparesis of grade-2/5 with perception of light absent in both eyes. Fundus examination revealed bilateral optic atrophy.

Magnetic resonance imaging (MRI) of the brain showed a large supratentorial heterogenous multicystic ring enhancing mass lesion involving right frontal lobe, right frontotemporal opercular region, and posteriorly abutting the central sulcus [Figures 1 and 2]. The lesion was hyperintense on T2WI and FLAIR images. The lesion was showing multiple cystic components of various sizes with smaller solid component abutting the dura peripherally; largest cyst showing ring enhancement with enhancing mural nodule in the superior aspect of the lesion. There was mild perilesional oedema and marked mass effect seen causing compression of right lateral ventricle and producing significant midline shift towards left side.

Patient underwent right frontoparietal craniotomy and near total excision of tumor. He received standard preoperative medication, including phenytoin, dexamethasone antibiotic, and mannitol on the morning of surgery. After the scalp was opened, the tumor was visible anteriorly, and there was destruction of galea and bone was present. Craniotomy was performed by using wide margin around the destroyed calavaria with the use of multiple burr holes. After the bone flap was removed, a large tumor mass was found in the extradural space anteriorly. The dura under this mass was completely intact macroscopically. The extradural mass was easily peeled off the dura. The dura was excised widely around the tumor, and attention was focused on intraparenchymal part of the tumor. Tumor was gray, soft, and friable, and at places, it showed cystic components also. It was moderately vascular and there was no clear plane of margin between tumor and normal brain. Near total excision of tumor was done and dura was repaired with bovine pericardium dural substitute. Bone flap was then inspected and the tumor resected with high speed drill and bone flap was replaced and scalp was closed. Postoperatively, patient kept on elective ventilatory support for 24 hours. Histopathological examination of tumor revealed oligodendroglioma WHO grade-2 [Figure 3].

Postoperatively, patient received six weeks of external beam radiotherapy to the gross tumor volume along with chemotherapy. There was slight improvement in limb weakness, but there was no improvement in vision and his seizures are well controlled on single antiepileptic drug.

At nine month follow-up, there was no recurrence of tumor.

Discussion

Oligodendroglioma usually involves white matter of the brain and are very slow growing, and history is usually of

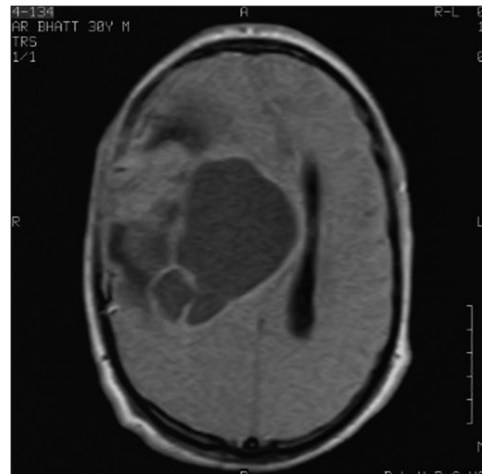


Figure 1: Postcontrast T1W image showing multicystic tumor causing calvarial destruction

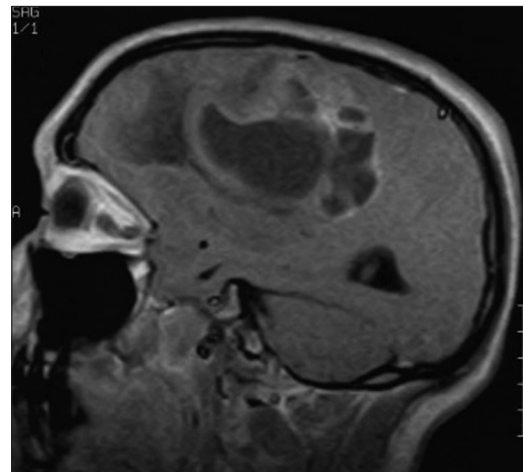


Figure 2: Postcontrast T2W saggital image showing vertical extent of tumor

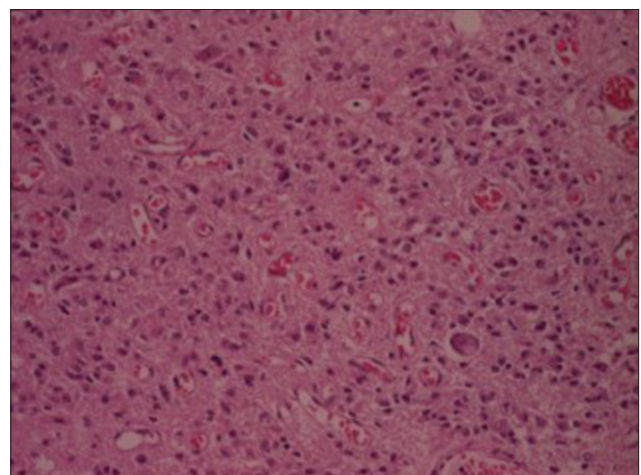


Figure 3: Histopathology shows oligodendroglioma WHO grade 2

long duration with seizures and raised intracranial pressure. Slow growth of the tumor with persistent raised intracranial pressure can cause calvarial erosion but direct involvement

of the bone due to tumor invasion and destruction of the bone is very rare. Calvarial erosion is presumed to be pressure erosion predisposed by the peripheral location and slow growing nature of oligodendroglioma.^[11] Calvarial erosion, in association with the peripheral location of the tumor and calcification is highly suggestive of an oligodendroglioma. It indicates a lower malignant potential.^[12] This case is very unusual for two reasons. First, the oligodendroglioma involved both the brain parenchyma and the skull without antecedent radiation or surgery. Second, the tumor had traversed the dura with destruction of the overlying bone and galeal tissues. It is far more common for meningioma, metastases, or sarcoma to cause direct involvement of the skull with accompanying destruction of the dura, given that the dura is believed to normally provide a barrier against invasion.^[13]

Conclusion

Calvarial destruction in association with extra and intra axial neoplasm should include oligodendroglioma especially in patients with long history of symptoms, although calvarial destruction is very rare. However, the final diagnosis is established by means of histopathological examination.

References

1. Mork SJ, Lindegaard KF, Halvorsen TB, Lehmann EH, Solgaard T, Hatlevoll R, *et al.* Oligodendroglioma: Incidence and biological behavior in a defined population. *J Neurosurgery* 1985; 63: 881-9.
2. Rubinstein LJ. Tumors of the central nervous system. In: Armed forces institute of pathology: Atlas of tumor pathology, series 2, fascicle 6. Bethesda 1972: 85-104.
3. Muzumdar DP, Goel A, Pakhmode CK. Oligodendroglioma causing calvarial erosion. *Neurol India* 2003;51:129-30.
4. Houston SC, Crocker IR, Brat DJ, Olson JJ. Extraneural metastatic glioblastoma after interstitial brachytherapy. *Int J Radiat Oncol Biol Phys* 2000;48:831-836.
5. Kros JM, Van den Berge H, Tanghe HL, Bakker SL. Right temporal lobe glioblastoma presenting in the left orbit. Case report. *J Neurosurgery* 2000;92:702-5.
6. Couldwell WT, Scheithauer BW, Rice SG, Zhang W, Stillerman CB. Osteosarcoma of the meninges in association with glioblastoma. *Acta Neurochir (Wein)* 1997;139:684-9.
7. Tomida M, Muraki M, Hiramatsu H, Tsukamoto K, Hinokuma K, Uemura K, *et al.* Glioblastoma multiforme in the left frontal lobe subsequent to malignant lymphoma in the right orbit. *Neurol Med Chir (Tokyo)* 1996;36:11-4.
8. Shuangshoti S, Kasantikul V, Suwanwela N. Spontaneous penetration of dura mater and bone by glioblastoma multiforme. *J Surg Oncol* 1987;36:36-44.
9. Rainov NG, Holzhausen HJ, Meyer H, Burket W. Local invasivity of glioblastoma multiforme with destruction of skull bone: Case report and review of literature. *Neurosurg Rev* 1996;19:183-8.
10. Murphy MN, Korkis JA, Robson FC, Sima AA. Gliosarcoma with cranial penetration and extension to maxillary sinus. *J Otolaryngol* 1985;14:313-36.
11. Osborn AG. *Diagnostic Neuroradiology*. St Louis, Missouri: Mosby;1994. p. 564-5.
12. Lee YY, Van Tassel P. Intracranial oligodendroglioma: Imaging findings in 35 untreated cases. *AJR Am J Roentgenol* 1989;152: 361-9.
13. Pederson PH, Rucklidge GJ, Mork SJ, Terzis AJ, Engebraaten O, Lund-Johansen M, *et al.* Leptomeningeal tissue: A barrier against brain tumor cell invasion. *J Natl Cancer Inst* 1994;86:1593-9.

How to cite this article: Bajaj A. Multicystic oligodendroglioma with calvarial destruction. *Asian J Neurosurg* 2014;9:93-5.

Source of Support: Nil, **Conflict of Interest:** None declared.