

Case Report

REOCCURANCE OF A CYSTIC MASS LESION IN AN OLD AGE PATIENT OF INTRAOSSEOUS MENINGIOMA AFTER GAMMA KNIFE RADIOSURGERY. A RARE CASE REPORT

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ABSTRACT

Background: Intraosseous meningiomas are the rare type of skull tumors that can occur at any of the skull bone. They can grow as silent and asymptomatic but can cause serious neurological symptoms including dementia, ataxia, disoriented, confused, seizures and harm to the adjacent facial structures. GKRS is thought to be the non-invasive therapeutic procedure for meningiomas. **Presentation of case:** A 40 years old man with on and off headaches for a very long time when became severe along with nausea and vomiting was admitted to the hospital. First CT scan showed a benign cyst in left frontal region of brain. With the passage of time patient was diagnosed with intraosseous meningiomas of fronto-parietal region. GKRS was performed for intraosseous meningiomas after which the follow up scans showed residual meningiomas and re-occurrence of cystic mass lesion on right frontal region of brain. **Discussion:** Primary Intraosseous meningiomas of skull are the rare entities of extra-Dural meningiomas. EBRT is thought to be the non-invasive and safe therapeutic method to resolve any type of meningiomas but this case study represents a rare cystic mass lesion along with intraosseous meningiomas. Also in literature the incidence of cystic meningiomas is rare and our case has reported both the characteristics that are cystic and Intraosseous which makes this case study exceptional **Conclusion:** This study has represented an exceptional case report by which a point towards the gamma knife radiation exposure side effects and outcomes has been raised. This case study will be helpful for further researches.

Keywords: Intraosseous Meningioma, cystic mass lesion, ommaya reservoir, gamma knife radio surgery.

INTRODUCTION

Intraosseous Meningioma is a rare type of extradural meningiomas which comprises two-third cases of extradural and less than 2% cases of overall meningiomas. Intraosseous meningiomas usually arise in the skull bones and can have some clinical presentation (Harary *et al.*, 2020, Elder *et al.*, 2007). Current report presents a frontal skull bone Intraosseous meningioma with atypical pathology (Yun and Lee, 2014) Gross total resection is considered as the primary treatment for patients having severe neurological symptoms but in challenging cases where surgery is not possible Radiology has introduced a reliable method stereotactic radio surgery. It has minimized the risk of reoccurrence of meningioma (Lippitz *et al.*, 2020). No evidence from literature has been found to describe the relation between reoccurrence of any cystic mass lesion after the gamma knife radio surgery for intraosseous meningioma. This work has been reported in accordance with the SCARE criteria (Agha *et al.*, 2016)

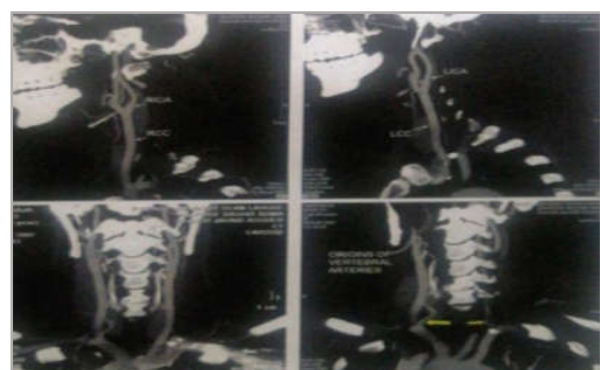
Case presentation

A 40 years old man presented with severe onset of headache along with nausea and vomiting. He was brought to a nearby private clinic and upon clinical examination the old man had prominent frontal bone but family history was not significant. He was suggested to have a CT scan of brain for the investigations. After the first CT scan, a cyst was noted in the left frontal lobe of patient's brain. Doctor then recommended the patient for CT Angiography of carotids to confirm is there any associations with this cystic lesion. CT Angiography of carotids with IV contrast was performed in a diagnostic center. CT Angiography reported normal carotids but diffusely expanded and thick frontal bone which requires biopsy correlation. Along with this,

few dilated calcified dural veins are appreciated along inferior aspect of under-table of frontal bone. Lab tests involving creatinine, hematology, coagulation profile was taken which only concluded little high prothrombin time (PTT) 16. Patient was treated with medications. Patient was still showing symptoms of severe headache, nausea, vomiting and also localized increase in skull vault density. The patient went to the doctor who recommended cerebral angiography.



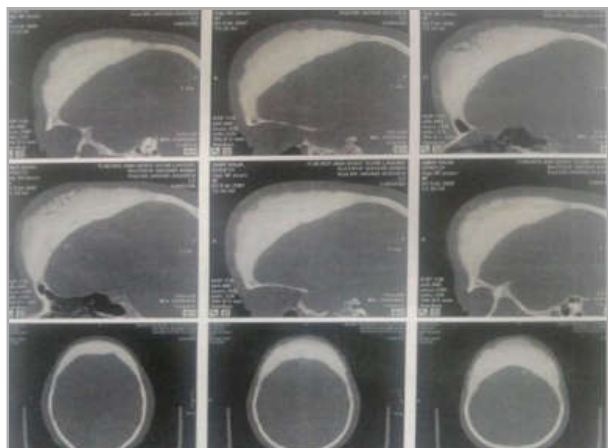
Thick frontal bone with left frontal lobe cystic masslesion



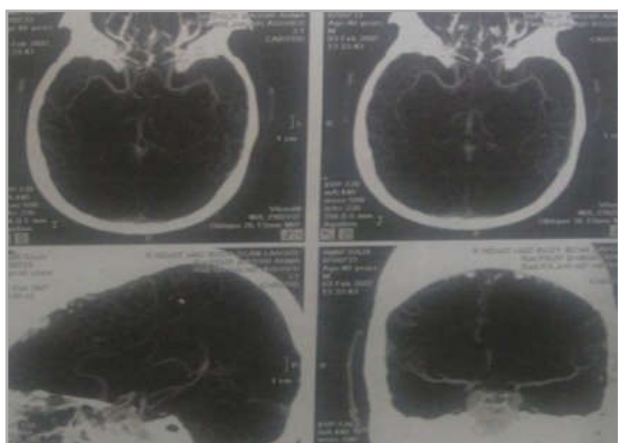
CT Angiography of Carotids with IV contrast showing both normal internal and external carotid arteries

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Diffusely expanded and thick frontal bone



Few dilated calcified Dural veins along inferior aspect of under-table of frontal bone

Cerebral four vessel angiography performed by right common femoral puncture through which 6F sheath and catheter systems were used to selectively catheterize both the internal carotid arteries and left vertebral artery. Multiple runs were obtained. Hemostasis secured in right groin. Patient kept in day-care recovery for 6 hours before being discharged in a stable state. Superior sagittal sinus is not completely opacified in early or late venous phases and is most probably thrombosed. There is collateralization of venous channels around this point at mid vertex as well. Rest of the venous sinuses is opacifying normally. There is no aneurysm or an arteriovenous malformation in the anterior or posterior circulation. The left frontal glial cell tumor evident on MR imaging takes its supply from anterior circulation mainly from the left anterior cerebral and its medial branches. Again, lab tests for hematology, liver function tests and renal function tests were performed before biopsy which was all in normal range.

| TEST | RESULT | NORMAL VALUE | UNIT |
|----------------------------|---------------|---------------------|---------------------|
| BIOCHEMISTRY | | | |
| Creatinine | 1.2 | 0.5 - 1.3 | mg/dl |
| HAPMATOLOGY | | | |
| TEST | RESULT | NORMAL VALUE | UNIT |
| Hb | 14.1 | 10.9 - 16.7 | g/dl |
| W.B.C | 7.5 | 3.9 - 10.4 | $\times 1000/\mu l$ |
| R.B.C | 4.68 | 3.71 - 5.52 | $\times 10^6/\mu l$ |
| H.C.T | 41.3 | 33.5 - 49.4 | % |
| MCV | 88.2 | 82.5 - 98.0 | fL |
| MCH | 30.1 | 26.1 - 32.8 | pg |
| MCHC | 34.1 | 30.7 - 35.9 | g/dl |
| Platelets | 228,000 | 150 - 450 | $10^3/\mu l$ |
| Polymorphs | 50 | 45 - 70 | % |
| Lymphocytes | 40 | 10-50 | % |
| Mixed | 10 | 1 - 20 | % |
| RDW | 12.6 | 11.0 - 16.0 | % |
| MPV | 9.5 | 9.0 - 13.0 | fL |
| PDW | 10.5 | 9.0 - 17.0 | % |
| C.S.F | 35 | M:10 P:15 | mm/15hr |
| COAGULATION PROFILE | | | |
| TEST | RESULT | NORMAL VALUE | UNIT |
| Prothrombin Time (PTT) | 16 | 14 | Sec |
| DR | 1.2 | 0.8 - 1.2 | mm |

Hypertrophied frontal skull bone was taken as specimen measuring 13*9*2 cm. biopsy report resulted in Intraosseous meningioma of frontal skull bone. After visualizing biopsy report and patient condition doctor prescribed craniotomy for management purpose. Patient has undergone craniotomy for long time. Patient condition was totally well but during surgery it was felt that the frontal bone is so hard that attempt for craniotomy was failed because of too much hypertrophied front parietal bone. For follow up MRI of brain Moderate reduction in volume of frontoparietal bone Multicystic lobulated mass lesion 3.6*5.1*6.1 cm (suspicion of cystic astrocytoma) Mild midline shift. Lesion occupies left lateral ventricle.



MR slice showing Pilocytic astrocytoma

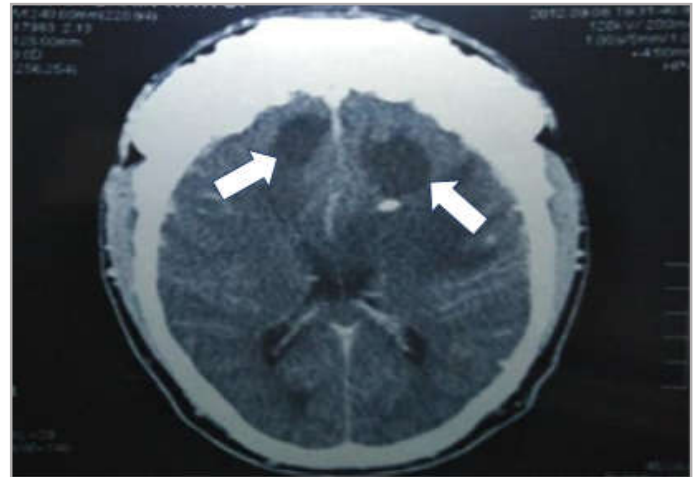
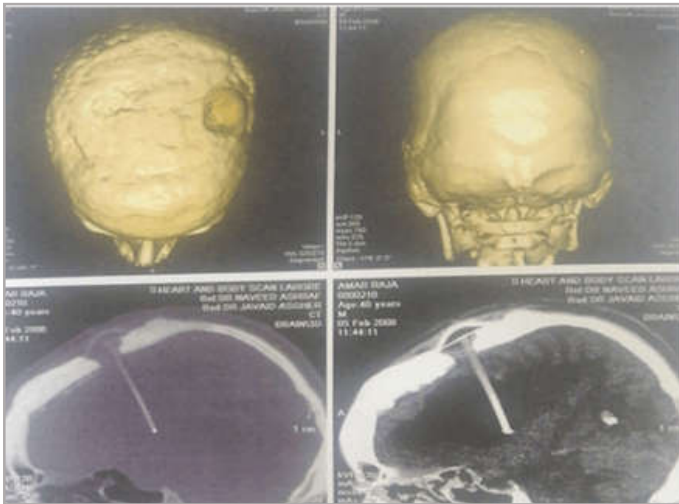


MR image: A curvilinear solid component with Frontoparietal bone hyperostosis

Patient continued taking medications to overcome the symptoms. Patient went to England for recreational purpose. There He suddenly fell down on the floor with severe headache and taken to the emergency where on examination the patient was slightly confused and disoriented. After taking into account his past history doctors made a decision for procedure of ommaya reservoir. Ommaya reservoir was done by making left frontal burr hole and cyst was aspirated followed by placement of an ommaya reservoir and brain 3D scans were reconstructed. After this cystic aspiration, approximately 2.5ml yellow colored fluid was sent as a specimen to the lab which was examined and showed up no malignancy in fluid. Patient was recovered and went to his homeland where a contrast enhanced CT resulted in Marked hyperostosis involving frontal bone and upper part of both parietal bones. Maximum thickness of 2.6 cm and this Pilocytic astrocytoma measures 5.1*4.0*4.9cm A curvilinear solid component seen. No significant change in size of cystic mass lesion was noted and on MRI brain 37*35mm hypo intense mass lesion (cystic astrocytoma) and Sub Dural hygroma was reported. As the patient condition and health worsens day by day. It's been more

than four years while patient was dealing with these critical health issues that has caused serious illness.

comma along with memory loss, tremor in hands, changed facial features, hearing and vision problem.



Follow up CT scan showed re-occurrence of cyst in left and right frontal lobe



For the treatment of meningioma covering the fronto-parietal bone doctors with taking into account patient's condition and health decided for the therapeutic stereotactic management Gamma knife procedure. On physical examination and past history before the gamma knife procedure patient was presented with Headache on/off with varying intensity. He was Responding to oral steroids, Tremor in hands, Thick frontal bone and left cystic mass lesion. Subdural hygroma and left frontal meningioma. Patient preparation was made by asking the patient not to eat or drink before procedure. Patient wore loose comfortable clothes and was then brought to the gamma knife suit. Anesthesia was given at pin sites and Leksell stereotactic frame model G was applied to head. CT and MRI scans taken (cystic and solid mass in left frontal region consistent with meningioma). Gamma dose plan made (14.0Gy@50%) and radiations were given at target site (left frontal meningioma). Procedure went smooth and After procedure frame taken off and local dressing was applied. Injection Dexamethasone 8mg administrated at end of procedure. Patient discharged from the hospital. After that various follow up CT and MRI scans were done but gamma knife procedure did not make any changes to the patient's health and symptom. Although follow up CT scan showed Frontal sinuses obliterated, mucosal thickening in sphenoid and ethmoid sinuses along with 2 cystic lesions in one in each frontal lobe instead of previous one cystic lesion. Right frontal lobe lesion measured 2.4*1.8*2.3 cm. Re-noted residual meningioma with cystic lesion in left frontal lobe measured 3.5*2.8*3.3 cm (larger). At present, patient is 46 years old who remains mostly in state of

DISCUSSION

Intraosseous meningioma is a rare extradural subtype which usually occurs at skull bone. Meningiomas that have inside them, or in an encompassing area, a cyst loaded up with liquid are therefore characterized as cystic (Fortuna *et al.*, 1998). Intraosseous meningioma is also associated with hyperostosis of skull bone (ALPERS and Harrow, 1932) it may involve and spread to the Dural lining of the skull. It is important to perform proper investigations for patients having symptoms of severe headaches, migraine, neurologic defects, confusion, disoriented and motor or sensory function loss. Besides of physical examination and lab tests radiological investigations are best to evaluate underlying pathologies of brain. Computed tomography and magnetic resonance imaging are the most accurate and reliable imaging modalities for evaluation of tumors. Presented case study has reported the dural involvement with tumor which is diagnosed on CT scan of patient's brain. Literature has presented studies which prove that CT and MRI investigations have the high visibility to diagnose Dural involvement with tumor. (Bassiouni *et al.*, 2006) Meningiomas with cyst are rare like in our case study meningioma having characteristic of Intraosseous along with presence of cyst is an exception. Majority of Intraosseous meningiomas have osteoblastic activity which causes hyperostosis. In literature scarce number of studies are held on osteolytic meningiomas and their occurrence with cystic mass lesion, likewise in our presented study (Vlychou *et al.*, 2016; Tokgoz *et al.*, 2015). Although stereotactic gamma knife surgery has been the therapeutic management for removal of meningioma and has very rare chances of tumor reoccurrence but the current case study has reported the residuals meningioma along with re-occurrence of one more new cystic lesion. Studies also put focus on the failure rate of atypical meningiomas by external beam radiation therapy. it is point of concern whether this happens due to high resistance from radiations or may be due to inadequate focusing of the tumor (Kano *et al.*, 2007; Attia *et al.*, 2012).

CONCLUSION

Re-occurrence of cystic mass lesion with residual intraosseous meningioma of fronto-parietal region after gamma knife radio surgery is very rare which makes this case report unique. This case study highlights the concern about the reliability of gamma knife radio-

surgery. It also leads towards the side effects of gamma knife radio surgery for advanced researches.

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