

A Rare Case of Mastoid Bone Osseous Meningioma Posing with Diagnostic and Operative Dilemma

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Abstract

Objective: Mastoid bone osseous meningioma is a very rare variant of meningioma. Our case presented with atypical clinical scenario, radiographic and operative findings which pointed toward various directions, creating a diagnostic dilemma. The case also posed operative challenge due to its expansile growth involving the petrous and mastoid bones with brain compression.

Methods: A young female presented with progressively enlarging left sided post auricular bony mass with mild hearing loss after a history of left ear infection. The osteolytic bony lesion widely separated the cortices of the mastoid-petrous bone with widened diploic space filled with non-contrast enhancing soft tissue mass. The enlarged bony mass compressed the middle fossa brain. Cholesteatoma was the primary diagnosis, and aneurysmal bone cyst the alternative one.

Results: The patient underwent excision of the bony lesion with decompression of the middle fossa brain. The involved base of the petrous bone by the lesion was not excised to preserve the bony labyrinth and hearing. The soft tissue mass within the bony lesion was curetted and was whitish and vascular, raising the suspicion of osseous meningioma intra-operatively. The histopathology report confirmed psammomatous meningioma. There was no facial palsy or further worsening of the left ear hearing after the surgery.

Conclusion: This case elucidates the diagnostic and operative challenges in a rare case of mastoid bone osseous meningioma who presented with atypical clinical and radiographic scenario, and an unexpected finding intra-operatively. This case can be a learning lesson for the neurosurgeon/otolaryngologist which may face similar dilemma.

Key Words: Osseous meningioma; mastoid bone; aneurysmal bone cyst; cholesteatoma.

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Case Report:

A 19 years old female with history of left ear infection (purulent ear discharge, ear ache and low grade fever) 6 years back noticed progressively enlarging, painless mass in the left post auricular region soon after the episode. She has experienced mild hearing loss in

the left ear and dizziness for about 1 year. She denies any facial asymmetry, tinnitus or vertigo. On examination, the lesion felt like bony enlargement of the mastoid bone with hard bony consistency with well demarcated margins. Both eardrum was normal on otoscopic exam. There was mild conductive hearing loss in left ear on clinical exam which was confirmed by the pure tone audiometry test. There was no facial asymmetry on exam and no other focal neurological deficit was discovered.

The patient was initially evaluated by the otolaryngologist with Computed Tomography (CT) scan of the head with contrast. It showed an expansile bony lesion measuring 7.5 cm by 6 cm in size, located in the mastoid and petrous part of the left temporal bone widening the outer and inner table of the bones. A soft tissue density lesion is seen sandwiched between the widened bony cortices in the middle ear cavity with consistency resembling fat or cholesterol, which did not exhibit contrast enhancement. The bony lesion was compressing the brain primarily in the middle cranial fossa and also posterior cranial fossa (Figure 1). The left middle ear cavity was involved by the bony lesion with inability to visualize middle ear ossicles. The left internal auditory meatus was

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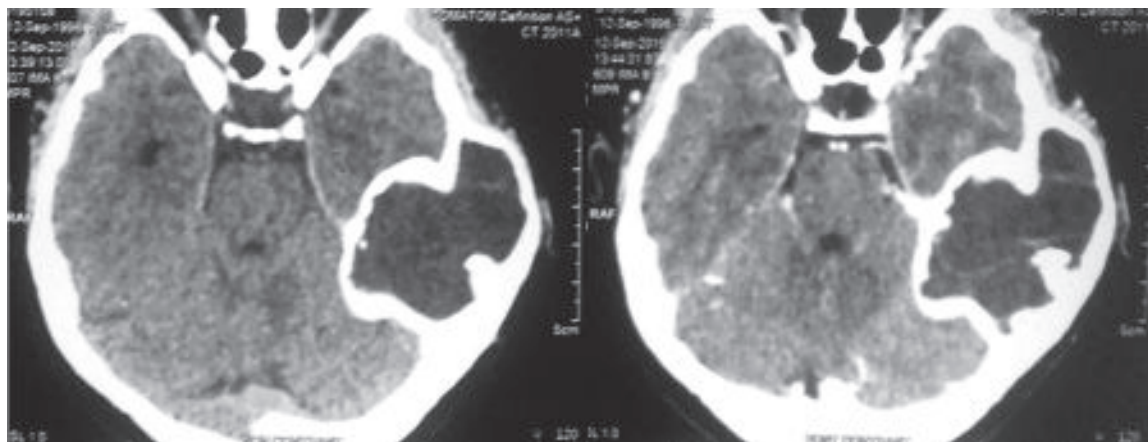


Fig.-1: An axial image on CT scan of the head shows: Left inset picture- an expansile left mastoid bony lesion with widened diploic space filled with soft tissue density mass in the middle ear cavity. Right inset picture- the soft tissue mass shows no appreciable contrast enhancement on CT scan with contrast administration.

enlarged but uninvolved by the bony lesion. The bone window clearly demonstrated its osteolytic nature in the left petro-mastoid region (Figure 2). MRI brain was not done as patient could not afford it due to financial constraint.

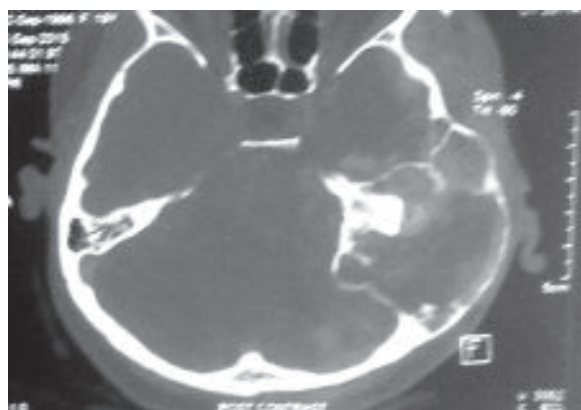


Fig.-2: An Axial image on CT scan of the head bone window reveals left mastoid bony lesion with widened diploic space and osteolytic destruction of the both outer and inner table. The left petrous bone base is also involved by the osteolytic bony lesion with semicircular canals visualized clearly.

Radiologist and otolaryngologist were of strong opinion it was cholesteatoma and the later was contemplating left mastoidectomy and curettage of the soft tissue density within the bony lesion. Neurosurgeons were consulted as the bony mass had extensive involvement of the temporal bone and primarily compression of the left temporal lobe in the middle cranial fossa. We (as the neurosurgeons) thought aneurysmal bone cyst in the left mastoid region could

be an alternate diagnosis; however the bony lesion did not show multiple septation, fluid-fluid level and enhancement that generally is seen in the abovementioned diagnosis which is a pathology of abnormal vascular channels.¹

The patient's further management was handed to neurosurgeons by the otolaryngologist as they thought they were ill equipped to deal with this complex bony lesion. The patient underwent excision of the left mastoid bony lesion by excision out the outer table followed by curettage of the soft tissue density underneath it and finally removal of the involved inner table, with special attention in preserving mastoid part of facial nerve (Figure 3). Both the cortices were paper

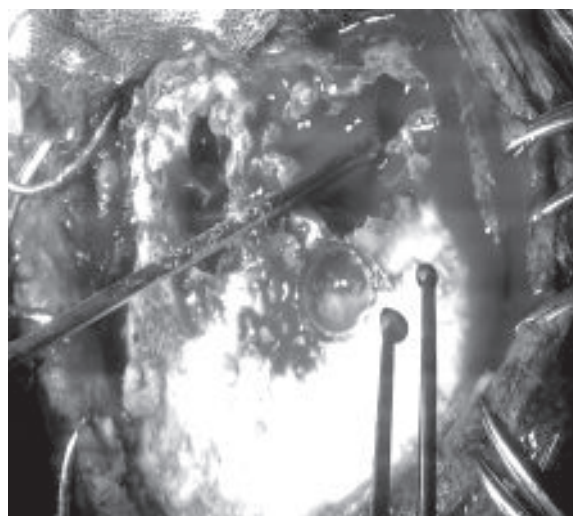


Fig.-3: A colored intra-operative photograph shows burr holes placed in the left temporal mastoid bones region followed by excision of outer table of the bony lesion.

thin and easily. The mass between the two tables of the bony lesion was soft, non-suckable, whitish and vascular (Figure 4). This was contrary to flaky, non-vascular, yellowish keratin debris that would have been

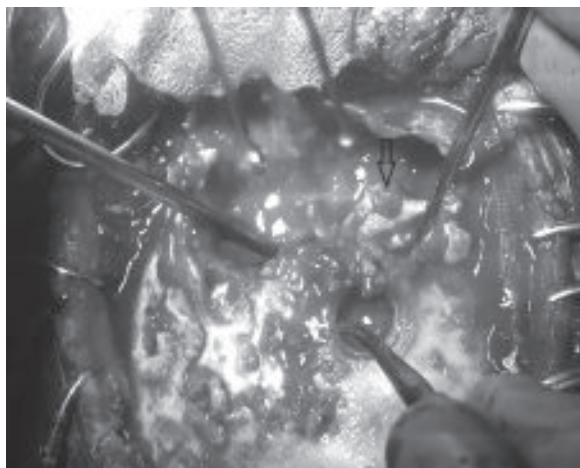


Fig.-4: Another colored intra-operative photograph with an arrow pointing toward the soft, vascular and whitish mass within the diploic space of the bony lesion.

encountered in a case of cholesteatoma. We immediately suspected a possibility of osseous meningioma and multiple specimens of the involved bone and soft tissue mass were sent for histopathology. The involved petrous bone was not resected fearing damaging bony labyrinth and further hearing loss. The left temporal lobe was decompressed of the bony lesion and the dura mater was found uninvolved by any neoplastic mass. The bony defect was packed with absorbable hemostatic agent (Gelfoam).

Post-operative CT head with intravenous contrast administration showed excision of the mastoid bony lesion with good decompression of the middle cranial fossa brain and no contrast enhancing lesion (Figure 5). The histopathology from two separate pathologists revealed psammomatous meningioma. There were multiple whorls of meningothelial cells with calcification in the center suggesting psammoma bodies.

The patient had no facial palsy and no further deterioration of left ear hearing in the post-operative period. The patient was discharged subsequently with the recommendation of regular follow-up in the outpatient department and possibility of future imaging to catch the possibility of recurrence of the mastoid bone osseous meningioma.

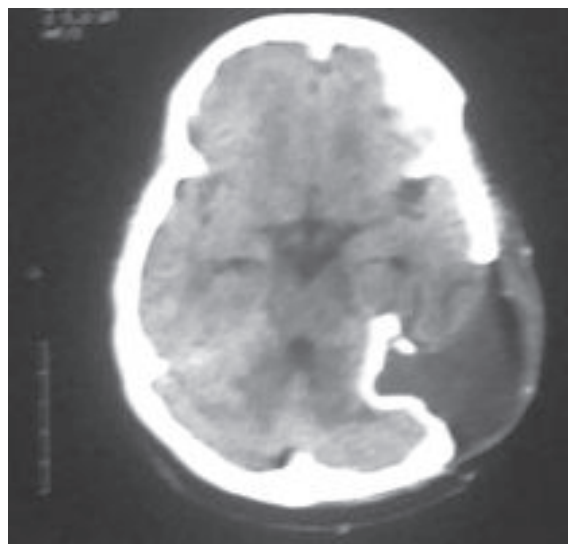


Fig.-5: An axial image on CT scan of the head with contrast administration reveals excision of the involved left mastoid bony mass with good decompression of left temporal lobe. There is no visible enhancing lesion seen in the area of bony defect.

Discussion:

Osseous meningioma are primarily a disease of the bone. Osseous meningiomas represent 1% to 2% of all meningioma.² These tumor occur in male and female, with a slight female preponderance, and typically develop in the fifth decade of life.² Osseous meningioma can be osteoblastic or osteoclastic, with the former being the more common type. It can involve the convexity of the skull or the skull base. It can be divided into purely extracalvarial tumors are type I, purely calvarial tumors are type II, and calvarial tumors with extracalvarial extension are type III.

In our case, it was type II osseous tumor involving the skull base (petro-mastoid bones) and osteoclastic in nature. Our patient is a 19 years old female which does not meet the average age group criteria for this tumor. On CT scan of the brain, generally these tumors appear hyperdense with areas of calcification and atypical vascular marking.³ However, in our case the mastoid bone appeared thinned and expanded with disruption of the inner and outer table, and presence of soft tissue mass resembling fat or cholesterol in the middle ear cavity. There was no evidence of calcification within the expansible cystic bony lesion of the mastoid bone. This should have been the case especially considering the diagnosis was psammomatous meningioma which contains multiple foci of calcification on CT scan.

As already discussed earlier, the clinical history of left ear infection prior to inception of left mastoid bony swelling and CT characteristics of middle ear cavity filled with soft tissue density resembling fat or cholesterol (suggesting keratinous debris) pointed toward cholesteatoma.⁴ This was the primary diagnosis of both the radiologist and otolaryngologist with the latter planning a simple mastoidectomy to address cholesteatoma. But the patient was finally left in the hand of neurosurgeon to manage the bony lesion. We entertained aneurysmal bone cyst (ABC) of the mastoid bony lesion considering well circumscribed, expanded diploic lesion.⁽¹⁾ However, it was not multiloculated, or exhibited fluid-fluid level, contrast enhancement on CT scan as generally seen in case of ABC as it is a consequence of underlying arteriovenous anamoly.¹

Operative dilemma existed as to the best surgical management for the petro-mastoid bony mass. There was brain compression from the expansible mass especially in the middle cranial fossa and patient hearing was affected, albeit mild. A radical excision of the lesion would have entailed facial nerve palsy and hearing deficit due to damage of the facial nerve in the mastoid bone and bony labyrinth in the petrous bone respectively. Hence we performed drilling of the outer table of the expanded mastoid bony lesion, curettage of the soft tissue mass underneath it and drilling of the inner table till the dura in the middle cranial fossa was visualized and pulsating to suggest good decompression of the brain compression. The involved petrous bone was not resected to preserve bony labyrinth and hence preserve hearing.

Interestingly, during curettage of the soft tissue mass within the diploic space of the bony lesion, it was found whitish and vascular with feeder from the temporal dura mater. This ran contrary to the observation seen in cholesteatoma which has soft, flaky, yellowish keratin debris. This raised the

suspicion of osseous meningioma and the pathology specimen did confirm meningioma. However, the diagnosis of psammomatous meningioma should have given the soft tissue mass in the diploic space somewhat firm consistency and maybe visualization of some calcified nodules. Neither was the scenario during the surgery.

Conclusion:

This case posed as a diagnostic dilemma from the clinical, radiological and even operative point of view. A diagnosis of osseous meningioma should be entertained in case of a mastoid bony lesion, especially by the neurosurgeons, otolaryngologist and radiologist who deal with such cases. It also raises the issue of best surgical management for the patients who present with large expansile mastoid bony mass involving the petrous bone and compressing the brain. A coordinated effort from both the neurosurgeon skilled in skull base and otolaryngologist may be the best option for managing such perplexing case rather than one specialty managing it solely.

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