Extradural dermoid tumor of the petrous apex

Case report

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✓ Dermoid cysts are rare, benign, congenital tumors. Most case series thus far have featured intradural tumors. The authors report on a case of an extradural dermoid tumor of the middle cranial fossa with osseous invasion, successfully removed using a left subtemporal extradural approach. The clinical presentation, histological features, radiological findings, and management of this unique case are described. (DOI: 10.3171/JNS-07/08/0426)

KEY WORDS • dermoid tumor • extradural dermoid tumor • middle cranial fossa • petrous apex

Dermoid cysts are rare congenital tumors that account for fewer than 1% of all intracranial neoplasms.14,16,28 Many have been reported in the posterior fossa, at the midline, and in the intradural region.7,10,14,17,18 Some have occurred in a supratentorial intradural location16,19,33 and the reportedly few dermoid tumors in the middle cranial fossa are commonly located between the two layers of the lateral wall of the cavernous sinus.1,24 We report on a completely extradural, intracranial dermoid tumor adjacent to the petrous apex that was associated with osseous erosion, and we discuss the histological characteristics, radiological features, and management of this unusual case.

Case Report

History and Examination. This 49-year-old man was examined in the emergency room following an episode of severe confusion at work, a 1-month history of worsening left-sided frontotemporal headaches, and a 6-month history of intermittent episodes of phantosmia, staring spells, and difficulties with concentration, memory, and word finding. The neurological examination revealed decreased pinprick sensation on the left side of the face.

Computed tomography without contrast enhancement and CT angiography of the head revealed a predominantly fat density in the medial aspect of the left middle cranial fossa with a central punctate area of calcification. The lesion was associated with marked erosion of the floor of the middle cranial fossa. It also appeared to be eroding the lateral osseous wall adjacent to the petrous segment of the internal carotid artery (Fig. 1).

Magnetic resonance imaging of the brain with and without Gd revealed on T1- and T2-weighted sequences a heterogeneous but predominantly hyperintense mass located within the medial aspect of the left middle cranial fossa just lateral to the cavernous sinus. No additional increased signal was identified on contrast-enhanced images. A dermoid tumor, epidermoid tumor, schwannoma, or a meningioma with lipomatous changes was originally suspected (Fig. 2).

Operation. After insertion of a lumbar drain to minimize intraoperative retraction of the brain, the floor of the left middle cranial fossa was exposed extradurally by a left subtemporal craniotomy. The gasserian ganglion was indented and pushed superiorly by a mass under its lateral aspect. Incision of the mass produced yellowish content consistent with desquamated cell debris. Drilling of the petrous and peripetrous bone was necessary to remove the lesion completely.

Postoperative Course. Postoperative MR imaging confirmed removal of the entire lesion, including a part that had been noted to insinuate into the bone (Fig. 3). Fragments of adipose tissue, squamous epithelium, hair follicles, and sebaceous glands as well as mature lamellar bone were found within the lesion. The pathological features were consistent with those of a dermoid tumor (Fig. 4). The patient recovered with no complications and was discharged on the 3rd postoperative day. One month after surgery, the patient reported resolution of the episodes of staring and of phantosmia. Neurological examination remained nonfocal.

Discussion

Intracranial dermoid cysts are rare congenital tumors that constitute only 0.04 to 0.7% of all intracranial lesions and are seen most commonly in patients 20 to 36 years of age. They are characteristically located in the posterior fossa, and only a few cases have been reported in the middle cranial fossa.1,24,28,30,33 The authors report on a case of an extradural dermoid tumor of the middle cranial fossa with osseous invasion, successfully removed using a left subtemporal extradural approach. The clinical presentation, histological features, radiological findings, and management of this unique case are described. (DOI: 10.3171/JNS-07/08/0426)
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Clinical presentation varies significantly and usually depends on location of the tumor and whether it is ruptured. Symptoms vary, but headaches, seizures, chemical meningitis, and visual disturbances are most common. Olfactory hallucinations have also been noted, and the patient in the present case experienced this symptom, although his delusion was not as extreme as that described by Takeuchi et al.

Dermoid cysts tend to occur near the midline, mostly infratentorially. Recent findings have indicated that most occur in the supratentorial compartment and in the frontal, basal, parasellar, and suprasellar regions. The relationship of these lesions to the dura mater is generally not emphasized. Intradural dermoids and a few cases of interdural dermoids, located between the two layers of the lateral wall of the cavernous sinus, have been reported.

Authors of the few reports of extradural dermoid cysts usually describe tumors in the posterior fossa, most often in children, and in the diploe of the anterior fontanelle or orbital regions, which are simpler to diagnose because of their superficial nature. Reports of extradural supratentorial dermoid cysts were not found. The present case is unique because it represents a completely extradural, intracranial dermoid tumor adjacent to the petrous apex that was associated with osseous erosion. Also note that the dermoid tumor was completely extradural in the petrous apex, pushing the gasserian ganglion and the mesial temporal lobe superiorly.

To the best of our knowledge, only two English-language publications have contained reports of dermoid cysts originating in the petrous apex, and each of these specify no relationship between the tumor and dura. Other reports of dermoids in the temporal skull base involve an intradural location. Nagayama and colleagues described a para-median hourglass-shaped dermoid tumor extending from the left middle temporal fossa to the left cerebellopontine angle with associated destruction of the petrous apex. Although they did not specify the cyst’s relationship to the dura, the tumor was probably intradural.

Well-defined osseous erosion, a characteristic of extradural dermoid cysts, was present in the currently featured case.

Dermoid cysts usually appear very hypodense on CT scans as a result of high lipid content, and in the present case attenuation ranged from −75 to −144 Hounsfield units. Some calcifications can be observed, usually related to the capsule. Most do not enhance, but dermoid tumors with enhancing capsules have been reported. The mass in the present case was nonenhancing and showed central punctate areas of calcific density rather than capsular calcification, correlating well with histological findings of lamellar bone within the lesion.
Dermoid cysts resembling thrombosed aneurysms have been reported, but an avascular pattern can be appreciated on cerebral angiograms of most lesions. Note that the CT angiograms obtained in the patient in the present case showed no vascular abnormality (Fig. 1).

On MR imaging, dermoid tumors are usually hyperintense on T1-weighted sequences and much more variable, from hypo- to hyperintense, on T2-weighted sequences due to their high fat content. Extensive enhancement can occur with rupture; otherwise, they generally do not enhance. In the present case, the dermoid cyst was predominantly hyperintense on all sequences (Fig. 2).

Most authors recommend total resection of dermoid tumors if possible. Some caution against aggressive removal of cysts in proximity to vital structures because of associated high morbidity and mortality rates, especially in cases with associated granulomatous reaction. We were able to remove the entire lesion in the present case (Fig. 3).

Conclusions

We describe an unusual case of an extradural dermoid tumor within the middle cranial fossa that included osseous erosion. We believe this case to be the first documented instance of an extradural dermoid cyst of the petrous apex. The tumor was successfully and totally removed using an extradural subtemporal approach. Complete resection of such lesions remains the treatment of choice, if possible, to limit recurrence from residual tumor/capsule.

References

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