Bilateral petrous apex arachnoid cysts

Clinical History:

A 45 year old female, was referred to our department for a brain and petrous bone MRI, because of left sided hearing deficit and tinnitus.

A previous brain CT scan (only soft tissue algorithm images), performed in another institute, was diagnosed as negative.

Imaging Findings:

We used T1w, before and after intravenous paramagnetic contrast medium injection, T2w, PDW and FLAIR sequences. We observed two extra-axial cystic lesions located at the apex of the petrous bone bilaterally. They measured 2cm anteroposteriorly and 1.5cm transversely on the right side and 1.5x1cm, respectively, on the left. The lesions extended frontally to the cavernous sinus on each side. The signal intensity of the lesions was identical to CSF on all MR sequences and showed only rim enhancement (Fig 1).

Retrospectively the patient’s CT, revealed a slight erosion of the apex of the right petrous bone by a low attenuation space-occupying lesion, corresponding to the one we observed on that side (Fig 2).

Discussion:

Cystic lesions in the petrous apex extending into Meckel’s cave have been given various names: Meckel’s cave arachnoid cyst, petrous apex cephalocele, petrous apex arachnoid cyst (PAC), and arachnoid cyst involving the Gasserian ganglion [1]. Arachnoid cysts are pouch-like intra-arachnoid masses of uncertain origin filled with CSF. At neuroimaging, their attenuation value and signal intensity match those of CSF. These lesions have smooth and rounded edges, displace neurovascular structures, and erode adjacent bone structures. There is no calcification or enhancement [2]. These lesions are often identified as asymptomatic incidental findings on brain MR images. Correctly identifying it as a PAC in such a circumstance avoids unnecessary surgical intervention [3].

Differential diagnosis must be done from other cyst-like lesions of that region. PACs arise from the adjacent Meckel’s cave, and secondary erode into the petrous apex [4], whereas lesions such as cholesteatoma, cholesterol granuloma, mucocele, apical petrositis and petrous apex effusion, arise from the petrous apex and expand it from

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within [3,4]. Furthermore, epidermoid cysts have high signal intensity on fluid-attenuation inversion-recovery sequence, whereas the signal of arachnoid cysts is suppressed. Diffusion weighted imaging (DWI) also allows differentiation of epidermoid and arachnoid cysts i.e. epidermoid cysts yield high signal on DWI due to their restricted diffusion while arachnoid cysts, like CSF, show very low signal intensity. In addition, lesions that have high signal intensity on T2W sequences such as paraganglioma, chondroma, chordoma and apex petrositis show contrast enhancement [2].

In our case, the lesions where hypo-intense on T1W, hyper-intense on T2W images, the signal was suppressed on FLAIR images, and showed only rim enhancement, clearly representing arachnoid cysts.

**Differential Diagnosis List:** Bilateral petrous apex arachnoid cysts., cholesteatoma, cholesterol granuloma, mucocele, apical petrositis, petrous apex effusion, epidermoid cyst, paraganglioma, chondroma, chordoma

**Final Diagnosis:** Bilateral petrous apex arachnoid cysts.

**References:**


Description: Cystic lesions at the apices of the petrous bones with sharp and smooth margins. The signal intensity is identical to CSF, on all sequences. They show rim enhancement. Origin:
Description: There is a low attenuation space occupying lesion eroding the right apex of the petrous bone. Origin: