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Case report

Supratentorial extradural epidermoid cyst associated with brain abscesses

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Abstract

We describe the unique CT and MRI findings of a young woman presenting with cerebral abscesses resulting from left temporal epidermoid cyst secondary infection confirmed at operation. Early neurosurgical intervention is advocated to prevent the ongoing risk of significant complications. The significances of pre-operative imaging evaluation and procedure planning are also discussed.

Keywords: Epidermoid cyst; Cerebral abscess; Magnetic resonance imaging; Diffusion-weighted imaging

1. Introduction

Epidermoid cysts are slow-growing congenital lesions of ectodermal origin, representing approximately 1% of all primary intracranial tumors. Intracranial epidermoid cysts are considered to be congenital in etiology, though trauma or surgery is also known to cause epidermoid cysts in brain, spine or elsewhere [1]. Patients with epidermoid cyst occasionally experience complications such as aseptic meningitis and delayed postoperative hemorrhage [2]. In this article, we report a unique case of a patient presenting with headache and fever, found to have an epidermoid cyst in middle fossa associated with an ipsilateral temporal lobe abscess.

2. Materials and methods

A 29-year-old female initially caught a cold (the highest temperature reached as high as 39 °C) and presented to our hospital with duration of over twenty days of fever and headache, her symptom of headache associated with nausea and vomiting aggravated in recent three days. She had been affected with hearing loss from childhood without any proper treatment. Physical examinations: temperature 36.6 °C, pulse 78 per minute, heart rate 20 per minute, blood pressure 129/78 mmHg. General examinations were within normal limits except of her bilateral conductive hearing loss. No focal neurological deficit was elicited. On admission, her white blood cell count was 9720 cells/mcL, neutrophils 64.7%, erythrocyte sedimentation rate (ESR) 19 mm/h, electrolytes and coagulation test were normal. Cerebrospinal fluid (CSF) routine analyses: white blood cells 65 × 10^6/L, mononuclear cell 90%, glucose 4.3 mmol/L, protein 487 mg/L, chloride 119.4 mmol/L, pressure 265 mm H_2O, negative of bacterial cultures. So ceftriaxone sodium was prescribed to counter infect, mannitol to reduce her increased intracranial pressure and oxiracetam injection to protect neurons.

Cranial CT examination was immediately performed showing a well-defined bulging inhomogeneous hypo-attenuated round mass located in the left middle cranial fossa and intruding into intracranial parenchyma with ring-like hyper-attenuated thin wall (Fig. 1A). An ill-defined hypo-attenuated round lesion with slightly peripheral edema was also noticed in left temporal lobe on the higher level plane. Remarkable bony defect of left temporal bone with sclerotic margin was also demonstrated on bony window (Fig. 1B, C).

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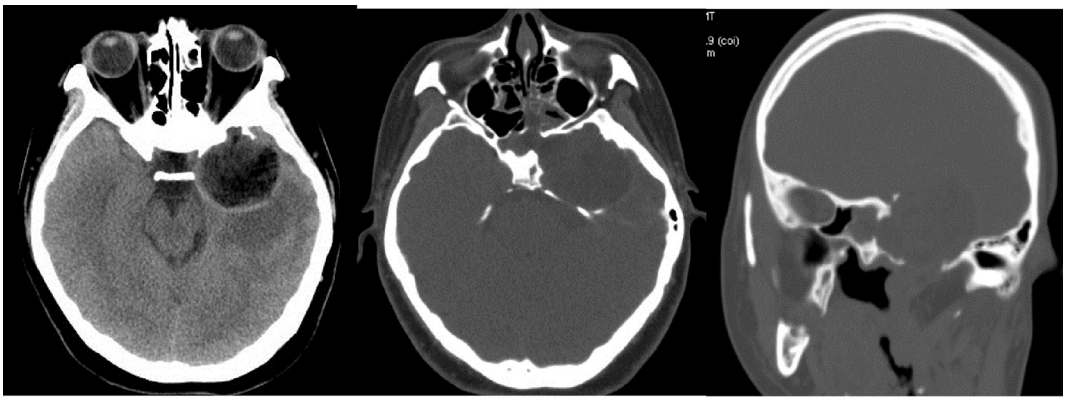

A B C

Fig. 1. Axial brain CT image showing a round bulging hypoattenuated mass in the left middle cranial fossa and intruding into intracranial parenchyma with ring-like hyper-attenuated thin wall (A). Axial bone window and oblique-coronal reformatted CT images demonstrating remarkable bony defect of left temporal bone with surrounding erosion and sclerosis and communicating with sphenoid sinus and left posterior ethmoid sinus with mucosal thickening (B, C).

In order to further characterize the lesion and associated intracranial extension, Cranial MRI examination was also performed. Moderate signal intensity on T1WI and T2WI images in the anterior part with hyperintense foci in the central components and hypointensities on fat-suppressed T1WI, behind which another oval hypointense cystic mass communicating each other via a defect between them two were demonstrated evidently (Fig. 2A, B). Axial T2WI revealed heterogeneous hyperintense components in the lesion and fluid–fluid level of hyperintensity in the posterior part, coronal T2WI showing its extradural origin relative to left skull base and parasellar location, hyperintense edema in proximal white matter of left temporal lobe was also noted (Fig. 2C, D). Grossly hyperintensity in the anterior part and mild hyperintensity in the posterior part are shown on diffusion-weighted imaging (DWI), in keeping with pus (Fig. 2E). Post-contrast T1WI after administering gadolinium showed thin-wall rim enhancement in both of the two parts (Fig. 2F).

Based on the complicated anatomies around the lesion and deteriorated clinical status, the patient was undertaken excision of skull base epidermoid cyst and drainage of intracranial abscess through the approach of posterior wall maxillary sinus with the aid of imaging navigation system. The operation was navigated with ENT dedicated imaging navigation system (Stealth Station Landmax 4; Medtronic Navigation, Louisville, Colorado) and digital high-resolution nasal endoscopes (Karl Storz Endoscopy, El Segundo, California, USA). Under general anesthesia, the patient was underwent a posterior-lateral approach of left maxillary sinus wall osteotomy and was exposed the anterior-inferior portion of the mass after entering into pterygopalatine fossa (**PPF**). A reddish soft cystic mass filling with white bean curd-like internal components was discovered, which was in accordance with the diagnosis of cholesteatoma (Fig. 3). After expanding the opening we performed intracystic incision and eliminated surrounding cystic wall with the aid of endonasal endoscopy guidance. During the procedure, we found the choleasteatoma enclosing left internal carotid artery and compressing left cavernous sinus, which was also communicating with left sphenoid sinus. The tumor destroyed sphenoid greater wing and involved pterygoid process, however PFP was spared. When gently compressing internal carotid artery upward, yellow fluid flowed out from the back, which was considered the concomitant intracranial abscess. Pus was drained and aspirated, then was washed with normal solution. With the guidance of endonasal endoscopy, grossly thoroughly excision of the lesion and open the ostiums of maxillary, sphenoid sinuses and adequately drainage were performed. Histopathological examination demonstrated keratinized squamous epithelium-lined with a large amount of inflammatory cells infiltration, which was conformed to epidermoid cyst and associated with infection (Fig. 4).

Antibiotic treatment was entailed one week after surgery, the patient has resolved from her symptoms of headache and fever. The patient's post-operative course and subsequent clinical follow-up one month later were uneventful, and MRI follow-up showed normal drainage of left maxillary sinus, closure of intracranial abscess and without prominent residual and recurrence (Fig. 5A, B).

3. Discussion

Intracranial epidermoid tumors are congenital inclusion cysts with an outer capsule and inner cystic fluids. Intracranial epidermoid cysts are usually located in the cerebellopontine angle and parasellar region, as well as petrous apex, chiasmal region, brain stem or intraventricular cavity. Intracranial epidermoid cysts usually have a benign clinical process and biological nature. Microscopically, the capsule of the epidermoid cyst consists of a layer of avascular stratified squamous epithelium tissue, the contents are mainly composed of keratin in concentric layers and cholesterol in a solid crystalline state. Most of epidermoid cysts are subdural origin or occasionally located in epidural space, the latter of which usually forming into round, oval or massive shapes with well-demarcated boundary [3], as of in this case.

The imaging features of epidermoid cyst are variable and largely depend on their content, usually multiple layers of keratin debris, dense debris in cystic centers and intraluminal