

Case Reports & Case Series

Scalp epidermoid cyst with abnormal hyperdense on CT scans-A case report and literature review



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ARTICLE INFO

Keywords:
Scalp epidermoid cysts
Hyperdense
Calcification

ABSTRACT

Scalp epidermoid cysts are a common tumor subtype in head, which usually exhibit hypodense on CT scans. Here, the authors report a case of 50 years old man with a mass at left frontal scalp with hyperdense on CT scans. Subsequent histological analysis identified the tumor as an epidermoid cyst.

1. Introduction

Epidermoids, containing both cholesterol and keratin, are slow-growing benign cysts and could be diagnosed by computed tomography (CT) or magnetic resonance imaging (MRI) [1]. Especially, CT scanning, a faster, easier and less expensive imaging method than MRI, has become a regular examination for intracranial, skull and scalp tumors in clinic. Typically, the CT density for epidermoid cysts always represents 'near cerebrospinal fluid (CSF)' or approximating that of water (~0 Hounsfield units), with an absence of post-contrast enhancement [2]. Intriguingly, previous studies have attested a subtype of epidermoid cyst namely white or bright epidermoid cyst, which exhibits unusual MR and CT appearance with hyperdense on CT scans and hyperintense on T1- and T2-weighted MR images locating at cerebellopontine angle, suprasellar and cerebral regions [2–5].

Scalp epidermoid cysts are a common subtype tumor occurring in head and they always result in cosmetic problems. Hence, patients with scalp epidermoid cyst often need CT scanning prior surgery resection. Most of scalp epidermoid cysts conventionally represent hypodense on CT scans [6]. To our limited knowledge, few reports display scalp epidermoid cyst with hyperdense on CT scans. Here, we introduce a case of an epidermoid cyst locating in the left frontal scalp depicting atypical CT signal intensity, which was validated by histopathological examination.

2. Case report

2.1. History and examination

A 50 year-old man was taken to the Neurosurgery Department complaining of a mass at left frontal scalp with painless, moveable and rubbery feature for 10 years, following one-year period of increasing tumor size without redness, swelling and pain. On admission, he only complained about cosmetic problems without neurological abnormalities. An initial CT showed a 20 * 15 * 10 mm mass with sporadic hyperdense on CT scans (49–72 Hounsfield units) at the left frontal scalp (Fig. 1).

2.2. Operation

The patient subsequently underwent surgery for mass excision. Briefly, a small skin incision just above the mass was performed behind the hairline after anaesthetizing with 1% lidocaine hydrochloride and the tumor was totally resected. Then, the free margin over the tumor was coagulated to avoid bleeding. Thereafter, the scalp was sutured according to the standard procedures and the removed tumor was underwent histopathological examination.

2.3. Histological examination

The tumor was presented as an offwhite cyst and filled with highly viscous, cheese-like contents. Microscopically, the cystic wall was composed of fibrous tissue lined with keratinizing squamous epithelium. The contents of the cyst were keratinous debris arranged in

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<https://doi.org/10.1016/j.inat.2019.100504>

Received 20 February 2019; Received in revised form 24 May 2019; Accepted 5 June 2019

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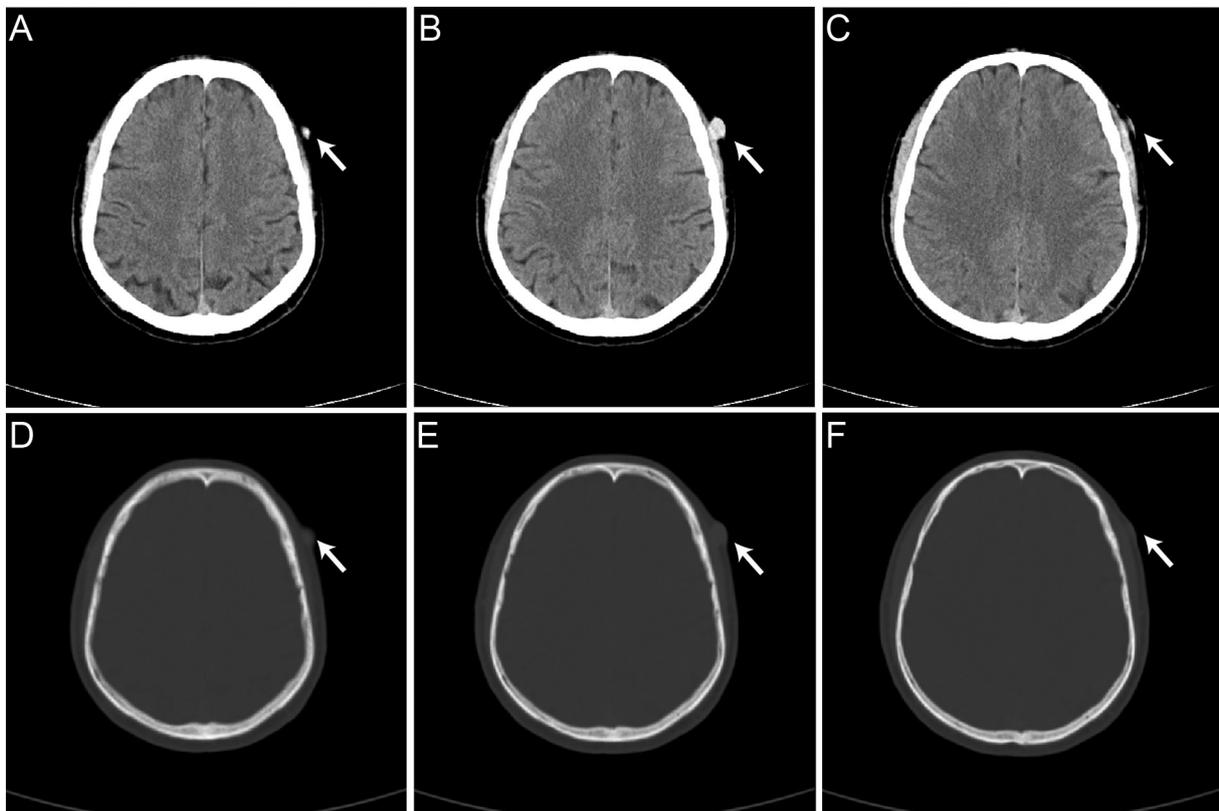


Fig. 1. Axial non-contrast (A–C) and bone windowed (D–F) CT scans showing a mass with sporadic hyperdense in the left frontal scalp.

laminated layers and prominent dotted or plaques of dystrophic calcification were present. No skin appendages (hair, sebaceous glands etc.) or non-ectodermal tissue was identified. Especially, neither evidence of prior hemorrhage and adipose tissue was present, nor was there any evidence of malignancy (Fig. 2). Hence, the tumor was diagnosed as an epidermoid cyst.

2.4. Post-operative course

The patient was hospitalized on the day before surgery and discharged 4 h after surgery. Postoperative pain was relieved by oral ibuprofen. After discharge, he was examined as outpatients twice as previously reported: first at 1 week from surgery and then 3 months after surgery [6]. We asked the patient to immediately return to hospital when any change in the wound or suspected cyst recurrence.

3. Discussion

Epidermoid cysts are a form of slow-growing benign and congenital inclusion cysts that occur in extracranial and intracranial regions in all age groups, especially in patients less than 5 years old [6]. Intracranial epidermoid cysts accounting for up to 1.8% of primary intracranial tumors [7] are usually located in the sellar and suprasellar regions, the middle fossa, cerebellopontine angle and off the midline in the posterior fossa [4,5]. Meanwhile, extracranial epidermoid cysts are occurred anywhere in the body where embryonic elements fuse together [8]. Previous report has revealed that the majority of epidermoid cysts are situated in ovaries and testicles (80%); 7% in the head and neck region, 1.6% in the oral cavity [8]. Although a low occurrence of epidermoid cysts in the head, they usually cause a cosmetic problem. Especially, epidermoid cysts tend to present early in life usually less than 3 years old and 89.7% younger than 5 years of age in pediatric patients [6].

On computed tomography (CT) scans, the majority of epidermoid cysts are hypodense and not enhanced with contrast material as cystic

contents are normally filled with debris, keratin, water, and cholesterol [9]. On magnetic resonance imaging (MRI) scans, most MRI scans depicts hyperintensity on T1WI, variable appearance on T2WI and lacking contrast enhancement with gadolinium [3]. However, few reports have corroborated that intracranial epidermoid cysts exhibit unusual appearance on CT and MRI scans owing to the presence of calcification, albumin, iron, copper and increased level of protein [1–3,5]. In the present study, we report an atypical extracranial epidermoid cyst (the left frontal scalp), which was initially misdiagnosed as neurofibroma based on CT scans. Unfortunately, the MRI scans were not performed before surgery in order to decrease the cost for patient. But this case still offers a notice for surgeons to think the abnormal radiologic features before performing tumor resection related to extracranial tumors.

Typically, epidermoid cysts often have a thin capsule composed of squamous epithelium, and an internal cystic component usually filled with desquamated epithelial cells and cholesterol crystals on histologic examination [10]. Macroscopically, epidermoid cysts display a shiny ‘mother of pearl’ appearance, with a nodular outer surface [2]. In the present case, as no skin appendages (hair, sebaceous glands etc.) or non-ectodermal tissue was identified on histology, the diagnosis of a dermoid cyst cannot be made. Furthermore, no evidence of prior hemorrhage and adipose tissue was present on histology. Hence, the tumor is diagnosed as an epidermoid cyst. The reason why the cyst exhibit atypical appearance with hyperdense on CT scans might due to the abundance of calcification, albumin, iron, copper or protein as previously studies reported [2,4,5]. Unfortunately, the composition of cystic contents was not determined using biochemical analysis due to paraffin imbedding when we realized its significance in the present study to answer the question of unusual CT appearance.

4. Conclusion

Scalp extracranial epidermoid cysts are a common tumor subtype in head, but displaying hyperdense on CT scans are a rare variant of

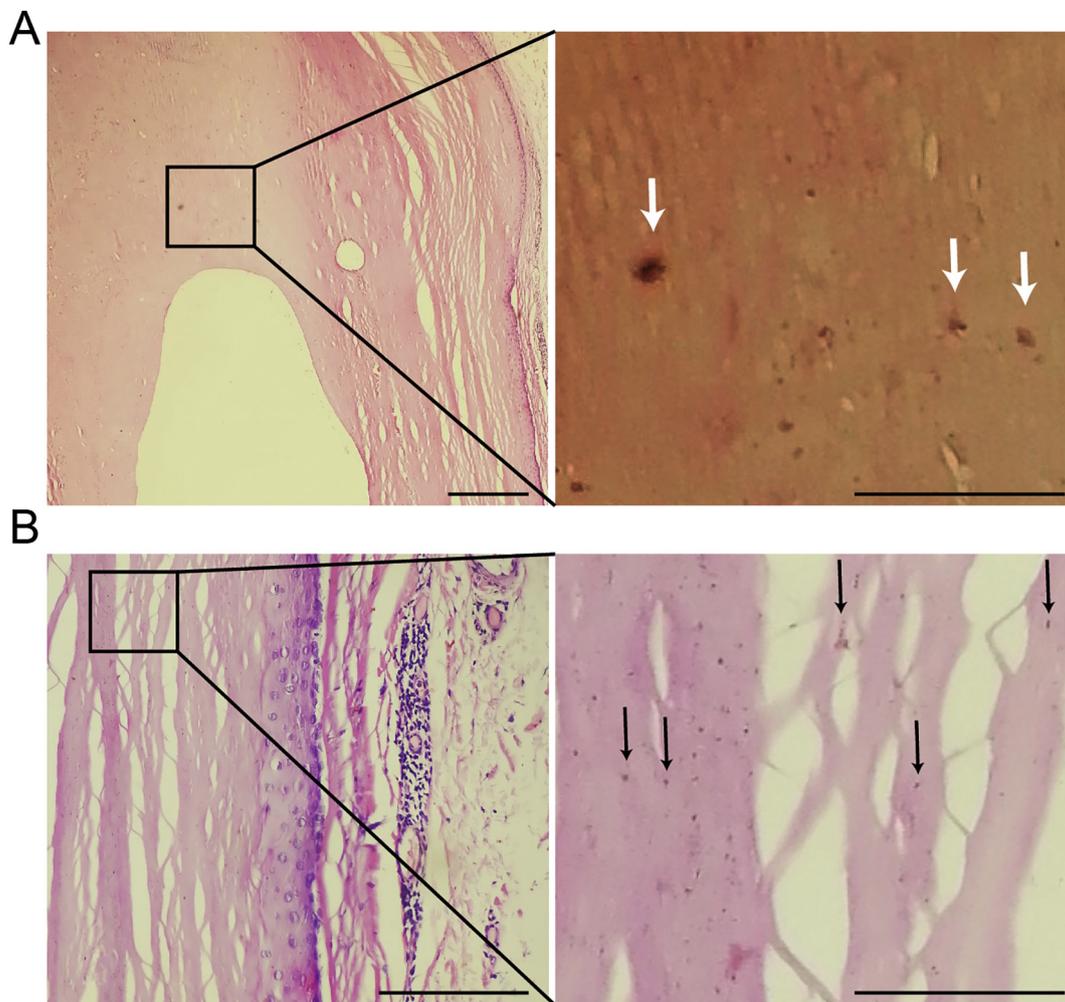


Fig. 2. Hematoxylin and eosin stained histologic sections of the lesion, (A) and (B), demonstrate predominantly keratinous debris together with a fibrous cyst wall containing dotted or plaques of dystrophic calcification (arrows). No skin appendages (hair, sebaceous glands etc.) were identified. Scale bars: 100 μ m.

epidermoid cysts that exhibit unusual characteristics on neuroimaging. Our case highlights an extracranial epidermoid cyst representing hyperdense on CT scans could be defined as white epidermoid cyst, to our limited knowledge, which has not yet been reported related to extracranial epidermoid cysts.

Declaration of Competing Interest

None.

Acknowledgement

This work was supported by grant from the Interdisciplinary Science and Technology of Physics and Biomedicine (WSS-2014-11M).

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