Anterior Cranial Fossa Hemorrhagic Epidermoid Cyst: CT and MRI Findings

Chien-Cheng Chen, Shu-Hang Ng, Ho-Fai Wong, Jiun-Jie Wang, Yao-Liang Chen, Sheung-Fat Ko, Mun-Ching Wong, Yau-Yau Wai

Department of Medical Imaging and Intervention, Chang Gung Memorial Hospital at Linkou, and College of Medicine, Chang Gung University
Department of Medical Imaging and Radiological Sciences, Chang Gung University

We reported a rare case of hemorrhagic epidermoid cyst located in the anterior cranial fossa. A 66-year-old female presented with progressive nausea and vomiting for one month. Computed tomography revealed a mixed high and low density mass in the right lateral frontal basal region, with a few stippled calcifications at its inferior wall. Magnetic resonance imaging showed that the lesion was largely hyperintense on T1 weighted images and was of heterogeneously mixed high and low signal intensity on T2 weighted images. The lesion had a surrounding dark rim and exhibited curvilinear contrast enhancement in its medial margin. The patient underwent total surgical removal of the mass and did well during one year follow-up. Recognition of imaging findings facilitates appropriate preoperative differential diagnosis and is helpful to prevent leakage of cystic content during surgery.

Intracranial epidermoid cyst (EC) is rare and has been reported to constitute 0.2%–1.8% of primary intracranial tumors [1]. It is a benign extraaxial lesion and in about 40-50% of cases are located in the cerebellopontine angle [1]. ECs also occur in the fourth ventricle (17%) and the sellar and/or parasellar regions (10%-15%). Less common locations include the cerebral hemispheres or brainstem. All are located off the midline. Because of its avascular nature, intracranial EC is seldom complicated with hemorrhage. Only a few such cases have been reported in the posterior cranial fossa and middle cranial fossa [2-4]. To our knowledge, this is the first reported case of hemorrhagic EC occurring in the anterior cranial fossa.

CASE REPORT

A 66-year-old female had progressive headache, dizziness, nausea, and vomiting for one months before admission. She visited our emergency department for help. Physical examination showed no obvious neurological deficit. Cranial CT revealed a well-defined, heterogeneous extra-axial mass with mixed high and low densities in right anterior cranial fossa. A few stippled calcifications were noted in its inferomedial wall (Fig. 1). Erosive bony reaction of the abutting inner table of the right frontal calvarium was also seen. MRI showed a heterogeneous and predominantly hyperintense mass on both T1-and T2-weighted images (Fig. 2). A surrounding low signal rim was also demonstrated. The lesion exhibited no obvious diffusion restriction on diffusion-weighted images but curvilinear enhancement in its medial wall after gadolinium administration. She received selective cerebral angiography and no abnormal tumor vessels or stain were identified on angiograms.

Our patient underwent right frontal craniotomy. A well encapsulated, hypovascular, cystic mass was
Intracranial epidermoid cyst with hemorrhage

seen at the right anterior cranial fossa containing old blood and necrotic debris. The lesion was restricted in the extradural space and involved the right lateral frontal and pterional bone. Due to tumor densely attached to dura matter, the intracystic content was aspirated out to prevent leakage and then tumor capsule was meticulously dissected. The tumor was almost completely removed without dura tear.

Microscopically, the wall of the cystic tumor was lined by squamous epithelium and keratin. The necrotic debris and hemorrhage with hemosiderin-laden macrophages were noted. These histopathologic findings indicated of an epidermoid cyst with intracystic hemorrhage. The patient had an uneventful recovery course without meningitis and did well during one year of follow-up.

DISCUSSION

Intracranial EC is a congenital lesion that arises from inclusion of ectodermal epithelial element [5]. The cyst grows by accumulating cholesterol and keratin from desquamation of the lining epithelium. Grossly, EC is typically a well defined lesion with an irregular nodular outer surface and a shiny “mother of pearl” appearance [7]. Microscopically, the wall of EC consists of a layer of stratified squamous epithelium without skin appendages [4]. The cyst content is derived from desquamated epithelial cells composed mainly of keratin in concentric layers and cholesterol in a solid crystalline state [2, 5, 7].

Typical EC usually appears as a low attenuation cystic mass on CT due to the fluid and lipid content [5]. On MRI, it always present as low signal intensity on T1-weighted images and high signal intensity on T2-weighted images [6]. ECs with atypical imaging findings have been previously reported [2-4]. Some dense ECs on CT have been documented, presumably due to a combination of high protein content and high viscosity [7, 8]. Some showed variable signal intensities on MR images due to different components of keratin, cholesterol, lipid, protein and water [3, 6]. Some showed intracystic hemorrhage with CT and MR features of various hemoglobin breakdown products [2-4, 9-10].

EC typically exhibits diffusion restriction in diffusion-weighted images, in contradistinction with arachnoid cyst that has an apparent diffusion coefficient similar to stationary water. However, no diffusion restriction is depicted in our case, which may be interfered by old blood products. Most ECs do not enhance after injection of contrast medium, although enhancement of the cyst wall has been described [4, 9, 11]. This enhancement is attributed to granulation secondary to leakage of the irritant cyst contents and subsequent chemical inflammatory reaction [12]. Calcification of EC is uncommon, which is typically confined to the cystic wall and is considered to be resulted from perilesional leakage of cyst content with secondary dystrophic calcification [6, 10]. Although atypical presentation in this case, there is still some image characteristics as clue to make diagnosis of epidermoid cyst, such as laminated appearance of tumor (Fig. 2a.) and insinuating growth into right frontal lobe. These findings are helpful to differentiate from other differential diagnosis like arachnoid cyst and cystic meningioma.

Our cases showed unusual imaging features of EC: intracystic hemorrhage, wall calcifications, partial capsular enhancement, and, particularly, anterior cranial fossa location. Our search of the literature revealed no previous reports of hemorrhagic EC occurring in the anterior frontal fossa. Since hemorrhage and irritant cyst content of ECs are prone to spread intraoperatively and result in severe aseptic meningitis [12], recognition of different imaging features of EC is helpful to establish a correct preoperative diagnosis and, in turn, to avoid leakage of the cystic content during surgery.
Intracranial epidermoid cyst with hemorrhage

REFERENCES

6. Warakaulle DR, Anslow P. Differential diagnosis of intracranial lesions with high signal on T1 or low signal on T2-weighted MRI. Clin Radiol 2003; 58: 922-933

Figure 2. a. Coronal fast spin echo T2-weighted MR imaging (TR/TE: 4200/99) show a heterogeneously mixed hyperintense and hypointense mass. b. It is predominantly hyperintense on axial fast spin-echo T1-weighted MR imaging (TR/TE: 665/14). c. Axial fast spin-echo gadolinium-enhanced T1-weighted MR imaging exhibits curvilinear contrast enhancement at medial wall of the mass. d. The diffusion-weighted image (b=1000) and ADC map (not shown) show no diffusion restriction in the tumor.

前顱窩出血性上皮樣囊腫：電腦斷層和磁振造影的影像表現

陳建誠¹ 吳樹鏗¹ 黃浩輝¹ 王俊杰² 陳耀亮¹ 高常發¹ 黃敏政¹ 衛優遊¹

我們報告一例罕見的個案是位於前顱窩的出血性上皮樣囊腫。一位六十六歲女性以噁心和嘔吐近一個月為初始症狀，電腦斷層顯示一個混合高低密度腫瘤合併下緣點狀鈣化產生。磁振造影發現腫瘤在 T1 加重影像主要為高訊號，而在 T2 加重影像中則是混合高訊號和低訊號並被周圍一圈低訊號環繞，腫瘤內側壁有弧狀顯影。病人接受手術切除腫瘤後，在一年的追蹤內保持良好健康。辨認出特殊的影像表現可以協助恰當的術前鑑別診斷且可預防手術中液態內容物的漏出。