

## Parasellar Dermoid Cyst: A Rare Cause of Spontaneous Intracranial Haemorrhage

S Alliou<sup>1\*</sup>, S Sninate<sup>1</sup>, J El Fenni<sup>1</sup>, M A Essaoudi<sup>2</sup> and M Abdellaoui<sup>1</sup>

<sup>1</sup>Department of Radiology, Military Hospital Mohammed V, Rabat, Morocco

<sup>2</sup>Department of Anatomy Pathology, Military Hospital Mohammed V, Rabat, Morocco

\*Corresponding Author: S Alliou, Department of Radiology, Military Hospital Mohammed V, Rabat, Morocco.

Received: May 19, 2020; Published: July 08, 2020

### Abstract

In this article, we report a 47 years old female patient with a parasellar dermoid cyst and intracranial hemorrhage, discovered in neuroimaging after a seizure. The hemorrhage was detected as hyperdensity on the initial cranial computed tomography (CT). Magnetic resonance imaging (MRI) revealed a hyperintense image on T1WI and T2WI corresponding to the fat content of the mass. The Angio MR demonstrates close reports with Willis circle arteries, which might be responsible for the intracranial hemorrhage. The intracranial hemorrhage caused by dermoid cyst could be a fatal complication. Its diagnosis is based on cranial MRI and CT.

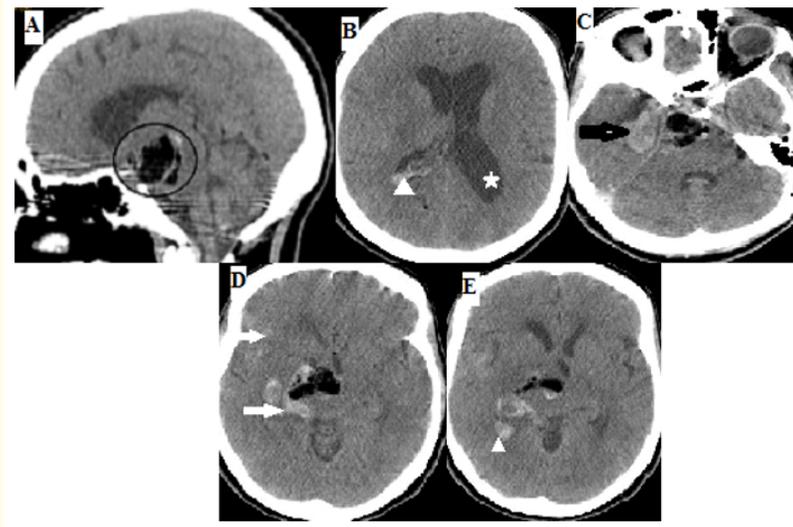
**Keywords:** Intracranial Haemorrhage; Dermoid Cyst; CT; MRI

### Introduction

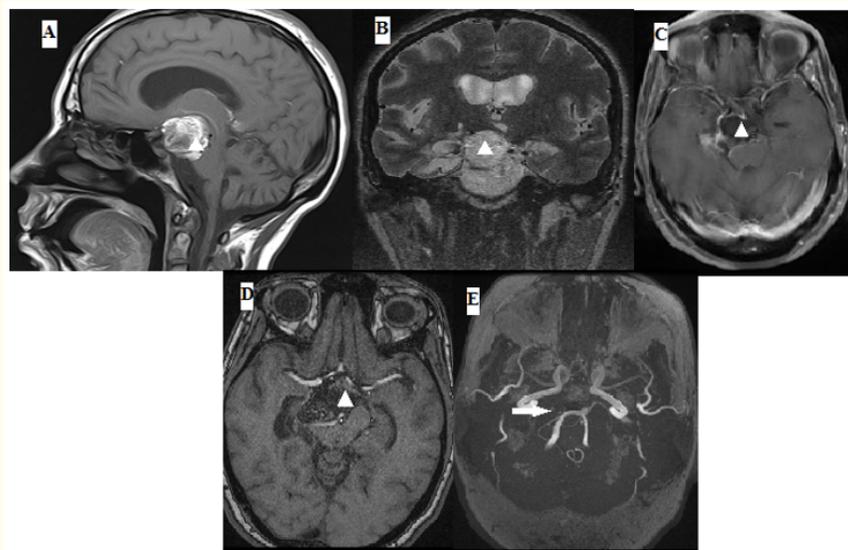
Intracranial dermoids get from the inclusion of ectodermally committed cells, at the time of neural closure during embryonic life. They understand 0,04% - 0,6% of intracranial tumors, which occur often in cisternal spaces and parasellar location [1-4]. MRI is considered as the gold standard imaging modality for exploring this mass, especially in preoperative. Dermoids appear hyperintense on T1 and on T2 because of their richness of fat constituents [5]. The diagnosis of these is usually done after having undergone symptoms as headaches, or because of complications like rupture or bleeding [6, 7]. Despite the fact that hemorrhage within the intracranial dermoid cyst is not exceptional, dermoid cyst as a potential cause for hemorrhage outside of the tumor has never been witnessed. This report sheds light on a patient with spontaneous intracranial hemorrhage resulting from parasellar dermoid bleeding.

### Case Report

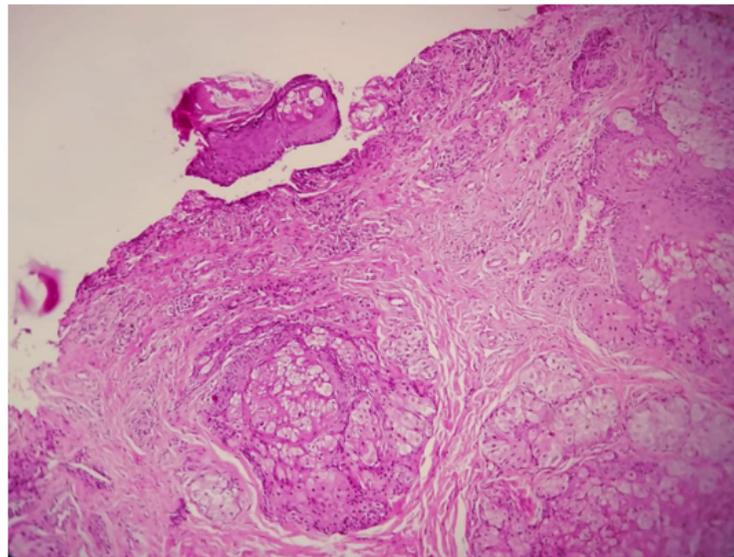
The responsible service received a 47 years old woman, which was emergently referred for severe headache, nausea, vomiting and dysarthria after a tonic-clonic seizure that occurs spontaneously. There was no past medical history, drug use or a traumatic context. On admission, her vital signs were normal, but the neurologic examination revealed a meningeal syndrome. The patient underwent a CT-scan which objectified a sharply defined extra axial, parasellar mass, with fat density that causes compression of the mesencephalon and the 3rd ventricle with the development of hydrocephalus. That was associated with a hyperdense aspect of subarachnoid spaces, a high attenuation mass in the right temporal region, and haemorrhagic flooding of posterior horn of the ipsilateral lateral ventricle corresponding of bleeding which occurs spontaneously (Figure 1). A preoperative MRI done after stabilization of the patient and resorption of the hemorrhage, revealed a lobulated lesion with hyperintense signal in T1 and T2 sequences which were suppressed in FAT-SAT sequence. It presents a slight restricted diffusion and no enhancement after contrast. Angio MR uncovers its encroachment of circle of Willis arteries and stenosis of the right posterior communicating artery (Figure 2). The patient underwent craniotomy and the tumor could not be completely resected. According to the histology, the cystic lesion was lined by stratified squamous epithelium and contained sebaceous glands and some hair follicles, which were characteristic of dermoid cyst (Figure 3). Postoperatively, the patient was discharged because she was recovered uneventfully. After 8 months of follow-up, the patient was without neurological deficits.



**Figure 1:** CT-scan images demonstrate a dermoid cyst of the parasellar area (A), causing hydrocephalus (star) (B). Note the presence of hematoma in the right temporal lobe (black arrow) (C), subarachnoid bleeding (white arrow) (D) and hemorrhagic flooding into the occipital horn of the ipsilateral lateral ventricle (triangle) (E).



**Figure 2:** Lobulated parasellar lesion presenting hyperintensity on T1WI (A) and T2WI (B), suppressed and none enhanced on T1 FAT SAT sequences after Gadolinium (C) (triangle). TOF angio MR sequences demonstrate its encroachment of circle of Willis arteries (D) and stenosis of the right posterior communicating artery (E).



**Figure 3:** Cystic lesion lined by stratified squamous epithelium and contained sebaceous glands and some hair follicles.

## Discussion

Intracranial dermoid cysts are extremely benign neoplasm, emerging from ectodermal inclusion along the maturing of neural tube, between the 3<sup>rd</sup> and 5<sup>th</sup> weeks in embryonic life [6]. They are extra-axial masses, frequently occupying the basilar area, close to the midline at frontobasilar, parasellar and posterior fossa spaces [8-10]. They are surrounded by squamous epithelium and incorporate hair follicles, fat, nails, teeth, sebaceous and sweat glands. Dermoid cysts expand through cumulation of glandular secretions and epithelial desquamation [11-12]. Despite, they are slow-growing tumors, they could engender some signs such as headache, nausea and vomiting, which are not specific, but also focal neurologic signs as a result of their invasion of neurovascular structures [13-16]. On CT-scan, dermoid cyst presents a sharply defined lesion, with calcifications in the wall, mixed densities, comprising hypodensities with low attenuating corresponding of fats. It rarely enhances after contrast administration [1,4,17,18]. On MRI, habitually, dermoid cysts reveal high signal intensity on T1 sequence; signal free on Fat-saturated sequence. They show a heterogeneous aspect on T2-W images, because of their mixed content. This imaging modality is considered as the best thank to its performance in appraising associated vessel displacement by flow void or MR angiography, mated with greater visualisation of the lesions related to the base of the skull as well as multiplanar imaging ability, which results in making MR quite preoperative imaging option [14,15,17,18]. In literature, intracranial hemorrhage has never been announced to take place outside dermoid cysts, but bleeding within this type of tumors has been described [18-19]. The bleeding in dermoid cyst could be accounted for mechanisms that clarify the bleeding inside other intracranial tumours, like trauma, tumor related to neoplastic aneurysm and hypervascularity of tumor. Notwithstanding, there is little chance that mentioned factors are held responsible for intracranial hemorrhage in our patient case as she showed no previous history of trauma or bleeding tendency. Also, dermoid cysts are often badly vascularised, while the angio MR showed no aneurysm. Moreover, these tumors seem to occur mainly in touch with large venous structures. For instance, there are cavernous sinus and the torcular herophilii which indicates that angiogenesis may take place somewhere in the dermoid cysts and later on led to the development of hemorrhage. Still, there is a lack of ample evidence of any serious tumor angiogenesis in our case study patient to maintain such claim. Degeneration, hyalinization and necrosis, may be a direct cause of the parietal fragility of tumor vessels vis-a-vis advanced age. The four reported cases in four different journals, who present a

good illustration of hemorrhage within their dermoid intracranial cysts, were over sixty years [3, 20,21]. There is a great chance that the last given factors attributed to encompassment of arteries circle of Willis by the dermoid cyst, are the causes of extratumoral hemorrhage in our patient. Regardless of the location of hemorrhage (inside or outside tumor), CT scan is reliable to distinguish it because of its high signal density. On MRI, blood and fat are hyperintense on T1 and variable on T2. Fat suppression sequences make fat recognizable from hemorrhage [22].

### Conclusion

Intracranial hemorrhage caused by dermoid cyst is a complication occurring with benign to disastrous presentation. The diagnosis is based on MRI with a protocol including TOF (Time of Flight) angiography to detect acute sign of ischemia and vasospasm, but CT is more capable to identify the presence of bleeding inside or outside the dermoid cyst.

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**Volume 12 Issue 8 August 2020**

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