Case Report

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Atypically Located Pott's Puffy Tumor Presenting as Epidural-Cutaneous Fistula

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Abstract

Pott's puffy tumor is described as an osteomyelitis of the frontal bone with associated subperiosteal abscess. It usually presents as a swelling over the forehead. Despite its decreased incidence in the post-antibiotic era, intracranial complications can be seen in upto 40% of cases. Rupture resulting in a draining cutaneous fistula has also been reported. We present one such case of a patient with two paramedian scalp masses that were initially ignored. Rupture of one of the masses led to a discharging sinus in an atypical location behind the coronal suture.The subsequent development of hemiparesis brought the patient to emergency. The location and clinical presentation led us to initially suspect an epidermoid/dermoid pathology until the final radiological and histological correlation. A bifrontal craniectomy with ultrasound guided aspiration of the abscess led to improved outcomes.

Keywords: Puffy Tumor; Epidural-Cutaneous Fistula.

Introduction

First described by Sir Percivall Pott in the 1700's, Pott's puffy tumor is an osteomyelitis of the frontal bone with associated subperiosteal abscess [1,2]. It usually develops as a complication of frontal sinusitis with the spread of infection occurring either through direct extension to the bone or as a thrombophlebitis through the valveless diploic veins [1]. We encountered an interesting case of a female patient who initially presented with a discharging sinus from a ruptured scalp mass that led to acute onset hemiparesis and signs of raised intracranial tension.

Case Report

A 24 year old female presented to our neurosurgery emergency with complaints of left sided weakness that progressed over ten days with associated symptoms of raised intracranial tension in the form of holocranial headache and vomiting. Her past history was significant for the presence of two small scalp swellings in the frontal region near the midline which she had ignored. She also had a preceding past treatment history for frontal sinusitis. It was when the scalp swelling on the right ruptured spontaneously and started discharging pus that she visited a general physician. She was initially treated with antibiotics in a primar health center and referred when the discharge did not subside and neurological deficit set in. On admission, she was febrile and vitally stable. Neurological examination showed a Glasgow come scale (GCS) score of E4V5M6 with left hemiparesis (upper limb 2/5 and lower limb 2/5). There was no neck rigidity or other focal neurological deficit. Local examination of the scalp revealed a left paramedian scalp mass 3 cm behind the coronal suture, firm in consistency with no punctum or active discharge (1A). A sinus with discharging pus was noticed in a similar location to the scalp mass on the right paramedian aspect. (Figure 1A) Computerized Tomography (CT) scan of the head showed a hypodense lesion in the right posterior frontal region with disproportionate surrounding perilesional edema (Figure 1B). There was also evidence of fluid levels within the frontal sinus. A Gadolinium enhanced Magnetic Resonance

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Imaging (MRI) of brain was done to better characterize the lesion. MRI revealed a space occupying lesion in the right posterior frontal region hypointense on T1W, hyperintense with disproportionate perilesional edema on T2W with diffuse restriction on DWI imaging (Figure 1C). This lesion was further evaluated with Gadolinium contrast and was found to have a well circumscribed regularly enhancing wall. Saggital and coronal T1 contrast images showed evidence of osteomyelitis and sub-periosteal abscess formation in bilateral frontal region with thinned out outer and inner table of bone (Figure 1D, 1E). A sinus tract was seen extending into the dura which was thickened and uniformly contrast enhancing (Figure 1D, 1E). After starting intravenous broad spectrum antibiotics, the patient underwent a bifrontal craniectomy to remove the entire osteomyelitic bone and the abscess was completely aspirated with the help of ultrasound (Figure 1G, 1H). Intra-operatively, the bone appeared to be thinned out consistent with changes of osteomyelitis (Figure 1F) and after craniectomy, a sinus tract was identified on the right side extending into the durabut the dura was not breeched. There was no hair in the sinus tract to suggest dermoid cyst and there was no granulation tissue to suggest calvarial tuberculosis. Examination of the pus revealed gram positive cocci but did not grow any organism on culture. Zeil Neelson staining and CBNAAT study were negative for tuberculosis. The histopathology of the sinus tract reported tissue lined by stratified squamous epithelium without any evidence of hair follicles or sebaceous glands. Based on this, we formulated a diagnosis of Pott's puffy tumor with epiduro-cutaneous fistula and abscess secondary to frontal sinusitis. In the post-operative period, the patient's alertness improved while the power remained the same. The post-operative CT scan was also satisfactory and the patient was referred to the ENT department for treatment of frontal sinusitis (1I). On 2 month follow up, the power improved to 4/5 in both upper and lower limbs and she is currently awaiting cranioplasty.

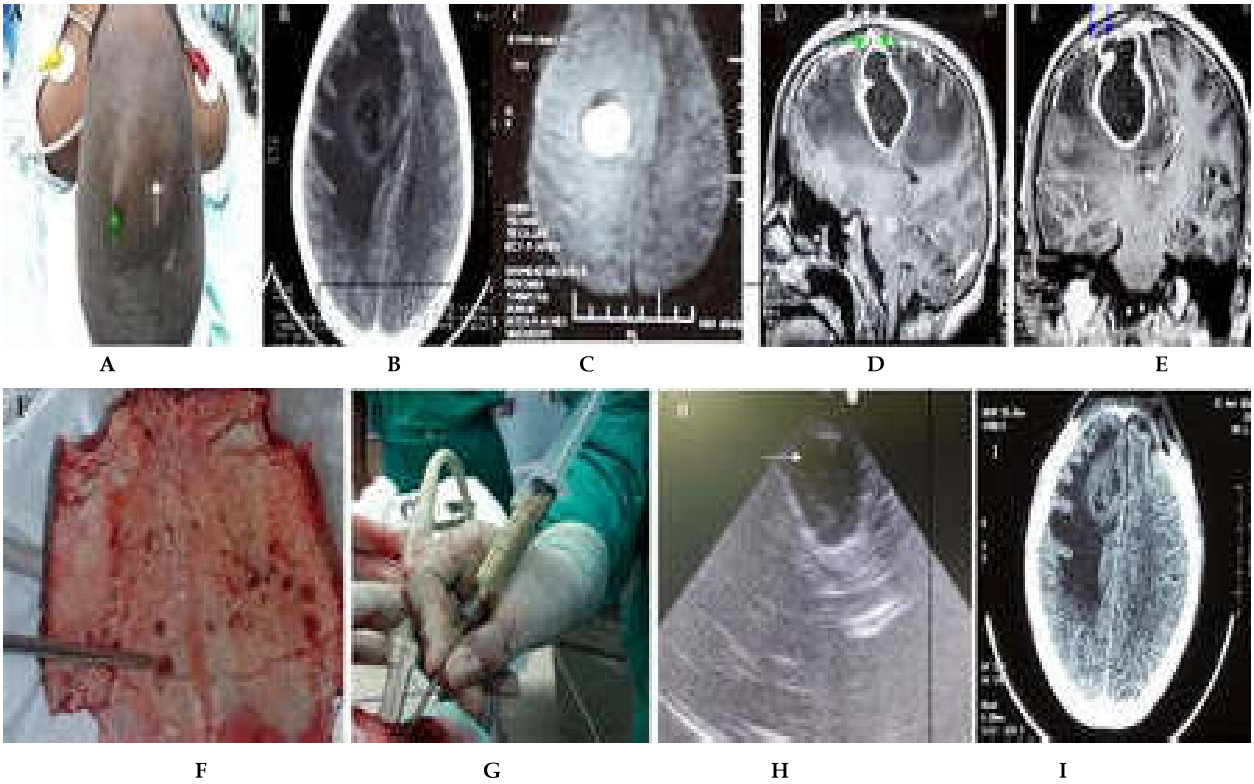

Fig. 1A: Clinical photograph of patient showing paramedian scalp mass behind coronal suture on left (green arrow) and discharging sinus on right (orange arrow). **B:** NCCT head showing hypopdense circumscribed right frontal lesion with disproportionate perilesional edema. **C:** DWI MRI imaging showing diffuse restriction of the lesion. **D:** Gadolinuim enhanced T1W saggital images showing hypodense lesion with regularly enhancing wall just posterior to coronal suture. Green arrow depicts the fistulous tract extending from skin to dura and orange arrow shows osteomyelitis of frontal bone. **E:** Gadolinium enhanced T1W coronal images showing abscess cavity with dural enhancement. Also seen are the frontal bone osteomyelitic changes and subperisoteal abscess formation (blue arrow) **F:** Intraoperative photograph of the bone showing changes of osteomyelitis. **G:** Ultrasound guided aspiration of pus using brain needle. **H:** Use of ultrasound to localize the lesion and assist in real time evacuation of abscess cavity. **I:** Post operative CT scan showing no residual abscess cavity

Discussion

The differential diagnosis for scalp masses include common conditions like epidermoid cysts, dermoid cysts and lipomas and rarer conditions like intra-diploic epidermoid cysts and Pott's puffy tumor. Possibility of intracranial extension is one of the main reasons why most neurosurgeons prefer doing a CT scan before excision of a suspicious scalp mass [3].

Pott's puffy tumor is a subperiosteal abscess of the frontal bone with underlying osteomyelitis. Intracranial complications are seen in upto 40% of patients and relate to the mode of spread of infection from the frontal sinus.[2]Spread of infection from the sinus can occur directly into the frontal bone resulting in osteomyelitis or via the valveless diploic veins resulting in intracranial pathologies. These include subdural empyema, intraparenchymal abscess, saggital sinus thrombosis etc [1].

Epidural-cutaneous draining fistulas have also been reported earlier by Goldfarb and Davidson et al [3,4]. These authors described the location of the discharging fistulas in the forehead near the frontal sinus. In our case, the patient initially had two paramedian scalp masses around 3 cm behind the coronal suture. We hypothesized that the formation of these masses were a reactionary change to the underlying infection. This could explain the atypical location of the fistula once the mass spontaneously ruptured.

Given the location, we initially considered an underlying epidermoid or dermoid pathology.The lack of hair follicles or sebaceous glands on histological examination ruled out dermoid cyst while there were no lytic intra-diploic lesions with sclerotic edges to suggest intra-diploic epidermoid cyst [3]. The other differential diagnosis considered was calvarial tuberculosis given that the patient lives in an endemic area [5]. The absence of granulation tissue, negative ZN staining and CBNAAT study helped rule out tuberculosis.

Removal of the osteomyelitic bone and sinus tract, drainage of abscess and intravenous antibiotics as per culture reports are the goals of treatment [2,3 6]. Treatment of the cause is also mandatory to prevent recurrence. When cultures are negative, broad spectrum antibiotics are given for six- eight weeks [3].

Conclusions

Complications of Pott's puffy tumor include draining epidural-cutaneous fistulas that may be a harbinger for malignant intracranial pathologies. Surgical excision of the infected bone and sinus tract with broad spectrum intravenous antibiotics is recommended. Treatment of the cause helps prevent recurrence.

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