POTT'S PUFFY TUMOR WITH ASSOCIATED EPIDURAL ABSCESS COMPLICATING FRONTAL SINUSITIS

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ABSTRACT
Pott's Puffy tumor is a rare disease entity arising from osteomyelitis of the frontal bone associated with subperiosteal abscess that develops on the forehead resulting from frontal sinusitis. In this case, we present a 12-year-old girl who presented with Pott's Puffy tumor with epidural abscess extension which was detected on CT scan. The role of radiological imaging is discussed.

INTRODUCTION

Pott's Puffy tumor (PPT) was first described by Sir Percival Pott in the 18th century as osteomyelitis of the frontal bone associated with subperiosteal abscess that develops and swells on the forehead resulting from frontal sinusitis[1] and less commonly from minor trauma of the frontal vault.[2,3] Pott's Puffy tumor is also reported following insect bite.[4] Intracranial extensions complicating sinusitis are infrequent in the era of antibiotics and occur in about 4% of patients hospitalized with acute or chronic sinusitis.[5] However, the exact incidence of suppurative epidural complication of sinusitis is unknown.

CASE REPORT

A 12-year-old girl presented at the Emergency Pediatric Unit of Jos University Teaching Hospital (JUTH) Jos, with recurrent catarrh and fever of four weeks duration; headache of three weeks duration; cough, painful bilateral peri-orbital swelling more on the right and a right sided forehead swelling of four days duration. She was initially treated at the outpatient department of the hospital with oral medications but with no improvement. No history of convulsion, contact with TB patient or any previous hospital admission. There was no preceding trauma and she had no history suggestive of sickle cell disease.

Physical examination revealed an acutely ill looking girl with temperature of 38.2 ºC, not pale. There was a tender, warm to touch, non-fluctuant swelling (6cm x 5cm) in the right frontal region with associated bilateral peri-orbital edema more on the right. There were no focal neurological deficits. A provisional diagnosis of frontal sinusitis with peri-orbital cellulitis was made. White cell count was 15.2 x 10^{9}/L, ESR was 80mm/hr, PCV, Urea and electrolytes were normal.

Computed Tomography (CT) scan, axial pre and post contrast images were obtained. Scout film showed a soft tissue swelling overlying the frontal bone with intact underlying outer and inner tables of the frontal bones (fig. 1). Axial slices revealed bilateral lenticular hypodense collections overlying the frontal lobes with rim enhancing thick walls consistent with epidural abscesses. A soft tissue swelling overlying the frontal bone was noted. Bone window revealed mucosal thickening of the frontal sinuses with erosion and discontinuity of both inner and outer tables of the frontal bone allowing communication between the epidural abscesses and the frontal soft tissue collection (figs. 2&3). The brain parenchyma and the ventricular systems were normal. A diagnosis of Pott's Puffy Tumor with bilateral epidural abscesses complicating frontal sinusitis was made.

The patient was then referred to the neurosurgical unit of the hospital where she had frontal craniotomy and evacuation of 22mls of the pus. She was placed on broad spectrum antibiotics (Ceftriaxone 50mg/kg body weight daily and Metronidazole 7.5mg/kg body weight 8hourly) for one week to prevent post operative meningitis. The content was sent for microscopy, culture and sensitivity which yielded no bacterial growth. The

post operative course was uneventful. She was discharged home after 7 days and she remained well on follow up at the surgical outpatient department.

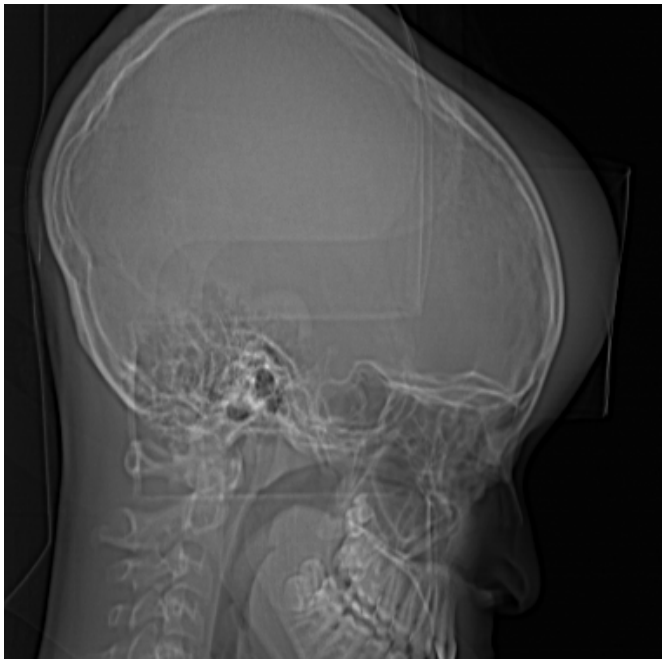

Figure 1: Scanogram: lateral view demonstrating a soft tissue swelling overlying the frontal bone.

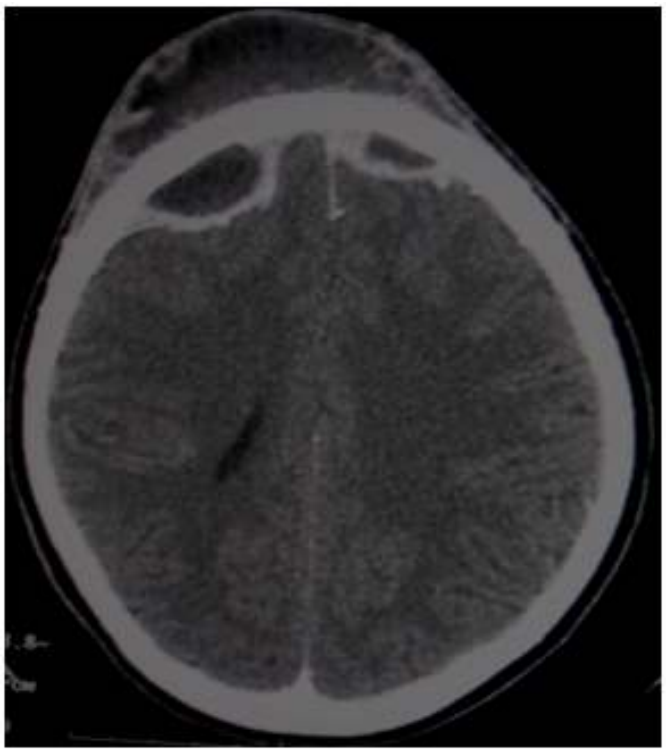

Figure 2: Axial contrast enhanced CT image showing two lenticular hypodense collections with rim thick wall enhancement overlying the convexity of both frontal lobes. The brain parenchyma and the ventricular systems are normal. Note also the collection overlying the frontal bone (Pott's Puffy Tumor).

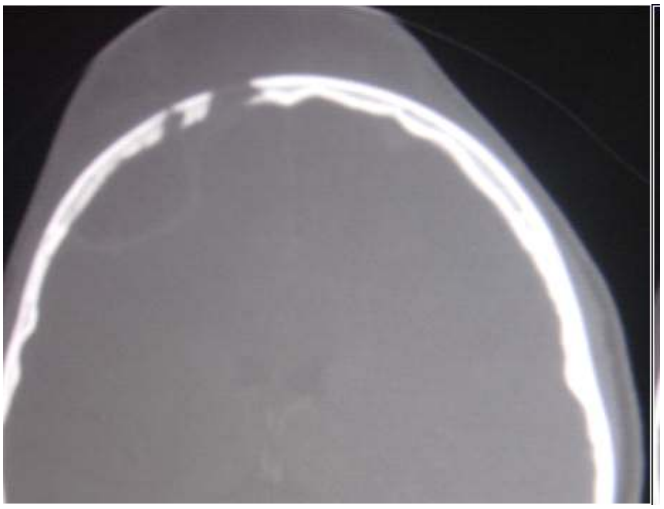

Figure 3: Computed Tomography bone window axial image of the skull,
showing bone defects involving both inner and outer tables of the frontal bone.

DISCUSSION

Pott's Puffy Tumor (PPT) is a rare disease entity which was thought to be extinct in the era of antibiotics [6] and most are thought to arise from contiguous spread from paranasal sinus mostly from frontal bones according to several reports.[4,7-9] This is similar to this case. The infection extends from the frontal sinus through the frontal bone marrow cavity causing osteomyelitis of the outer table, eroding it and causing subperiosteal abscess (PPT). It can also destroy the inner table resulting in epidural abscess and can spread through the dura to cause subdural, intracerebral empyema and thrombophlebitis which may lead to cerebritis.[6] These complications of sinusitis are said to occur through haematogenous spread via the valveless diploic veins.[6,9] The current case had osteomyelitis, subperiosteal abscess (frontal swelling), peri-orbital edema (which may be the early stage of orbital complication) and two epidural abscesses.

Pathogens such as streptococci, staphylococci and anaerobes are implicated in Pott's Puffy Tumor.[8,9] No growth was cultured from the materials evacuated in the present case, and is similar to the report by Collet *et al*[3] , Adeniji *et al*[5] and Moloney *et al*[10]. The negative culture is probably due to the use of various antibiotics prior to presentation.

The diagnosis of PPT should be suspected from clinical features of headache, catarrh, fever, peri-orbital swelling, erythaema, photophobia and tender swelling over the frontal bone. Radiological

investigations are of utmost importance in confirming the diagnosis of sinusitis and the complications be it orbital and or intracranial. Plain skull radiograph will demonstrate the soft tissue swelling overlying the frontal bone and the mucosal thickening. Osteomyelitis with bone defect may appear as moth eaten lucencies due to necrosis of the bone and is only evident after 30-50% of the bone is demineralised,[7] and thus may be absent in the acute phase as in the present case. Plain skull radiograph is not conclusive in demonstrating intracranial involvement as documented in previous reports.[7] Sinusitits may be evident on plain radiograph of the skull as mucosal thickening and soft tissue haze with fluid level occupying the sinuses. Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) are optimal in diagnosing the bone lesion and intracranial extension of sinusitis respectively. CT scan (axial and coronal reformat) is gold standard for demonstrating frontal osteomyelitis and intracranial involvement as reported by Emejulu *et al*[1] and Durur-Subasi *et al*[2]. In the current case, epidural abscess was demonstrated in both frontal regions with thick rim enhancement post intravenous contrast. Bone window also demonstrated osteomyelitis of the frontal bone as bone defects with irregularity of the inner table. These defects allow communication between the epidural abscesses and the subperiosteal abscess.

Even though MRI was not performed in this case due to financial constraint, the role of MRI can not be played down. MRI is more sensitive than CT scan in detecting intracerebral lesions but it is less sensitive than CT in detecting bone lesions. Abscess will appear as oval hypointense lesion with rim enhancement on T1 weighted images and hyperintense on T2 weighted images with surrounding edema.

Based on previously published data and our work, the role of imaging, especially CT scan is emphasize in the diagnosis of Pott's Puffy Tumor associated with epidural abscess following chronic sinusitis.

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