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POTT'S PUFFY TUMOUR: A RARE COMPLICATION OF SINUSITIS

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ABSTRACT

Introduction: Pott's puffy tumour is a rare entity defined by the presence of a subperiosteal abscess of the frontal bone associated with frontal osteomyelitis. Several predisposing conditions can lead to this entity, such as frontal sinusitis.

Case description: We report the case of a 15-year-old patient who presented to the emergency department for headache, fever and forehead swelling. Computed tomography revealed severe pansinusitis complicated by a subperiosteal abscess associated with frontal osteomyelitis, leading to the diagnosis of Pott's puffy tumour. The management combined intravenous antibiotics and surgical drainage of both the sinusitis and subperiosteal abscess.

Discussion: Pott's puffy tumour represents a rare but serious complication of frontal sinusitis. Clinicians should be aware of this potential complication as the diagnosis can be challenging at an early stage but may influence the subsequent prognosis.

KEYWORDS

Pott puffy tumour, tumour, subperiosteal abscess, sinusitis

LEARNING POINTS

- Pott's puffy tumour is a rare but severe complication of frontal sinusitis.
- The main symptoms are fever, headache, rhinorrhoea, and forehead swelling.
- Early diagnosis and treatment can prevent neurological sequelae and associated mortality.

INTRODUCTION

The term Pott's puffy tumour was initially evoked by Sir Percival Pott in 1768 to characterise subperiosteal abscesses following head trauma. Later, this finding was recognised as being associated with complicated frontal sinusitis[1-3].

Currently, Pott's puffy tumour is a rare condition with the use of antibiotics. However, this entity still occurs in certain circumstances, such as the spreading of an underdiagnosed or inadequately treated local infection or a complicated surgery[4]. Children and adolescents also seem more likely to develop this complication, often attributed to a greater risk of infection spreading due to the difference in vascularisation and abundant flow in the diploic veins responsible for the venous drainage of this area[3-5]; diploic veins communicate with the dural venous sinuses, which can contribute to the presence of septic emboli[5].

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In this article, we report a case of Pott's puffy tumour (PPT) in a 15-year-old patient and provide a review of the literature regarding this rare entity.

CASE DESCRIPTION

A 15-year-old patient initially presented to the emergency department (ED) for symptoms evolving for four days. He mainly described fever and rhinorrhoea but also several episodes of diarrhoea. The physical examination was normal, and the patient had no significant previous medical conditions. The patient underwent a screening for SARS-CoV-2 – which was positive – and he was discharged home with symptomatic treatment. Two days later, the patient returned to the ED for worsening symptoms. He described purulent rhinorrhoea, headaches with photophobia and swelling of the forehead extending to the left eye. He presented no neck stiffness. His heart rate was 83 beats per minute, his blood pressure was 120/80 mmHg and his oxygen saturation was 95%. He was afebrile. A biological analysis revealed a major inflammatory syndrome (C-reactive protein: 280 mg/l) with neutrophilic hyperleukocytosis (16,700/mm^3). Procalcitonin was elevated (25 ng/ml). Computed tomography (CT) revealed the presence of pansinusitis complicated with an extradural frontal lobe abscess (7 × 5 × 1.5 cm) associated with frontal osteomyelitis *(Fig. 1)*. Magnetic resonance imaging (MRI) confirmed the diagnosis *(Fig. 2)*.

The diagnosis of Pott's puffy tumour was made. The patient was placed under intravenous antibiotics (cefotaxime 2 g every 8 h, metronidazole 500 mg every 8 h, vancomycin 2 g every 24 h) and intrathecal antibiotics (vancomycin 20 mg every 24 h).

Surgery was indicated, and the patient underwent an ethmoidectomy and endoscopic sinuses drainage. The subdural abscess was drained a second time. Bacterial analysis revealed multiple pathogens (*Streptococcus anginosus*, *Parvimonas micra* and *Eikenella corrodens*). Blood culture identified the presence of *Fusobacterium necrophorum*.

The outcome was favourable, with a complete resolution of symptoms and the absence of any neurological sequelae. The MRI confirmed the full recovery *(Fig. 3)*, and the patient was discharged from the hospital.

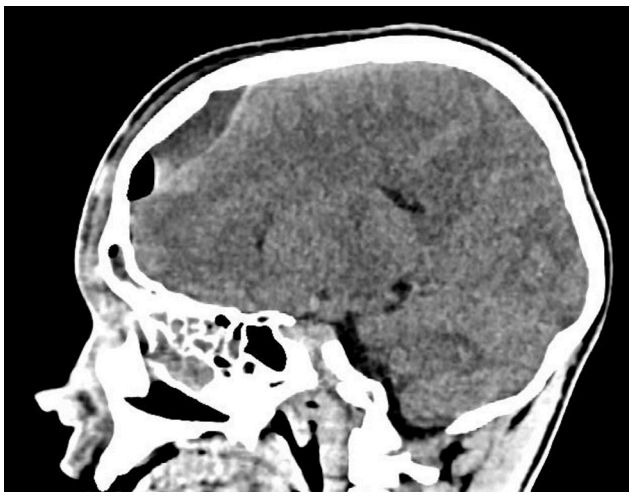

Figure 1. Contrast-enhanced CT at the time of admission (parasagittal image), shows a collection with air–fluid level evocative of an extradural abscess.

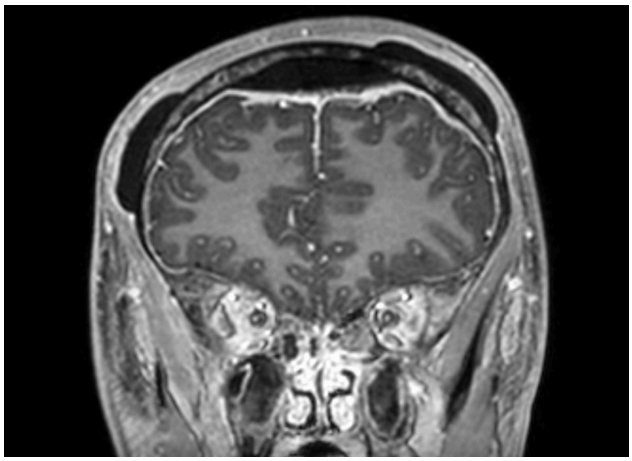

Figure 2. Magnetic resonance imaging at the time of admission (coronal image). It displays extradural and subperiosteal abscesses.

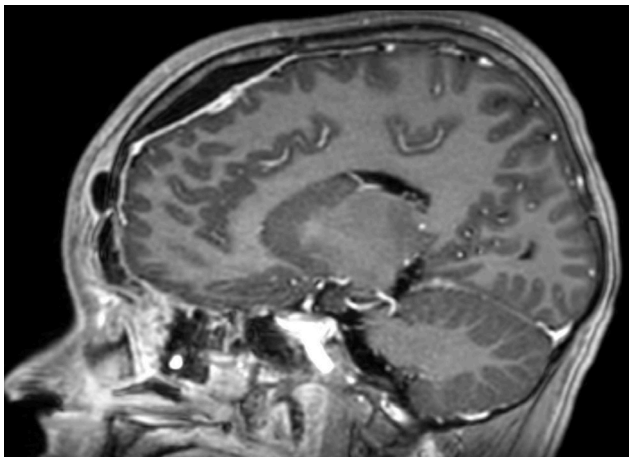

Figure 3. Magnetic resonance imaging shows complete remission of extradural abscess (sagittal image).

DISCUSSION

Clinical findings of PPT are numerous and variable, but a recent systematic review by Rhode et al. reported more frequent symptoms such as forehead swelling, headache, erythema or periorbital swelling and rhinorrhoea[6]. Other symptoms are described, and patients can present with neurological signs depending on the extent of the infection[6]. In children and adolescents, the clinical presentation can be non-specific and can complicate the early diagnosis.

Regarding predisposing factors, PPT mainly occurs following acute or chronic sinusitis, but other aetiologies exist such as head trauma, odontogenic disease, post-neurosurgery complications or intranasal drug use[5,6]. The infection either comes from direct local spreading, through bone vascularity or because of an immunocompromised state of the patient[5,6].

PPT bacterial findings are often polymicrobial, and the primary pathogens described as causative of PPT are *Streptococcus*, *Staphylococcus*, *Fusobacterium*, *Pseudomonas*

and *Prevotella*, but other anaerobes and enterococci can be identified[5,6].

Diagnosing PPT can be challenging due to potential non-specific symptoms and the rarity of the entity. However, clinical findings should raise awareness and guide clinicians to perform imaging. CT should be performed promptly to guide the diagnosis and lead to early treatment[5]. MRI is considered the gold standard as it displays the extent of the infection and guides surgery. However, this imaging is often less accessible and should not delay the initiation of the treatment[5]. However, MRI is a performant technique for the follow-up of patients to assess the complete resolution of previous findings[6].

The main differential diagnostics of PPT are represented by localised cellulitis, infected haematoma or brain tumour[3].

In all cases, prompt treatment is required to manage the spread of the infection. The recommended treatment described is a combination of medical management and the surgical drainage of the infection[5,6]. Several cases referring to antibiotics alone have been described, but this management seems to be associated with a higher risk of disease progression or recurrence[6]. Surgical treatment is represented by three distinct approaches depending on the severity of the infection and the radiological findings: external drainage, functional endoscopic sinus surgery or craniotomy[6]. Endonasal drainage can be envisaged in limited disease, but intracranial abscesses should benefit from complementary neurosurgical treatment[5].

Regarding the choice of antibiotics, recommendations suggest the initial use of broad-spectrum antibiotics with appropriate blood-brain barrier penetration. The spectrum should be adapted while the results of the microbiological material are obtained. However, reports differ regarding the optimal duration of the treatment, varying from 10 days to 6 months[6,7].

Prognosis and neurological sequelae are reduced with an early and effective treatment[5,7]. The main complications of PPT are due to the intracranial extension of the infection. In a literature review by Koltsidopoulos et al., intracranial complications in children and adolescents were reported in 72% of the cases[7]. These authors also reported that while mortality was high before the use of antibiotics, mortality is currently estimated at 3.7% of the cases. Mainly, the patients recovered without neurological sequelae[7].

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