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Pott's Puffy Tumor: A Rare Complication of Frontal Sinusitis

—An ENT Case Report

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Abstract

Background: Pott's puffy tumor (PPT) is a rare but severe complication of frontal sinusitis, defined by a subperiosteal abscess associated with frontal bone osteomyelitis. Although uncommon in the antibiotic era, it remains a potentially life-threatening condition due to the risk of intracranial extension. Early diagnosis and multidisciplinary management are essential to prevent morbidity. **Case Presentation:** We report the case of a 22-year-old male presenting with a 5-month history of progressive bilateral frontal headaches, followed by left periorbital and frontal swelling. Clinical examination revealed a tender, erythematous frontal tumefaction without neurological deficit. Laboratory tests showed elevated inflammatory markers (CRP 151 mg/L; leukocytosis 12,000/mm^3). Craniofacial computed tomography demonstrated left frontal sinusitis complicated by anterior frontal table erosion, subperiosteal abscess, and frontal osteomyelitis, consistent with PPT, associated with bilateral maxillary sinusitis and preseptal cellulitis. The patient received broad-spectrum intravenous antibiotics (amoxicillin-clavulanate and metronidazole) for 14 days, followed by oral therapy to complete a six-week course. Adjunctive corticosteroid therapy was administered for persistent inflammatory edema. Although initial clinical and biological improvement was achieved, recurrence occurred one month after discharge, necessitating endoscopic frontal sinusotomy (DRAF 2a), with favorable postoperative evolution. **Conclusion:** PPT remains a rare but serious complication of frontal sinusitis in young adults. Its presentation may be insidious, delaying diagnosis. Early imaging, prolonged antibiotic therapy, and timely surgical intervention when indicated are crucial to prevent recurrence and intracranial complications. Close follow-up is mandatory to ensure complete resolution.

Keywords

Pott's Puffy Tumor, Frontal Sinusitis, Osteomyelitis, Subperiosteal Abscess, Intracranial Complications, Case Report, Frontal Bone, Sinus Infection, DRAF Procedure, ENT Surgery

1. Introduction

Pott's puffy tumor (PPT) represents an unusual yet critical condition in which the forehead appears as a swelling due to a subperiosteal abscess associated with osteomyelitis of the frontal bone. The condition frequently occurs as a complication of frontal sinusitis or trauma. Symptoms include fever, headache, nasal discharge, and signs of increased intracranial pressure. It was first described by Percival Pott in the 18th century (Sharma et al., 2017; Sandoval & De Jesus, 2022). It may progress to life-threatening intracranial extension. Physicians must be highly vigilant when faced with a clinical picture suggestive of PPT (Cress et al., 2024).

2. Case Report

We report the case of a 22-years-old male patient who consulted us in our ENT and cervico-facial surgery department for a cranio-facial pain and a left periorbital swelling.

The patient reported a 5-month history of progressively worsening bilateral frontal headaches, described as constant and throbbing, which were markedly exacerbated when bending the head forward, suggesting increased pressure within the frontal sinuses. Initially, these headaches were associated with mild facial discomfort and occasional nasal congestion, without neurological deficits. Over time, the clinical course was marked by the development of bilateral periorbital swelling, more pronounced on the left side, accompanied by a prominent left frontal swelling, consistent with the formation of a subperiosteal abscess. On physical examination, the patient was in good condition, with Glasgow Consciousness Scale 15/15. No signs of neurological deficit were noted. On facial examination, we note a peri-orbital tumefaction that is red, tender and retractable on palpation, suggesting an inflammatory response associated with a lateralized frontal tumefaction on the left side (**Figure 1**)

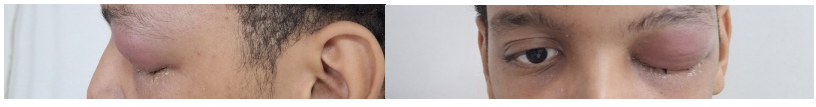

Figure 1. Left periorbital and frontal swelling, red, tender, and retractable on palpation, indicating an inflammatory response consistent with Pott's puffy tumor.

On rhinoscopy, we noted a purulent rhinorrhea in the middle meatus with an inflammatory appearance nasal mucosa.

The biological assessment revealed an infectious syndrome; CRP = 151, white

blood cells = 12,000.

Microbiological sampling was performed from the purulent nasal discharge, but culture results demonstrated a polymicrobial flora, consistent with the mixed bacterial etiology commonly observed in complicated frontal sinus infections.

The patient underwent a combined craniofacial CT scan, which revealed left frontal sinusitis complicated by a Pott's puffy tumor, characterized by a periosteal collection and frontal osteomyelitis (Figure 2). Additional imaging demonstrated bilateral maxillary sinusitis (Figure 3) and preseptal cellulitis on the left side (Figure 4), confirming the extent of the infection and guiding subsequent management.

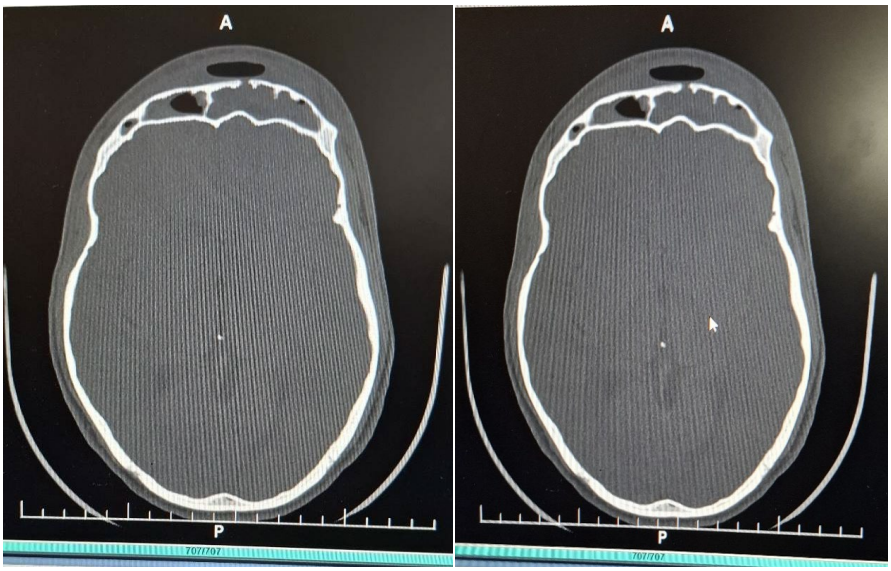

Figure 2. Axial plan of CT scan, frontal sinusitis with lysis of the external table and abscess under periosteal.

Figure 3. Axial CT image of the facial bones showing bilateral maxillary sinusitis.

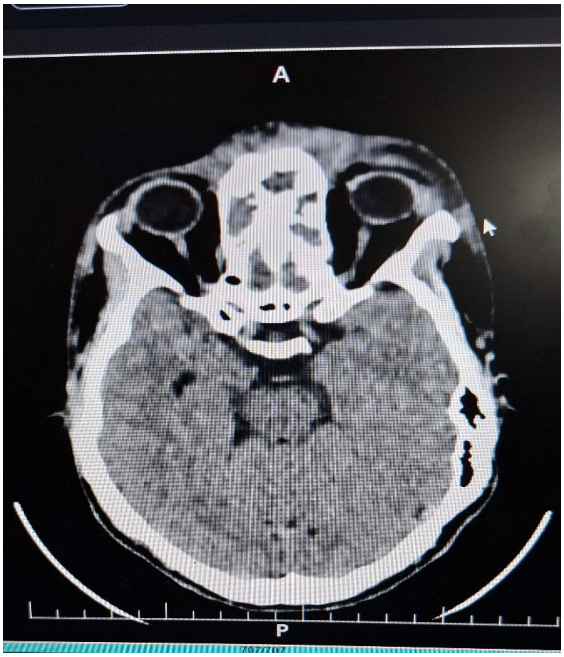

Figure 4. Axial CT scan showing preseptal cellulitis.

The patient received intravenous amoxicillin-clavulanate 1 g every 8 hours combined with metronidazole 500 mg every 12 hours. On the third day, due to persistent local inflammatory edema, adjunctive intravenous methylprednisolone 160 mg once daily was initiated for five days. After 14 days of IV therapy, treatment was switched to oral amoxicillin-clavulanate 1 g three times daily for four weeks, completing a six-week course, targeting streptococci, methicillin-sensitive *Staphylococcus aureus*, anaerobes, and community-acquired Gram-negative bacilli.

After showing clinical and laboratory improvement, the patient was declared cured and discharged. Nevertheless, one month later, he returned with a recurrence of the same symptoms, including frontal headache and left periorbital swelling, indicating a relapse of the underlying infection.

Subsequently, the patient underwent a frontal sinusotomy (DRAF 2a), and the procedure was completed successfully with an uneventful postoperative recovery.

3. Discussion

Pott's puffy tumor is a rare complication of frontal sinusitis, primarily affecting adolescents and young adults due to ongoing sinus development, increased vascularity, and venous connections to the intracranial space. Early diagnosis is crucial to prevent intracranial complications, and management typically involves targeted antibiotics and surgical drainage when needed (Cress et al., 2024).

In this patient, imaging revealed anterior frontal sinus wall erosion. Early recognition is essential; however, PPT symptoms often overlap with uncomplicated sinusitis (Al Doaibel et al., 2023). Forehead swelling, nasal congestion, and headache may be present without systemic signs such as fever, further obscuring the

diagnosis. Computed tomography (CT) is highly sensitive for detecting bony erosion, while magnetic resonance imaging (MRI) is superior for evaluating intracranial complications, including epidural abscess, subdural empyema, and pachymeningitis (Sharma et al., 2017; Al Doaibel et al., 2023; Welkoborsky et al., 2015).

Effective management requires coordination among otolaryngology, neurosurgery, infectious disease, ophthalmology, and critical care teams. Surgery remains the cornerstone of treatment, particularly in cases with intracranial extension. Common procedures include abscess drainage, debridement of necrotic bone, and sinus cranialization (Sharma et al., 2017; Altman et al., 1997). Cranialization is especially critical when the posterior sinus wall is eroded, as it eliminates the sinus cavity and reduces the risk of recurrent infection (Sharma et al., 2017; Vadiee et al., 2023).

Empiric antibiotic therapy should provide broad coverage against *Streptococcus* spp., *Staphylococcus aureus* (including MRSA), and anaerobes (Tan & Spector, 2007). Viral co-infections, such as SARS-CoV-2, may contribute to complications (Szewczyk & Mitosek-Szewczyk, 2022). Although not present in this case, the literature suggests an increased risk in co-infected patients.

Management of frontal bone osteomyelitis requires prolonged antibiotic therapy, typically for at least six weeks (Rai et al., 2020). Close outpatient follow-up is essential, including laboratory monitoring and imaging to confirm resolution. Corticosteroids, as initially prescribed, may transiently mask infection and delay diagnosis. Although systemic corticosteroids can relieve sinus symptoms, they should be used cautiously in severe or atypical cases (Smiljkovic et al., 2024; Venekamp et al., 2014).

Our case illustrates several important aspects of PPT management. First, the clinical course may be insidious; our patient experienced a 5-month history of frontal headaches before the development of periorbital and frontal swelling. This underscores the importance of maintaining a high index of suspicion in patients presenting with frontal swelling, headache, and sinusitis symptoms. Early imaging, particularly CT or MRI, is essential to identify subperiosteal collections and underlying osteomyelitis.

Second, timely initiation of broad-spectrum intravenous antibiotics is crucial. Our patient received amoxicillin-clavulanate and metronidazole, providing appropriate coverage against common pathogens implicated in sinus-related osteomyelitis. Despite initial persistence of periorbital edema, adjunctive corticosteroid therapy contributed to rapid resolution of inflammatory swelling.

Third, surgical intervention remains a cornerstone of PPT management in cases of abscess formation, intracranial extension, or failure of medical therapy. In our patient, initial medical management led to clinical improvement; however, relapse occurred one month later, necessitating a DRAF 2a frontal sinusotomy, which resulted in complete recovery. This highlights the importance of close follow-up and timely surgical intervention when conservative treatment is insufficient.

Finally, successful management of PPT benefits from interdisciplinary collabo-

ration and patient engagement through shared decision-making, which improves adherence and outcomes (Hoque, 2024).

4. Conclusion

Pott's puffy tumor remains a potentially serious complication of frontal sinusitis. In our patient, this case underscores the importance of early clinical suspicion in young adults presenting with frontal and periorbital swelling, even when systemic symptoms are mild or absent. Prompt imaging enabled accurate diagnosis, and a combination of multidisciplinary management, prolonged intravenous and oral antibiotic therapy, and adjunctive corticosteroid use led to significant clinical and biological improvement. Although surgical intervention was ultimately required after a relapse, timely medical therapy and close follow-up contributed to a favorable outcome.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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