

Case Report

Pott's Puffy Tumor: A Case Report

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Abstract

Background: Pott's Puffy Tumor is one of the most dangerous complications of frontal sinusitis. It's a manifestation of frontal bone osteomyelitis associated to subperiosteal abscess. It is now a rare pathology thanks to advances in antibiotic treatment of sinusitis. The diagnosis of Pott's puffy tumor may be challenging and might be confused with a tumor, isolated abscess or hematoma. Although this condition is frequently observed in children, rare cases in adults have been described. Early diagnosis and treatment of this condition are essential for optimal outcomes.

Case Presentation: A 14-year-old male patient was admitted to the emergency department with an inflammatory frontal swelling, combined with headaches, purulent nasal discharge, and fever. CT scan revealed a collection in the anterior frontal soft tissues complicating an active pansinusitis with anterior and posterior frontal sinus walls defect. The patient underwent percutaneous drainage of the abscess under general anesthesia and was successfully treated by intravenous antibiotics. Postoperative course was uneventful. We reviewed published cases of Pott's puffy tumor in adolescents and discussed the particularities of this condition.

Conclusion: Pott's Puffy tumor, although very rare, can evolve into intracranial extension which can be fatal. It requires early diagnosis and treatment based on appropriate antibiotic therapy and surgical approach.

Keywords

- Frontal sinusitis
- Abscess
- Osteomyelitis
- Pott's puffy tumor

BACKGROUND

Pott's Puffy Tumor is a rare and serious condition that arises as a complication of frontal sinusitis. It is characterized by a subperiosteal abscess and osteomyelitis of the frontal bone [1]. It is often observed in children and adolescents, although it can also affect less frequently adults [2]. The diagnostic workup should include a contrast-enhanced CT scan with brain and bony sequences to reveal potential complications. The treatment for Pott's puffy tumor involves both medical and surgical approaches. The best surgical procedure is controversial. Although minimally-invasive procedure such as percutaneous emergency drainage of the abscess seems effective as a first step. More comprehensive delayed functional endoscopic sinus surgery (FESS) can be performed afterwards for safety considerations.

CASE PRESENTATION

A 14-year-old adolescent with no particular medical history, was admitted to the emergency department with a painful frontal swelling that had been progressing for three weeks [Figure 1,2].

The patient reported frontal headaches, fever and a purulent nasal discharge.

Physical examination revealed a renitent inflammatory mass of the frontal region; fever (39°); a cardiac pulse of 100 per min; and a blood pressure of 110/60 mmHg. Clinical examination of the cranial nerves, visual field, and acuity were normal.



Figure 1 Clinical presentation: Inflammatory frontal swelling

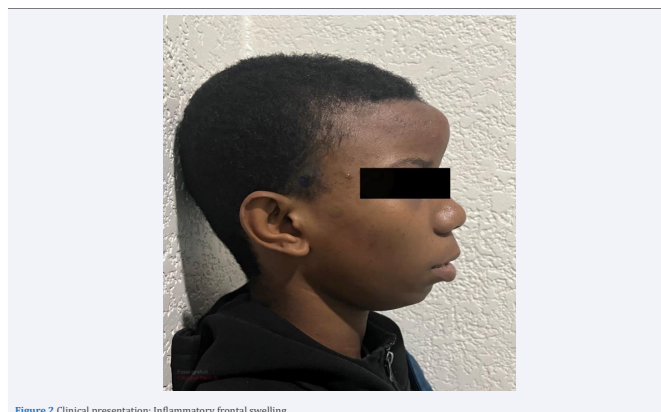


Figure 2 Clinical presentation: Inflammatory frontal swelling

Routine blood tests showed hyperleukocytosis with 75% neutrophils, and an increased CRP value. Kidney function and coagulation test were normal.

A contrast-enhanced CT scan was performed, and revealed the presence of an enhanced collection in the anterior frontal soft tissues, with a large defect in both anterior and posterior walls of the frontal sinus; complicating an active sinusitis but no abnormalities in the brain parenchyma [Figure 3,4].

During the patient's hospital care, he presented a brief episode of dysarthria along with a partial seizure. The occurrence of these neurologic signs prompted the decision to perform a new CT scan with a lumbar puncture. The new computed tomography scan showed stability of the initially described lesions, but with the appearance of a focal meningeal irritation near to the posterior wall of the frontal sinus. The lumbar puncture was sterile. An evaluation of patient's immune status was performed; including normal blood glucose levels and negative viral serologies.

The treatment consisted of surgical drainage of the frontal collection; under General Anesthesia through a frontal approach [Figure 5]. Bacteriological examination is systematically performed before irrigation with providence-iodine serum, and placement of providence-iodine-soaked gauze wicks within the abscess cavity [Figure 6].



Figure 3 Pan-sinusitis with frontal abscess.

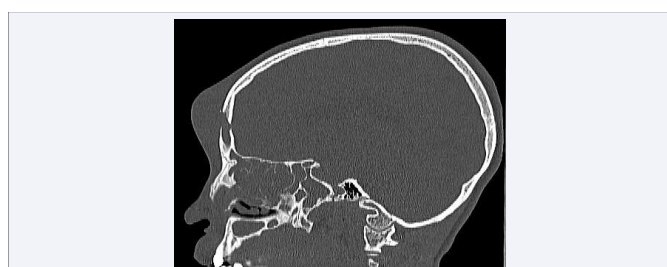


Figure 4 CT scan in sagittal section: Defect of anterior and posterior walls of the frontal sinus with abscess.



Figure 5 Surgical drainage through a frontal mini-incision.



Figure 6 Surgical drainage through a frontal mini-incision.

The patient received also intravenous ceftriaxone at intrathecal dose: 100mg/kg daily; with 40mg/kg daily metronidazole for two weeks; and 5mg/kg daily gentamicin for five days. Bacteriological result identified the presence of Group F streptococcus. The postoperative course was uneventful. Fever, edema and swelling resolved and the patient was free of symptoms at 2 months follow-up.

The patient underwent a nasofibroscopy after 2 months. It revealed an inflamed nasal mucosa with secretions observed in the middle meatus, requiring initial medical preparation with antibiotics, local corticosteroids, and recurrent nasal saline washes.

The child will be readmitted to the service within 6 months after the infection; for a functional endoscopic sinus surgery Type Draff 2b. This procedure will enlarge the frontal recess, including the milling of the sinus floor, remaining limited laterally to the lamina papyracea. This surgical management allows a complete resolution of sinus blockage improves sinus drainage and thereby prevents infectious complications.

DISCUSSION

Pott's puffy tumor (PPT) was first described by Percivall Pott in 1768 as a subperiosteal abscess due to cranial trauma. This pathology predominantly affects children and adolescents [5]. It is less common in adults, with a clear male predominance [3]. The main causes are acute and chronic sinusitis, as well as cranial trauma. Intracranial complications are secondary due to frontal osteomyelitis and can manifest primarily as a frontal abscess, subdural or epidural empyema [5].

The most commonly found bacteria are Streptococcus, Staphylococcus, and anaerobes [4,6]. This can be explained by the reduced oxygen concentration in the frontal sinus [6]. Cultures often reveal a polymicrobial flora [6]. In our case, the presence of Group F streptococcus was identified.

Pott's puffy tumor can manifest clinically with headaches, orbital or frontal swelling, cutaneous fistulas, altered consciousness, or cranial nerve involvement. Fever may be absent [7]. In our case, the patient presented with headaches, frontal swelling, dysarthria, and partial seizures as a neurological complication.

Diagnosis is confirmed by contrast-enhanced CT scan,

while MRI allows for better characterization of the intracranial extension [7]. In our case, an urgent craniofacial contrast-enhanced CT scan was performed, revealing the presence of a collection in the anterior medial frontal soft tissues that enhanced peripherally after contrast injection. Additionally, a defect in the anterior and posterior walls of the frontal sinus was identified, complicating an active acute pan sinusitis without clear delineation of a cerebral complication.

Antibiotic therapy should be continued for at least 4 to 6 weeks to prevent recurrence of osteomyelitis [6]. In our case, the treatment was extended for an additional 3 weeks at home with antibiotics after discharge. The treatment for Pott's puffy tumor involves both medical and surgical approaches. The best surgical procedure is controversial. Although mini-invasive procedure such as percutaneous emergency drainage of the abscess seems effective as a first step. More comprehensive delayed functional endoscopic sinus surgery (FESS) can be performed afterwards for safety considerations. Our patient showed clinical improvement, which can be attributed to the early diagnostic and both medical and surgery therapeutic management.

CONCLUSION

Pott's puffy tumor is a rare complication of sinusitis; however, delayed diagnosis can be life-threatening. PPT should

be suspected in any patient with frontal swelling in the context of sinusitis. Urgent imaging is mandatory, and initiation of antibiotics combined with surgical drainage is required to improve morbidity and mortality.

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