BALKAN ORL-HNS

Approach To Pott's Puffy Tumor in a 5-Year-Old Girl: Case Report

CASE REPORT
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ABSTRACT

Pott's puffy tumor typically occurs as a complication of frontal sinusitis, an infection and inflammation of the frontal sinuses in the forehead, just above the eyes. A 5-year-old girl was admitted to our hospital with swelling in the forehead, redness, and swelling in the right eye. We wanted to describe the successful treatment protocol with medical treatment, endoscopic sinus surgery, and external approach to the frontal region.

Keywords: Frontal sinusitis, osteomyelitis, pediatric sinusitis, Pott's puffy tumor, subperiosteal abscess

Introduction

Pott's puffy tumor (PPT) is a rare and potentially severe medical condition involving an infected frontal sinus in the skull, which can lead to swelling or an abscess on the forehead. The condition is named after Sir Percivall Pott, an English surgeon who first described it in the 18th century.[1]

Pott's puffy tumor typically occurs as a complication of frontal sinusitis, an infection, and inflammation of the frontal sinuses located in the forehead, just above the eyes. The disease can spread to the bone, causing the formation of an abscess and osteomyelitis.[2] The abscess can cause a painful swelling on the forehead, which may feel hot and tender to the touch. Other symptoms of Pott's puffy tumor include fever, headache, and difficulty moving the eyes.[3]

The infection can spread from the frontal sinus to the surrounding bone, causing erosion and abscess formation. Rupture of an abscess can lead to intracranial complications such as meningitis, epidural empyema, subdural empyema, and brain abscess.[4] Treatment of a mumps mass usually involves antibiotics to treat the underlying infection and drainage of the abscess to relieve pressure on the skull. In some cases, surgery may be required to remove the infected tissue and repair the damage to surrounding bones and structures.[5]

Pott's tumor is a rare but severe disease requiring immediate medical attention and treatment to prevent complications.

Case Presentation

A 5-year-old girl was admitted to the hospital with swelling and hyperemia on the forehead. The patient, who did not have any previously known disease, had an upper respiratory tract infection about 45 days before the admission and consulted a doctor with complaints of increased redness and elevated temperature in the upper part of the right eye 2-3 weeks after the upper respiratory tract infection. Medical treatment (amoxicillin-clavulanate, paracetamol) was initiated for 3 days. The hyperemia in the patient's eye decreased, and then swelling began to occur in the forehead area (Figure 1). During the swelling process, it was noted that the fever occasionally increased. The patient came to the hospital complaining of swelling in the forehead region, redness, and swelling in the eye. On physical examination, the patient weighed 20 kg, and her height was 135 cm. Heart rate was 95 beats/minute;

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Figure 1. Swelling over the forehead.

blood pressure was 90/60 mm Hg, and body temperature was 37.6˚C. There was swelling, erythema, and tenderness in the right periorbital region but no eye clouding or chemosis. Eye movements were normal, with no proptosis or decreased visual acuity. Oropharyngeal and other system examinations were normal. Laboratory findings included hemoglobin 10.7 g/dL, white blood cells 15.060/mm^3, platelets 547.000/mm^3, erythrocyte sedimentation rate 26 mm/hour, and C-reactive protein 42 mg/L. Biochemistry values were typical.

Ceftriaxone (50 mg/kg intramuscular in a single dose) with metronidazole (30 mg/kg/day orally divided into 4 doses given every 6 hours) and vancomycin (40 mg/kg/day divided into 3 doses given every 8 hours) was started with a blood culture. In the first week of treatment, redness in the periorbital region and swelling in the frontal region decreased. A cranial computed tomography (CT) scan showed mucosal thickening in the right frontal sinus and destruction of the anterior wall of the frontal bone (Figures 2 and 3). Endoscopic sinus surgery and an external approach to the frontal sinus were performed on the 10th day of hospitalization (Figure 4). Intraoperative abscess material was sent for culture. No growth was detected in the culture. On the 15th day of the patient's clinic, marked improvement was observed, and no complications were seen. The patient was discharged from the hospital after 2 weeks of Ceftriaxone (50 mg/kg intramuscular in a single dose), and oral amoxicillin clavulanic acid (40 mg/kg/day divided into 3 doses given every 8 hours) treatment was given. Outpatient follow-up was performed for 3 months. No symptoms of any disease were observed. Written informed consent was obtained from the patient's parents for this report.

MAIN POINTS

- *Pott's puffy tumor typically occurs as a complication of frontal sinusitis, an infection and inflammation of the frontal sinuses in the forehead, just above the eyes.*
- *Pott's tumor is a rare but severe disease requiring immediate medical attention and treatment to prevent complications.*
- *Surgical intervention was also necessary to remove the sinus infection and drain the subperiosteal abscess. This is important to prevent the spread of the disease to other parts of the body, including the brain.*

Discussion

Pott's puffy tumor is a rare complication of frontal sinusitis, typically in adolescents. It is characterized by a subperiosteal abscess associated with osteomyelitis of the frontal bone. The condition can lead to severe complications, such as cortical vein thrombosis, epidural abscess, subdural empyema, and brain abscess.[6]

Patients with a drum mass usually have mild frontal swelling, often accompanied by fever, headache, nasal discharge, and increased intracranial pressure. Imaging tests such as head CT and brain Magnetic Resonance Imaging (MRI) confirm the diagnosis.[7]

Management of Pott's puffy tumor usually involves a combination of surgical intervention and broad-spectrum antibiotic therapy.[8] Prompt diagnosis and treatment are essential to prevent severe complications and ensure a good outcome for the patient.

While *Staphylococcus aureus* and non-enterococcal streptococci are commonly associated with sinusitis, oral anaerobes can also be involved in some cases, and the etiology of Pott's bulging tumor can vary. Other potential causative organisms include *Haemophilus influenzae*, *Streptococcus pneumoniae*, and anaerobic bacteria such as *Prevotella* and *Peptostreptococcus* species[9]

Pott's bulging tumor, which is secondary to frontal sinusitis, was also found in our patient. No causative agent was detected in the pus

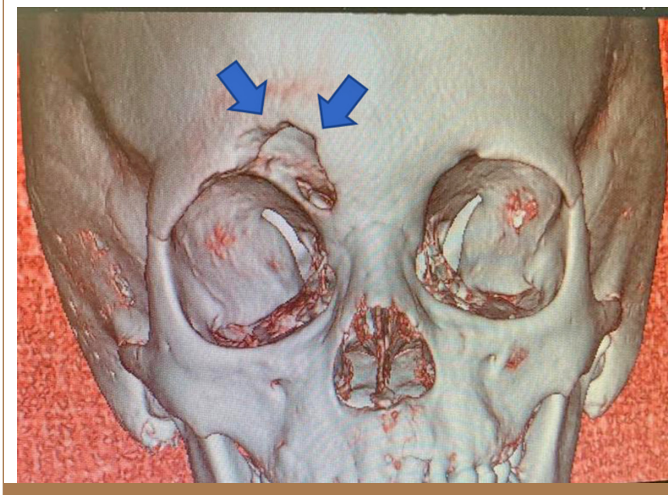

Figure 2. 3D computed tomography image of the lytic area in the frontal bone.

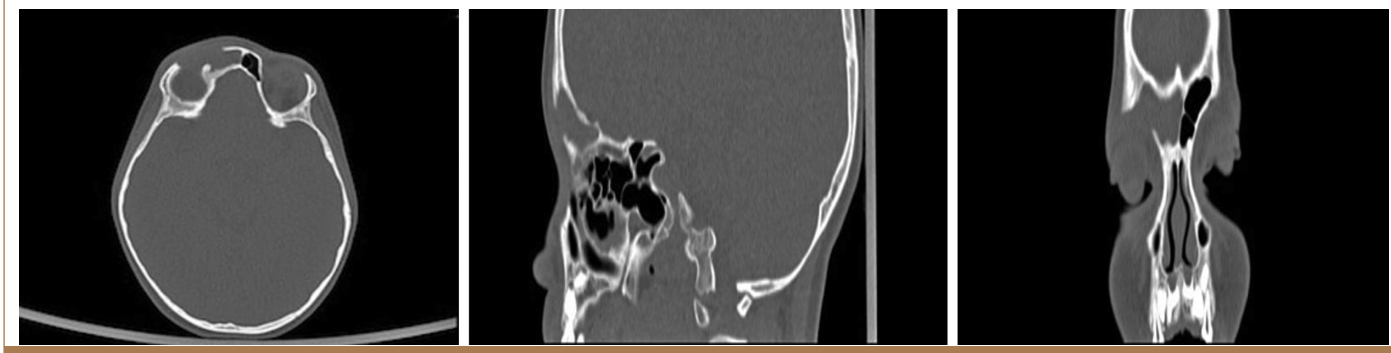

Figure 3. CT images in axial, coronal, and sagittal sections.

culture obtained after endoscopic sinus surgery, and it was thought this might be related to the antibiotics used before the culture. In conclusion, with appropriate and timely antibiotic and surgical treatment approaches, our patient was discharged with healing without any accompanying life-threatening complications.

Swift detection of subperiosteal abscesses is paramount in averting adverse health outcomes. A keen awareness is necessary, with a diagnosis rooted in the patient's medical history, physical examination, and imaging analysis. Symptoms typically include a forehead lump, fever, and headache, often after frontal sinusitis or trauma. Immediate imaging is essential to verify the diagnosis and assess potential complications upon suspicion.[10]

A thorough diagnostic workup must entail a CT scan fortified with contrast and brain and bony sequences. This scan has the upper hand in displaying bone compositions and immaculately captures air-tissue interfaces.[11] CT also pinpoints sinusitis, bone erosion, intracranial extension, and subperiosteal collection. It is possible to spot osteomyelitis through CT scans as low-attenuated areas of lytic bone destruction. While CT scans are speedy and accessible, clinicians should be mindful of children's radiation exposure.[5]

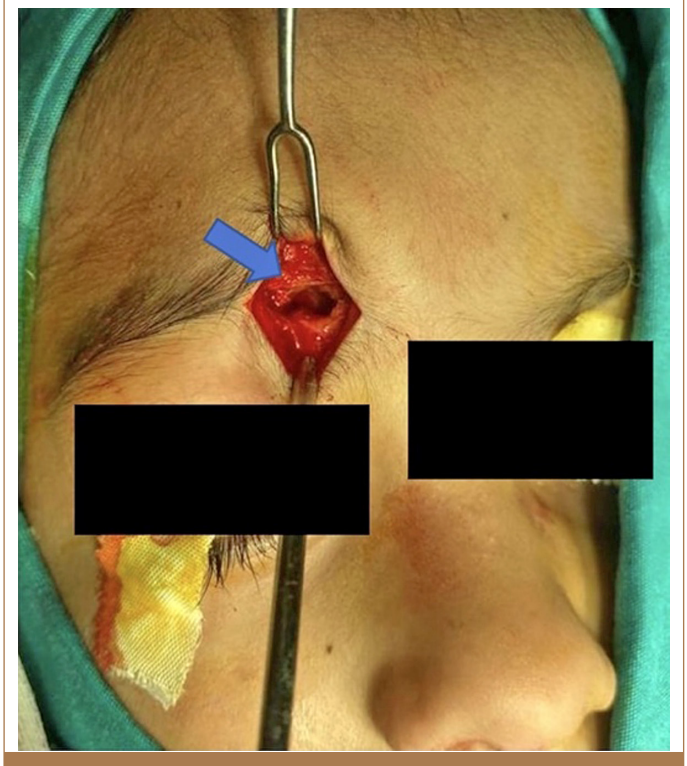

Figure 4. Lytic area in the frontal bone by external approach.

Magnetic resonance imaging is an imaging technique that excels in revealing soft tissue details, enabling the identification of intracranial issues, dural sinus thrombosis, and bone edema. Due to its precision, it is regarded as the ultimate method for detecting intracranial complexities. Even so, MRI is a lengthier process that necessitates anesthesia in younger children, and its availability is less widespread than other scanning methods.[4]

Initially, the patient had symptoms consistent with septal cellulitis, eyelid infection, and periorbital soft tissue infection. However, the appearance of a sensitive fluctuating swelling in the frontal region led to the suspicion of PPT, and imaging studies confirmed this diagnosis.

It is worth noting that misdiagnosis of PPT is not uncommon, as it can be mistaken for other conditions with similar symptoms. The study by Akiyama et al[12] referenced that 44.4% of cases were misdiagnosed with conditions such as epidermoid cysts and cellulitis. Therefore, careful evaluation and imaging are essential in establishing an accurate diagnosis of PPT.

Treatment of PPT usually involves a combination of broad-spectrum antibiotics, analgesics, and systemic and topical decongestants. If drug therapy does not improve the condition, surgical treatment may be required.[13] Patients with nasal polyps or mucosal swelling may not respond to drug therapy. In these cases, surgery may be performed on an outpatient or endoscopic basis or in combination to clear the paranasal sinuses of infection, drain the subperitoneal abscess, and remove the sequestrum.[14]

After surgery, long-term antibiotic therapy (at least 6-8 weeks) is needed for osteomyelitis. Before the introduction of broad-spectrum antibiotics, the mortality rate of frontal osteomyelitis was reported to be as high as 60%. Therefore, early and appropriate management of PPT is essential to prevent severe complications and reduce the risk of mortality.[15]

In this case, the medical team revised the patient's antibiotic treatment to include effective drugs against resistant Streptococcus, Staphylococcus species, and anaerobic bacteria. The medications mentioned, for example, ceftriaxone, vancomycin, and metronidazole, are commonly used to treat severe bacterial infections.

Surgical intervention was also necessary to remove the sinus infection and drain the subperiosteal abscess. This is important to prevent the spread of the disease to other parts of the body, including the brain.

Knowing that the patient received prompt and appropriate treatment to avoid more severe complications is reassuring.

It is important to note that PPT is a delicate condition, but it can be potentially life-changing if not treated instantly. In some cases, it is assumed that a specialist should examine PPT for further evaluation and operation. Pott's puffy tumor is a rare but potentially severe complication of frontal sinusitis, which requires a multidisciplinary approach for its management. Timely diagnosis, appropriate antibiotic therapy, and, in some cases, surgical intervention are crucial in ensuring favorable outcomes for patients with this condition.

Data Availability Statement: *The data that support the findings of this study are available on request from the corresponding author.*

Informed Consent: *Written informed consent was obtained from the parents of the patient who agreed to take part in the study.*

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