

Case Report: Pott's Puffy Tumor, But Without The Tumor

Himanshu Raval, Kalpesh Shah¹

¹ Smt. N.H.L. Municipal Medical College

Funding: The author(s) received no specific funding for this work.

Potential competing interests: The author(s) declared that no potential competing interests exist.

Abstract

Introduction: Percival Pott was the first who described Pott's puffy tumor as frontal sub-periosteal abscess formation with frontal osteomyelitis. Though the emergence of broad-spectrum antibiotics cases is rare to occur, its higher morbidity makes it an important entity that requires prompt intervention.

Case Report: Here we are presenting the case of a 16-year-old female with Pott's puffy tumor with uncertain etiology as both trauma and upper respiratory tract infection were present in the history. She was presented with the sign and symptoms of infective etiology. Ct scan and all routine investigations were done, and she was diagnosed to have frontal osteomyelitis and sub-periosteal abscess. She was operated on with Riedel's procedure and recovered completely. During the post-operative phase, her neurological examination was normal and no complications occurred up to 6 months of follow-up.

Conclusion: Though rare but hazardous Pott's puffy tumor warrants prompt intervention and primary prevention by appropriate usage of antibiotics. Morbidity can be easily prevented by early management.

Keywords: Tumor, Frontal Osteomyelitis, Pott's Puffy Tumor, Frontal Sinus.

Introduction

In the 18th century, Percival Pott first described frontal osteomyelitis with sub-periosteal abscess and hence named Pott's puffy tumor.^[1] Here, the puffy word is a kind of adjective that is related to puffy or fluctuant properties on palpation of the involved region.^[2] Initially, Pott noted its origin following trauma, but, subsequently, sinusitis came into the picture.^[1] Different etiological factors may result in the occurrence of this tumor. The word tumor, here, is a misnomer since it represents just a swelling and not a neoplasm. Very few cases are reported in the current literature.

In this case report, we are presenting the case report of a 16-year-old female with Pott's puffy tumor. The novelty of this case is the presence of both etiological factor trauma and sinusitis. There is no absolute pathway that we can decide the culprit particularly in this case. The presence of convulsion as presenting feature is also a rare

event.

Case History

This case report is prepared according to CaRe guidelines and proper consent regarding this is obtained from the patient's side. A 16-year-old female presented with complaints of headache in the forehead region in the past 20 days which was mild but gradually increasing in intensity with time, frontal region swelling for the past half month which was gradually become noticeable, two spikes of high-grade fever before 8 days and 6 days respectively and single episode of generalized tonic clonic convulsion before 5 days of presentation. She had a history of nasal stuffiness and running nose for 1 month for which she had received treatment and got it resolved. She also had a history of falls while stepping down and she suffered an injury to the forehead one month before, for which no treatment was taken. She has no other co-morbidities. At the time of presentation, on examination, she was afebrile and vitally stable. She has no icterus, pallor, clubbing, cyanosis, edema, or lymphadenopathy. On neurological examination, she was conscious, oriented, and cooperative. Her higher mental function was normal and her MMSE score was 26/30. The cranial nerve examination was normal. Power, tone, and reflexes were normal. There was no history of vomiting, respiratory distress, and unconsciousness. There was relative hyperemia and visible frontal bossing on the left half of the face on inspection. On palpation she was apprehensive, there was a doughy feel on swollen region and slight tenderness on palpation. All routine workups, MRI (magnetic resonance imaging), and CT (computed tomography) were done which were suggestive of frontal osteomyelitis/ Pott's puffy tumor.

She was shifted to Operation Theater coronal flap was raised for proper exposure and there was approximately 20ml pus removed from the sub-periosteal region, surrounding necrotic bony part was also removed and an iatrogenic window was created through the frontal bone. Dura was intact. The bone at the margin was necrotic and it was removed by Kerrison's punch into bits and sent for investigations. The operative area was washed with vancomycin and metronidazole. A defect in the frontal bone was there and no implant was placed closer as there was pus. Closer was done in layers with non-absorbable sutures and sterile dressings were applied. During the post-operative period, she was treated with higher antibiotics according to pus culture sensitivity report suggestive of staphylococcus aureus, analgesics, and anti-convulsant therapy. The histopathological report was suggestive of frontal osteomyelitis. She was discharged and suture removal was done. At three months of follow-up, there was no complication and the patient's neurology was normal. Cranioplasty has been planned but due to covid pandemic, it is postponed as it of now.



Figure 1. AP View: Frontal swelling can be seen



Figure 2. *Lateral view: Frontal bossing*



Figure 3. 3D reconstruction CT showing involvement of frontal bone

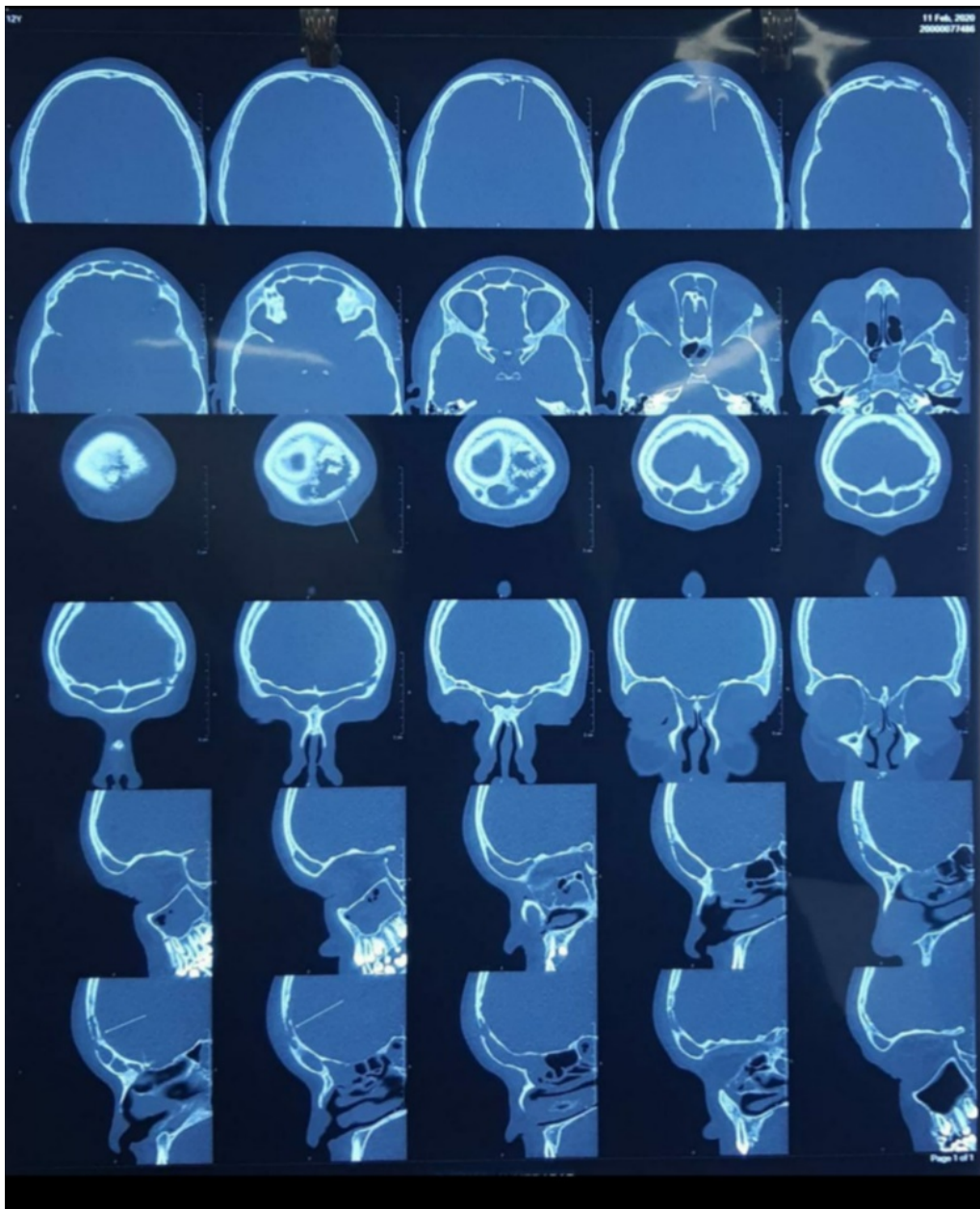


Figure 4. Bony window shows involvement of frontal bone

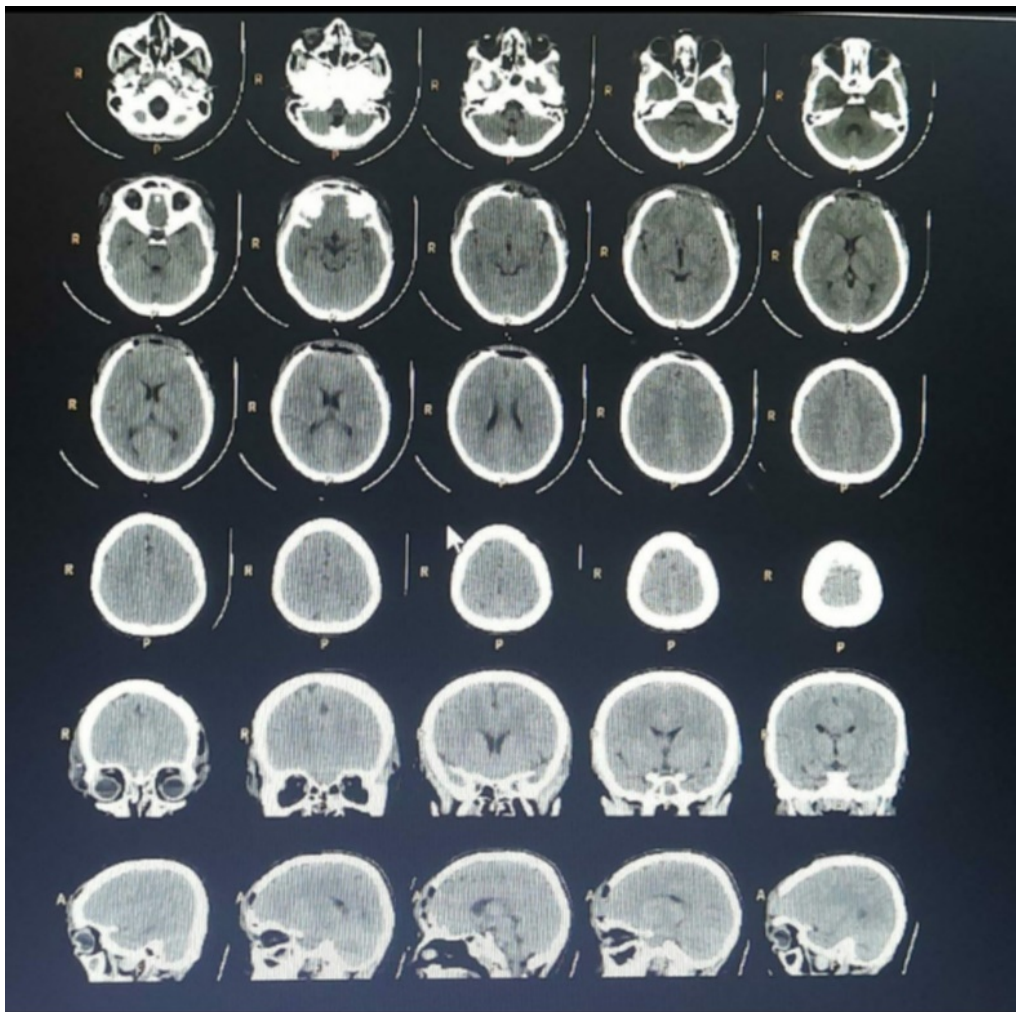


Figure 5. Post-operative scan showing removal of diseased part

Discussion

Percival Pott first came up with the case of pericranial abscess related to trauma in the frontal region which was swollen and puffy in the 18th century. The term Pott's puffy tumor is now used to describe sub-periosteal cellulitis or abscess of frontal bone associated with frontal osteomyelitis.^[3] Pott's puffy tumor's incidence was possibly high before then now due to lack of broad-spectrum antibiotics. There is no particular incidence rate mentioned in the literature.^[4] It is more common in males than females.^[5] In this case, the patient is a female.

For etiopathogenesis, knowledge of anatomy as well as embryology plays an important role, it's the ethmoidal sinus air cell that gives rise to frontal sinus during the age of ten to fifteen years, and, during a similar period, vascular connection surrounding frontal sinus on the rise.^{[6][7]} Both these factors make the frontal sinus more vulnerable to systemic sepsis spread through the hematogeneous route. In this case, possible etiology might be ignorance of minor trauma or non-selective antibiotic treatment which was given to the female without any investigations. The age of the patient is 16 years here, which makes her fall in vulnerable age. There was also a case in which frontal osteomyelitis developed following an insect bite.^[3] The pathogens most commonly isolated in Pott's puffy tumor are non-

enterococcal *streptococci*, *staphylococci*, and *anaerobes* which colonize the respiratory tract.^[8]

Headache, fever, nasal stuffiness, frontal swelling, and lid swelling are the common presenting feature. The focal deficit, altered consciousness, vomiting, and convulsion are suggestive of intracranial extension of abscess with a breach in the dura.^[9] In this case, though the dura is not breached, the possible cause of convulsion is an inflammatory reaction surrounding the frontal cortical region in the sub-periosteal space irritating the dural and underlying cortical surface. There are also cases that were presented with only low-grade fever and frontal region swelling.^[10] CT scan brain with a bony window is the investigation of choice when it came to diagnosing the condition. It gives even minute details about the anterior table and posterior table integrity of the frontal sinus. Any collection in the inside cranial cavity can be identified.^[11] In this case, a CT scan with a bony window shows attrition of the anterior and posterior walls of the frontal sinus. 3D reconstruction of the image shows a better picture and anatomical details. In this case, the absence of any associated fracture line in the surrounding bone hinted toward the infective origin, though the patient had a history of trauma as well as infection.

Management requires drainage of pus from the frontal sinuses, achieved either endoscopically or conventionally through a frontal sinus trephination via an incision in the superomedial aspect of the orbit. In the absence of a sub-periosteal or intracranial abscess, further surgery may not be necessary acutely. Prolonged antibiotic therapy, ideally culture-directed, for 6–8 weeks covering both aerobic and anaerobic organisms is recommended.^[12] Once the acute phase has subsided the patient should be re-evaluated to determine if a frontal sinus drainage procedure is required for long-term management. This can be undertaken endoscopically or externally through an osteoplastic frontal flap, or in combination. A limited sub-periosteal abscess may be drained through a Lynch Howarth brow incision. However, this does not allow adequate inspection of the frontal bone to assess for necrotic bone. An alternative is to perform a spectacle incision providing good exposure to the frontal sinus but resulting in a scar, which may not be acceptable cosmetically.^[13] A bicoronal scalp incision and flap provide excellent access to assess the whole frontal sinus enabling the removal of diseased bone. This procedure is of such significant complexity that the inexperienced rhinologist should not undertake it.

Associated intracranial complications necessitate prompt neurosurgical intervention. This is typically performed through a bifrontal craniotomy enabling drainage of intracranial pus and removal of necrotic bone.^[14] Complete removal of the posterior table will require frontal sinus cranialization. Extensive osteomyelitis of the anterior table may necessitate a Riedel's procedure.^[15] In this case, the patient was managed with Riedel's procedure with the removal of both the wall and the floor of the frontal sinus allowing the forehead skin to collapse, later after antibiotic therapy cranioplasty is the option.

Conclusion

Though its occurrence is seen rarely following URI (upper respiratory infection), inappropriate antibiotics and ignorance may lead to grave complications of simple trauma or URI. Early diagnosis and management hold the key here. Various management is available but prompt intervention can save the patient from extensive morbidity.

Source(s) of support: None

Presentation at a meeting: None

Conflicting Interest: None

Statement of equal author contribution: "These authors have contributed equally."

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