Potts Puffy Tumor: A Rare Cause of Seizure in Children

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Abstract

Potts puffy tumor is subperiosteal abscess of the frontal bone associated with frontal osteomyelitis. It can present with seizures as the presenting feature. We report a case of 14-year-old male who presented with seizures secondary to Potts puffy tumor.

A 14-year-old adolescent male presented with complaints of recurring episodes of generalized tonic clonic seizure. On examination, he was also found to have swelling over the forehead. He also complained of intermittent high-grade fever, nasal obstruction, and headache. Laboratory investigation showed leukocytosis. Contrast-enhanced magnetic resonance imaging of brain showed the presence of left frontal swelling with subcutaneous collection, frontal bone defects with bifrontal chronic subdural collection, and underlying buckling of brain parenchyma. Contrast-enhanced computed tomographic scan of paranasal sinuses showed the presence of fluid collection over the frontal region, with enhancing anterior frontal wall thickening, with another extra-axial fluid collection just beneath the inner table of frontal bone with associated erosion and cortical irregularity in the adjacent frontal bone. Endoscopic sinus surgery with external drainage of Pott's puffy tumor was done. Intravenous antibiotic was given for 6 weeks along with antiepileptics.

Potts puffy tumor is a rare complication of frontal sinusitis, which can present rarely to emergency with seizures and frontal swelling.

Keywords: Potts puffy tumor, frontal osteomyelitis, seizures, forehead swelling

INTRODUCTION

In 1769, the first case of Pott puffy tumor was reported by Sir Percival Pott in a case of forehead trauma.[1] Pott puffy tumor is a rare complication of misdiagnosed or inadequately treated frontal sinusitis. Other causes of Pott puffy tumor are frontal trauma, insect bite, frontal surgery, fibrous dysplasia, and dental infection.[2]

It is a subperiosteal abscess of the anterior wall of frontal sinus associated with underlying osteomyelitis and usually signifies an impending intracranial complication.[3] The infection may spread to the intracranial cavity and may cause severe intracranial complications like meningitis, epidural abscess, subdural empyema, intracerebral abscess, and dural sinus thrombophlebitis.

Pott puffy tumor is common among the adolescent age group because the diploic vein flow tends to be increased during this age group, and frontal sinusitis being the most common cause.

Usual clinical presentation is localized, tender swelling of the forehead along with other symptoms of headache, periorbital swelling, purulent rhinorrhea, fever, and vomiting. Rarely, it may present with seizures as the initial presenting feature to the emergency clinician.

Here, we present to you one such case in a 14-year-old adolescent male who presented with recurring episodes of generalized tonic clonic seizures to the neurosurgery department. The purpose of this article is to alert the physician of this rare presentation of Potts puffy tumor.

CASE PRESENTATION

A 14-year-old adolescent male presented to the emergency department with recurrent episodes of generalized tonic clonic seizures, each episode lasting for 15-20 minutes. He was managed by the pediatric neurologist and was started on Inj. Phenytoin 15 mg kg^{-1} body wt./twice daily. He was found to have swelling over the forehead, for

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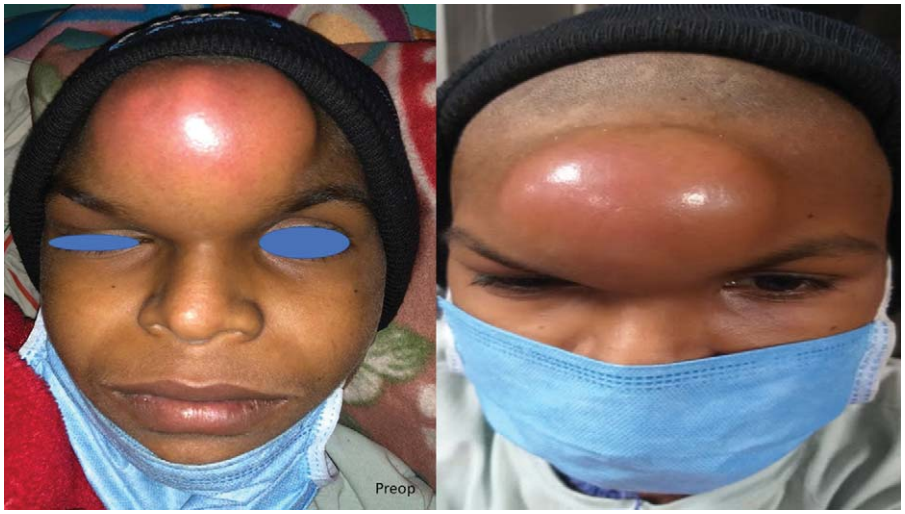

Figure 1. Preoperative photograph of patient showing fluctuant swelling over the forehead.

which he was referred to ENT department. He also complained of intermittent high-grade fever, nasal obstruction, nasal discharge, and headache for 7 days. He had no neurological weakness or visual complaints.

On examination, 6×6 cm soft fluctuant swelling occupying the midfrontal region just crossing the midline with erythematous overlying skin and defect in the frontal bone could be palpated (Figure 1). Nasal endoscopy showed purulent discharge and edematous, polypoid mucosa in middle meatus, and purulent discharge in the nasopharynx along the eustachian tube.

Lab investigation's showed hemoglobin of 10.1 g dL^{-1}, and increased white blood cell count to 20,000 μL^{-1} and increased neutrophil count to 78%. Other biochemical parameters were normal.

MRI brain with gadolinium was done, which showed the presence of frontal bone defects and subcutaneous abscess and left frontal swelling with bifrontal chronic subdural collection 32 × 34 mm with underlying buckling of brain parenchyma (Figure 2).

Contrast-enhanced computed tomography of Paranasal sinuses showed the presence of frontal scalp fluid collection 25 × 25 × 9 mm with enhancing anterior frontal wall thickening, with another extra-axial fluid collection just beneath the inner table of frontal bone with associated erosion and cortical irregularity in the adjacent frontal bone. There was also haziness of the frontal sinus and anterior ethmoidal cells and hypodense soft tissue density in the right maxillary sinus. (Figure 2). A diagnosis of Potts puffy tumor was made along with chronic frontal sinusitis.

Main Points

- Potts puffy tumor is complication of acute frontal sinusitis
- Potts puffy tumor can occasionally present with seizures as the presenting complaints
- Prompt surgical drainage and prolonged antibiotic therapy improves the outcome.

Neurosurgery clearance was obtained, and the patient was planned for surgery.

The patient underwent endoscopic anterior and/or posterior ethmoidectomy with bilateral frontal sinusotomy (DRAF 2 A) along with external drainage of the forehead swelling using brow incision under general anesthesia (Figure 3). About 25 mL pus was drained from the forehead, and the unhealthy necrotic bone around the bony defect was curetted out. There was polypoidal mucosal changes in bilateral frontal, ethmoids, and maxillary sinuses. Pus culture was reported as *Streptococcus* sensitive to ceftriaxone. Injection ceftriaxone was continued for 6 weeks. There were no further episodes of seizures. Subsequent CT scan of the head revealed no evidence of intracranial abscess or osteomyelitis. The patient recovered without any neurological deficit (Figure 4). An informed consent was taken from the patient to publish his case in the journal.

DISCUSSION

Potts puffy tumor is an unusual complication of chronic frontal sinusitis.[4] The underlying pathophysiology is osteomyelitis of frontal bone. The infection can erode both the outer and inner tables of frontal sinus. Erosion of outer wall of frontal sinus causes subperiosteal collection of pus over the frontal bone. Erosion of the inner table of frontal sinus may meningitis, epidural, or subdural empyema, frontal lobe abscess, or cavernous sinus thrombosis. Erosion of the inferior wall of the frontal sinus can spread toward the orbit, leading to orbital complications like lid edema, orbital cellulitis, and vision blurring and loss.

Though Potts puffy tumor can occur in any age group, it is common in the adolescent age group because of the following reasons. First, it is in this age that the flow in diploic veins increases. Second, the connection between the frontal sinus and bone marrow is less tight in the adolescent age group. Third, pneumatization of frontal sinus completes by 14-15 years.[5] It is rare in children below 2 years because the frontal sinus is not completely developed by this age.

The incidence of Potts puffy tumor has decreased in the post-antibiotic era.[6] The incidence of Potts puffy tumor presenting with intracranial complication is even rarer in this antibiotic era, and its prompt diagnosis

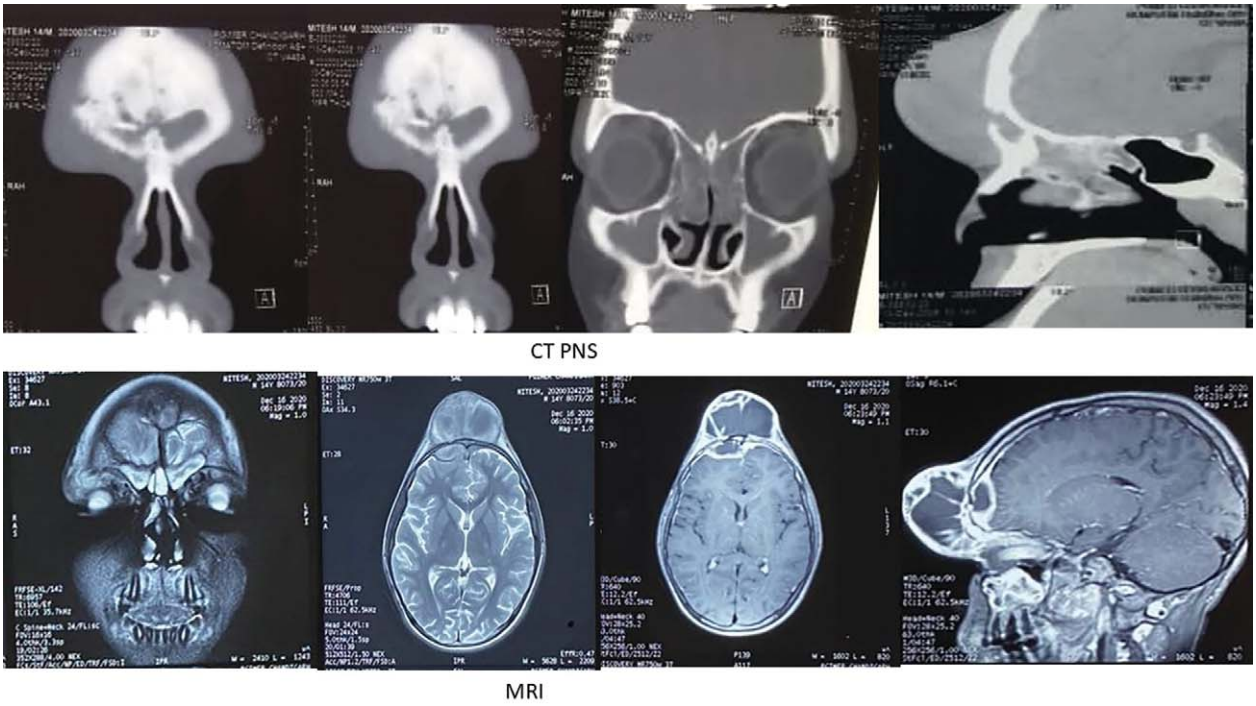

Figure 2. a,b. (a) Computed tomography scan of paranasal sinuses, showing frontal scalp fluid collection 25 × 25 × 9 mm^3 with enhancing anterior frontal wall thickening, with associated erosion and cortical irregularity in the adjacent frontal bone. (b) MRI brain with gadolinium showing frontal bone defects and the subcutaneous abscess in the frontal region and bifrontal chronic subdural collection 32 × 34 mm^2 with underlying buckling of brain parenchyma.

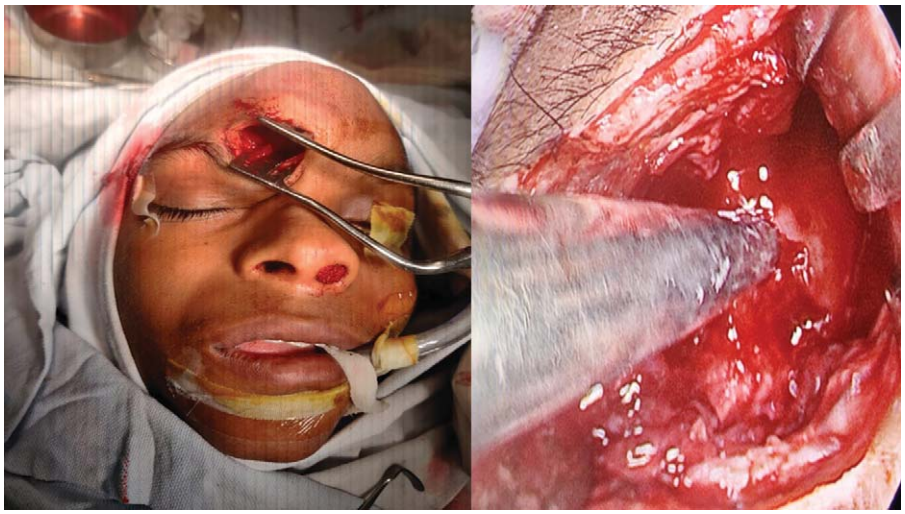

Figure 3. Intraoperative pic showing external incision with opening made into the frontal sinus.

requires a high index of suspicion. Symptoms such as lethargy, nausea, and vomiting; altered mental status; nuchal rigidity; or papilledema, seizures, hemiparesis, and focal neurological signs along with forehead swelling should suggest the diagnosis. The rate of an intracranial complication of Pott's puffy tumor is uncertain but is estimated to be 60-100%.[7,8]

Radiological imaging is required to document extra sinus involvement. Both contrast-enhanced computed tomography of PNS and MRI of brain with gadolinium enhancement are needed to clinch the diagnosis and document the intracranial complication.[9] CT is superior in its depiction of bone and provides excellent depiction of air-bone and air-soft tissue interface and sinus involvement.[10] MRI is superior, provides better soft

Figure 4. Postoperative photograph.

tissue resolution, and is gold standard for the diagnosis of intracranial complications.

Surgical intervention in which affected sinuses and intracranial foci are drained and infected bone debrided is the keystone of successful treatment, which can be effectively accomplished by combined endoscopic frontal sinusotomy and open drainage using brow incision as was done in our case.[11] High-dose intravenous antibiotics based on culture results should be given for 6-8 weeks postoperatively. Third-generation cephalosporin and metronidazole are effective antibiotic protocol in such cases.[12]

Potts puffy tumor can be a very dangerous complication, as it can lead to life-threatening in 5-10% cases.[13]

CONCLUSION

Pott puffy tumor is a rare complication of frontal sinusitis and can be a cause of seizures and high index of suspicion, and a prompt surgical drainage with prolonged course of intravenous antibiotic improves the outcome of surgery.

Informed Consent: Written informed consent was obtained from the participant who participated in this case.

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