

Pott's puffy tumor following an insect bite

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ABSTRACT

Pott's puffy tumor, a feature of osteomyelitis of the frontal bone, is a rare entity, especially in adults. Sir Percival Pott originally described this condition as a complication of trauma to the frontal bone. This is also a recognized complication of fronto-ethmoidal sinusitis. We present a rare case of Pott's puffy tumor caused by an insect bite presenting initially as a preseptal cellulitis and explore its pathogenesis and management.

KEY WORDS: Frontal osteomyelitis, Pott's puffy tumor, preseptal cellulitis

Preseptal and orbital cellulitis are well-known complications of sinusitis. Known causes of preseptal cellulitis and orbital cellulitis, apart from sinusitis, include periocular and facial trauma, insect bites, hematogenous seeding and direct extension from the skin. Preseptal cellulitis usually responds well to conservative management, which includes administration of appropriate antimicrobial agents. Occasionally, complications may occur despite antibiotic therapy.^[1] We present a patient who had clinical signs of preseptal cellulitis following an insect bite which developed into a Pott's puffy tumor that failed to respond to intensive oral and intravenous antibiotics, eventually requiring major endoscopic sinus surgery. Pott's puffy tumor is a rare entity, which has been reported in older children and very rarely in adults. On review of the literature, this appears to be the first case of Pott's puffy tumor following an insect bite in an adult reported so far.

Case History

An apparently healthy 49-year-old Caucasian male presented to the casualty service of the Eye Care Center with complaints of swelling of the right upper eyelid of one-week duration following an insect bite while vacationing at Canary Islands, Spain. There was no previous history of ocular infection or any other medical problems. On examination, visual acuities were 6/6 and 6/24 in the right and left eye respectively. Local examination of the right eye showed erythema and tense edema of the upper lid. Rest of the ocular examination was

unremarkable with full range of extraocular movements in both eyes. Fundus examination was normal in the right eye while the left eye, incidentally, showed macular chorioretinal scarring accounting for the decreased visual acuity in the left eye. On systemic examination, the patient was noted to be afebrile with normal vital signs. Hence, a diagnosis of preseptal cellulitis was made and he was treated with oral Augmentin® 375 mg Tid (Co-Amoxiclav) for one week.

On subsequent follow-up after one week (day 7 of antibiotic therapy), he showed no improvement in his condition with new complaints of swelling of the right forehead. On general examination, he was afebrile, well appearing and well oriented. Examination revealed persistent edema of the right upper lid with a small fistula draining a bloodstained purulent discharge in the furrow of the lid. The edema had extended to the right frontal region resulting in a soft, fluctuant swelling over the forehead [Figure 1]. He was subjected to an emergency CT scan of the brain and orbits using thin slices in axial and coronal sections with contrast, which showed soft tissue swelling with edema around the superior aspect of the right orbit with slight proptosis. The superior margin of the right orbit showed extensive bony erosion and destruction of the frontal bone. The inner and outer tables of the skull vault were breached and abnormal opacification of the frontal sinus noted. Small bony sequestrae were noticed within the frontal sinus [Figure 2]. Extraocular movements and cranial nerves I-XII were intact. A diagnosis of Pott's puffy tumor was made, consistent with the findings of the clinical and radiological investigations.



Figure 1: Persistent preseptal cellulitis in the right eye

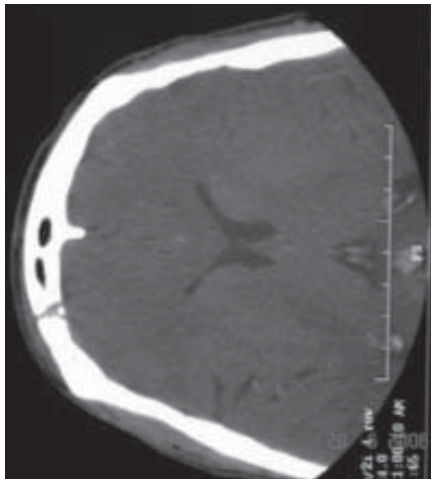


Figure 2: CT scan of skull showing destruction of frontal bone with breach in skull vault

The patient was immediately admitted to the Head and Neck Unit under joint management by the Ophthalmology and the Otolaryngology team. He underwent trephination of the right frontal sinus that yielded eroded bone and mucopurulent fluid. Endoscopy of the nose did not reveal any pus in the middle meatus. Pus swabs from the eyelid and cultures of the mucopurulent fluid yielded *Staphylococcus aureus*. The patient was started on intensive intravenous antibiotic treatment comprising IV flucloxacillin, fusidic acid and metronidazole after appropriate culture and sensitivity tests which ruled out methicillin-resistant *Staphylococcus aureus*. The edema over the frontal region began to subside after five days of antibiotic therapy. A repeat CT scan using thin slices post contrast was done after one week of antibiotic therapy which showed clearing of the fluid in the frontal sinus with decreased subcutaneous swelling and absence of any intracranial complications. The plan was to continue intravenous antibiotics for six weeks. The fistula appeared to heal slowly but the patient remained symptomatic with intermittent discharge and extrusion of pieces of dead bone. The CT scan after four weeks of IV antibiotic therapy showed persistent osteomyelitis of the frontal bone with opacification of the

frontal sinus along with multiple breaches in the inner and outer table of the skull vault. A modified endoscopic Lothrop procedure was performed to clear the sinuses and remove the sequestrum. Follow-up imaging studies showed sclerosis of the frontal sinus with resolution of the posterior wall defect of the frontal sinus. The patient recovered fully without any sequelae.

Discussion

“But the inflammation of the dura mater and the formation of matter between it and the skull, in consequence of contusion, is generally indicated and preceded by one [sign] I have hardly ever known to fail; I mean a puffy, circumscribed, indolent tumor of the scalp and a spontaneous separation of the pericranium, from the skull under such tumor.”

Sir Percival Pott, Observations on the nature and consequences of those injuries to which the head is liable from external violence, 1768.^[2]

Sir Percival Pott originally described this condition as a complication of trauma, but it is more commonly observed as a complication of frontal sinusitis. It is described as a frontal bone osteomyelitis resulting in a subperiosteal abscess presenting as a fluctuant mass over the forehead and scalp. Pott's puffy tumor is a rare entity, which has been reported mostly in the pediatric population and adolescents and very rarely in adults. Only 20-25 cases have been reported in the literature of the postantibiotic era, predominantly in the adolescent age group.^[3-6] However, in our patient, an insect bite was the most probable cause of Pott's puffy tumor. This has not been reported elsewhere in the literature.

Pott's puffy tumor can occur as a result of the spread of sinusitis and infection to the frontal bone, with the development of osteomyelitis in the frontal bone and extension of purulent material anteriorly or posteriorly. Interestingly, it is also reported following trauma to the prefrontal region of the skull and surrounding soft tissues.^[7] Pott's puffy tumor can be associated with subdural empyema, brain abscess, cortical vein thrombosis and epidural abscess.^[8] Because the mucosal venous drainage of the frontal sinus occurs through diploic veins, which communicate with the dural venous plexus, septic thrombi can potentially evolve from foci within the frontal sinus and propagate through this venous system. Thus, intracranial involvement is possible with or without direct erosion of the frontal bone. In previously reported cases, most of the cultured organisms consisted of microaerophilic streptococci, including alpha-hemolytic streptococcus, staphylococcus, peptostreptococcus, bacteroides species and other anaerobes such as fusobacterium. These organisms may be more common in this setting, compared to other otorhinologic infections, because of the relatively lower oxygen concentration in the frontal sinus caused by compromised ostial patency.^[9]

A high index of suspicion based on the history and clinical examination is necessary to identify this rare but grave condition. When a patient with preseptal cellulitis either following sinusitis or trauma presents with a fluctuant swelling

of the forehead, immediate radio-imaging is suggested either by contrast enhanced CT or MRI.

Treatment of Pott's puffy tumor ideally requires joint management care by the Ophthalmology and Otolaryngology team for prompt endoscopic drainage of sinus and removal of sequestrum, along with intensive antibiotics. Our case clearly demonstrates the aggressive nature of this condition and its resistance to intensive systemic antibiotics. The patient's condition improved only after thorough surgical drainage. Neurosurgical consult may be required in case of intracranial complications.

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Announcement

Dr. J. C. Patel Birth Centenary Celebration Committee

The year 2008 is the Birth Centenary Year of Dr. J. C. Patel. Some of his students/admirers felt that it would be a good idea to celebrate this Centenary Year by organizing CMEs, Orations/Lectures, Conferences, etc., during the year. He was associated with many professional bodies, which meet regularly every year; during these annual meetings/conferences, a lecture/symposium, etc., can be organized as a part of Centenary celebrations. We would like to form a Dr. J. C. Patel Birth Centenary Celebrations Committee. All his past students/admirers are invited to join the committee (without any financial commitment). Kindly communicate your name, designation, postal address, telephone number and E-mail ID to Dr. B. C. Mehta at Flat 504, Prachi Society, Juhu-Versova Link Road, Andheri (W0, Mumbai 400 053 (drmehta.bc@gmail.com).