A rare case of tubercular pansinusitis with orbital and intracranial extension

Sir,

Tuberculosis is a pandemic and India, with its population of over 1200 million, is estimated to account for nearly 30% of the global tuberculosis burden. Tuberculous involvement of the nose, nasopharynx, and paranasal sinus is extremely rare, even in countries like India, with a high incidence of pulmonary disease. Nasal and sinus tuberculosis remains both silent and asymptomatic until well advanced. The radiological picture can mimic that of a fungal granuloma or malignancy. Gleitsmann has reviewed the literature on tuberculosis of the maxillary antrum. It is sometimes confused with granulomatous or neoplastic processes and can have varied pathological presentations.

A 12-year-old girl, presented with complaints of pain and swelling of both orbits, more on the left for eight to ten months. She also complained of decreased vision in the left eye and two to three episodes of blood-tinged sputum for the last two months. There was no history of fever, cough or joint pain. There was no history of other significant medical or surgical complaints or any drug intake. The general physical, cardiovascular, and lower respiratory examination was within normal limits. The ophthalmological evaluation showed normal extraocular muscle movements, normal intraocular pressure, vision of 6/6ft in both eyes, normal anterior and posterior segments, normal fundus, and pupillary reaction to direct light was present. No mass was palpable in the orbit. Her complete blood count, liver function tests (LFTs), kidney function tests, and urine routine microscopy were within normal limits, except for the serum total protein, which was 9.2 g/dl and an erythrocyte sedimentation rate (ESR) that was 91 mm at the end of the first hour. Plain radiograph and computed tomography (CT) examination of the chest were normal. A computed tomography (CT) scan of the orbits [Figure 1a-c] showed a large (8.4 × 7.3 cm), inhomogeneous textured, patchy enhancing soft tissue lesion, involving the bilateral ethmoidal sinuses, frontal sinuses, and superonasal region of both the orbits. Frank and extensive bone destruction was seen in the ethmoid bones, medial wall, roof, and floor of the orbits and bilateral frontal bones, including the orbital rim. Diffuse mucosal thickening was seen in the bilateral maxillary sinuses (right > left). The mass was extending medially in both orbits and in the retrobulbar area, causing a down and out displacement of both globes. Both optic nerves appeared normal. Magnetic resonance imaging (MRI) revealed diffuse pathology in the bilateral frontal and ethmoid sinuses, extending into the frontal epidural, extracranial, and superior extraconal space of the orbits, bilaterally. The brain parenchyma was normal [Figure 2a-c]. We kept the differential diagnoses of malignancy, tuberculosis, fungal infection, and the rare possibilities of pseudotumor, sarcoidosis, and Wegener’s granulomatosis.

Endoscopic nasal biopsy was performed and the samples were sent for histopathology, Ziehl - Neelsen (ZN) staining, polymerase chain reaction (PCR) for tuberculosis, and...
fungal culture. Histopathology revealed necrotizing granulomatous inflammation and the ZN stain was negative for *Mycobacterium tuberculosis*. PCR was positive, as the IS6110 and MPB 64 regions of the *Mycobacterium tuberculosis* were detected. Serology for HIV 1 and 2, anti-nuclear antibodies (ANA), cytoplasmic anti-neutrophil cytoplasmic antibodies (c-ANCA), and perinuclear anti-neutrophil cytoplasmic antibodies (p-ANCA) were negative. The serum angiotensin converting enzyme was 25.4 U/L. The Mantoux test was positive.

The final diagnosis was tubercular sinusitis with orbital and intracranial extension and the patient was put on anti-tubercular treatment as a HRZL (isoniazid, rifampicin, pyrazinamide, levofloxacin) daily regimen. We avoided using ethambutol for fear of optic neuritis. During follow-up, the patient had significantly improved, and symptoms such as protrusion of eye and pain in the eye were completely absent. During the fourth month of treatment, a computed tomography (CT) scan was performed, which showed (Figure 3a and b) significant improvement compared to the previous scan, with a decrease in the soft tissue component and enhancement, and smoothening of the bony margins with no new areas of involvement.

Tuberculosis of the sinonasal region is a rare condition. Myerson\(^5\) states that any of the sinuses may be attacked by tuberculosis, with the maxillary and ethmoid being the most susceptible. Our patient had involvement of all the paranasal sinuses, which is a rare finding. The various compartments at the base of skull communicate with one another and intracranially through the foramina and perforations, thus allowing for widespread involvement.\(^6\) The disease is nearly always secondary to pulmonary or extrapulmonary tuberculosis, which reaches the maxillary sinus by way of the blood stream or by a direct extension into the sinus.\(^7\) However, our patient did not have pulmonary tuberculosis.

Our patient had tuberculoma and bony involvement, which are rare findings, with signs of poor prognosis, but our patient responded well to medication. In some cases of sinonasal tuberculosis there are also bony changes in the orbit, which produce visual disturbances and proptosis. In our case the patient initially sought medical care for the two complaints of bulging of eyes and vision problem.

Both benign and malignant sinonasal lesions could be differential diagnoses. Carcinomas constitute 80–90% of all sinonasal tumors.\(^8\) Benign lesions include polyp, mucocele, fungal diseases, and a variety of infective and non-infective granulomatous diseases. Infections include tuberculosis, rhinosclerosis, sarcoidosis,\(^9\) and the like. Fungal diseases are common in the ethmoid sinuses, occasionally in the sphenoid sinus, and rarely involve the frontal sinus. The patient often presents with recurrent nasal obstruction, not responding to routine antibiotic therapy. Radiologically, fungal and granulomatous lesions have an almost similar appearance. Malignant lesions of this area have to be considered in the differential diagnosis also, with a difference being that the latter group has bone destruction. The intracranial surface of

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**Figure 1:** A contrast-enhanced computed tomography (CECT) scan of the paranasal sinuses and orbits. (a) Coronal soft tissue window (b) axial soft tissue window (c) axial bone window images show inhomogeneous, patchy, enhancing soft tissue filling the bilateral ethmoid sinuses, and extending to the bilateral frontal sinuses and superonasal region of both the orbits. Frank extensive bone destruction is seen in the ethmoid bones, medial wall, roof, and floor of the orbit and bilateral frontal bones, including the orbital rim. The mass was extending medially into both the orbits and in the retrobulbar area, causing down and out displacement of both the globes. The optic nerves appear normal.

**Figure 2:** CE-MRI of the paranasal sinuses and orbits. (a) Coronal T2W image (b and c) coronal post-contrast T1W images show diffuse pathology in the bilateral frontal and ethmoid sinuses, extending into the frontal epidural, extracranial, and superior extraconal space of the orbits, bilaterally. On the T2W image, the core of the lesion appears hypointense, and the enhancement is peripheral. There is intracranial extension, with enhancing extradural collection and thickened enhancing dura.
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The tumor-like lesion tends to be broad-based and fairly flat, while malignant lesions have a highly irregular intracranial surface, with focal bone destruction, remodeling, the sinus walls and septa are thick and hypertrophic, and the cavity is expanded. In our case, the bone destruction present in the frontal, ethmoid, and orbit favored a malignant cause more than granulomatous infection.

To summarize, we present a case of pathologically proven extensive tubercular involvement of the paranasal sinuses, in a child presenting with slow, progressive proptosis and orbital pain. There was widespread disease, with a heterogeneous, enhancing, soft tissue component within the sinuses, extending to the orbits and intracranially, with significant bone destruction. Although neoplasms, development anomalies, and non-tuberculous infections are much more common causes of proptosis in childhood, tuberculosis must always be considered in the differential diagnosis of atypical orbital lesions.

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Conflicts of interest
There are no conflicts of interest.