Osteomyelitis of the Skull Base Due to Mucormycosis

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INTRODUCTION

Osteomyelitis of the skull base (SBO) is a well described but uncommon entity with a high mortality rate (Chandler et al. 1986, Beneke J.E 1989). This condition is usually secondary to infection in the external auditory meatus or middle ear by gram negative organisms in the absence of adequate host response. We report a case of osteomyelitis of the skull base due to mucormycosis in an immunocompetent patient who presented with multiple cranial nerve palsies.

Case Report

A thirty eight-year old female patient presented to the otolaryngology outpatient clinic with complaints of diminution of vision in both eyes and swelling of both sides of the face of eight months duration. The swelling followed extraction of the right upper second molar. This swelling gradually progressed to the other side of the face with rapid development of blindness accompanied by headache during the next five days. She was diagnosed having bilateral cavernous sinus thrombosis and was treated with injections Amikacin, Cefadizime and cloxacillin. Subsequently the patient developed multiple abscesses over the face and neck, which required incision and drainage. A biopsy had also been taken at that time. The swelling decreased with antibiotic therapy but she developed bilateral hearing loss, which was

thought to be a sequel to ototoxic antibiotics. The patient developed drooling of saliva, facial asymmetry, hypernasality and hoarseness. Examination of the face revealed multiple incision marks with discharge of purulent exudate. Neurologic examination revealed normal higher mental function. Examination of the cranial nerves showed involvement of all cranial nerves except the olfactory and accessory nerve on the right side. On the left side she had II, III, IV, and VI nerve palsies. Investigations revealed deranged renal function parameters with moderate rise in urea and creatinine levels probably as a sequel to prolonged administration of aminoglycoside antibiotics. Her blood sugar profiles (fasting and post prandial) were found to be within normal limits. ELISA test for HIV was negative. CT scan of the nose and paranasal sinuses revealed involvement of the soft tissues of the cheek on both the sides with extension of a heterogeneous mass involving the maxillary sinuses, orbits, infratemporal fossa and parapharyngeal space extending to the jugular foramen and base of skull causing destruction of the clivus and transverse process of C₂ vertebra on the left side. (Fig 1 and 2a and 2b).

Tc97 scan also revealed a pathological process along the base of skull with suspicion of osteomyelitis. Fungal serology was negative and the stain for fungus was negative. Fine needle aspiration cytology from both orbits

Fig 1 CT scan showing opacification of the maxillary sinuses

Fig 2b CT scan (axial view) showing involvement of Clivus area (arrows).

Fig 2a CT scan (coronal view) showing involvement of C₂ vertebra (arrows).

Fig 3 Photomicrograph showing broad aseptate hyphae of mucor in a background of necrosis and inflammatory cells (PASX1200).

revealed a suspected granulomatous pathology. Biopsy slides were obtained where the patient had been treated earlier. A review of that material revealed evidence of mucormycosis (Fig 3). Radical surgery could not be contemplated due to extensive involvement of the base of the skull and destruction on cervical vertebra. Patient was treated with itraconazole in a dose of 100mg twice daily for a period of three months. A repeat scan done after 4 weeks showed a very good response with disappearance of opacification of the maxillary sinuses

with no remarkable change in the skull base lesion. The patient was lost to follow up after six months.

Discussion

Osteomyelitis of the skull base of fungal etiology has been described previously. Bacterial infection of the nose and paranasal sinuses may spread to the cranial vault leading to Pott's puffy tumor and osteomyelitis but spread to the skull base has not been reported (Chandler J.R.

1986). Osteomyelitis of the base of the skull of bacterial origin is usually secondary to infection beginning in the external auditory canal and is caused by *Pseudomonas aeruginosa*.

Mucormycosis is an aggressive opportunistic infection due to *Rhizopus*, *Mucor* and *Absidia* of class *Mucorales* (Succar M.B. et al. 1979). These fungi are not pathogenic and normal hosts are rarely involved. The fungus penetrates the arterial walls producing thrombosis and infarction of the tissues (Deweese et.al. 1965). Spread occurs via vessels to the paranasal sinuses and to the central nervous system via the cribriform plates and to the orbit via ethmoid vessels or through the lamina papyracea (Baver H et.al. 1955).

Our patient probably started with a dental infection followed by osteomyelitis of the maxilla leading to cavernous sinus thrombosis. Prolonged antibiotic therapy for cavernous sinus thrombosis might have predisposed the patient to this opportunistic fungus resulting in chronic infection along base of skull leading to involvement of multiple cranial nerves.

Headache is a constant symptom of osteomyelitis of the base of the skull. Involvement of cranial nerves II, III, IV, V, and VI has been reported in nycirmycosis (Estrem S.A 1990, Bhattacharya et.al. 1992, Karam F. 1990) Nussbaum et.al (1994) has reported a 36% incidence of cranial nerve dysfunction in mucormycosis without specific mention of the nerves involved. On careful search of the avail-

able English literature, we didn't come across any report of multiple cranial nerve palsies including the lower cranial nerves in mucormycosis. The involvement of cranial nerves II, III, IV, V, VI is because of the involvement of orbit and cavernous sinus. Cranial nerve VII was involved at the exit from the stylomastoid foramen. Cranial nerves IX and X were involved at the jugular foramen and cranial nerve XII was involved in the parapharyngeal space. Cranial nerve VIII may have been affected by administration of ototoxic antibiotics.

Surgical debridement and systemic antifungal therapy is the main stay of treatment in mucormycosis but in our case spread was along the base of skull stage III (Chandler J.R.) and hence nor amenable to surgical debridement. Although amphoterecin B is accepted to be a better drug for mucormycosis, it could not be administered to our patient due to her impaired renal function. Hence the patient was treated with oral itraconazole. Although the reports of the role of itraconazole in the treatment of mucormycosis are lacking, we encountered a good response in our patient as evident from the repeat CT scans.

An increase awareness of this entity, necessity of tissue biopsy for diagnosis and prompt surgical management in the stages of the disease could have prevented spread of the disease to the skull-base and consequent morbidity to the patient.

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