Infantile Maxillary Sinus Osteomyelitis Mimicking Orbital Cellulitis

Nagarajan Krishnan, Nathan Ramamoorthy[1], Suresh Panchanathan[1], Jothiramalingam S Balasundaram[2]

Departments of Radiology, [1]Pediatrics, and [2]Otorhinolaryngology, Chettinad Hospital & Research Institute, Kanchipuram, Tamil Nadu, India

ABSTRACT

Periorbital soft tissue swelling may result due to primary orbital pathology or from adjacent facio-maxillary or sino-nasal inflammatory causes. Osteomyelitis of maxilla in the pediatric age group is a rare entity in this era of antibiotics. We present an 11-month-old female infant who was brought with peri-orbital selling and purulent nasal discharge. Computed Tomography showed erosions of the walls of maxillary sinus suggestive of osteomyelitis. Culture of sinus scraping showed *Staphylococcus aureus* growth and the child improved with intravenous cloxacillin therapy. This case is presented due to the rarity of its presentation in this age group and for awareness to consider this entity in children having fever and peri-orbital swelling.

Key words: Computed tomography, Infant, Maxilla, Osteomyelitis

INTRODUCTION

Orbital complications of sinusitis were described first by Hubert in 1937[1] and modified by Chandler *et al* in 1970[2] as

1. Inflammatory edema,
2. Orbital cellulitis,
3. Subperiosteal abscess,
4. Orbital abscess and
5. Cavernous sinus thrombosis.

Periorbital cellulitis with preseptal involvement and lid edema caused by faciomaxillary inflammatory process has to be differentiated from postseptal orbital involvement by imaging, as the prognosis is considered less favorable with the latter.[3,4] Although clinical signs of orbital involvement like proptosis and/or pain or limitation of extraocular movements are suggestive of orbital post-septal involvement, Computed Tomography (CT) has emerged as imaging modality of choice for their differentiation.[5,6]

Access this article online

Quick Response Code:

Website: www.jgid.org

DOI: 10.4103/0974-777X.138511

However, bony involvement of the sinus walls leading to osteomyelitis is rare. Osteomyelitis of maxilla in infants as an entity has been reported in pre-antibiotic days. The last published cases of osteomyelitis of maxilla in infants were in 1990s.[7,8] The reported cases were due to extension of local infection from the paranasal sinuses or odontogenic in origin. There was preponderance of cases in children, but the sparse literature of these cases was noted as early as in 1959 by Lieberman and Brem.[9] They described a "syndrome of acute osteomyelitis of superior maxilla in early infancy" presenting with a train of symptoms and signs, usually ophthalmological or sino-nasal. Most of the cases were due to the organism *Staphylococcus aureus* and appropriate antibiotic therapy was used.[10] The complications include ophthalmological, airway involvement, odontogenic and death.[11]

CASE REPORT

The present case report is about an 11-month-old female infant was brought with peri-orbital swelling, mild conjunctival congestion and fever. The child was normal in weight and growth parameters for age. Her developmental milestones were upto her age. Immunization history was upto date, but she had suffered from fever with skin rashes 2 weeks before her presentation, which was suggestive of chicken pox. The child had left peri-orbital swelling with

Address for correspondence:
Dr. Nagarajan Krishnan, Email: lknagarajan1@gmail.com

induration and tenderness. Mild conjunctival congestion was noted. Purulent nasal discharge was noted and nasal examination showed necrotic material at the left lateral nasal wall. Clinical diagnosis was that of orbital cellulitis probably due to sinusitis and CT was suggested to look for the extent of orbital involvement and rule out the possibility of complications like cavernous sinus thrombosis. The child was started on loading dose of intravenous antibiotics and referred for CT.

Plain CT was done using multi-slice (6-slice CT) (Brilliance 6, Slice collimation 6 × 1.5 mm, Table feed 1.5 mm, reconstruction thickness 2 mm). CT sections showed near-complete opacification of left maxillary and ethmoid sinuses with irregularity and erosions of the bony walls of maxillary sinus [Figure 1]. No sclerotic focus of sequestrum noted. There was gross left orbital preseptal, zygomatico-maxillary and naso-frontal soft tissue swelling extending upto the frontal scalp. However, no asymmetric swelling of extra-ocular muscles, or intra-conal fat stranding was noted to suggest involvement of post-septal compartment of left orbit. No orbital wall erosions or subperiosteal thickening/collections noted. No cavernous sinus enlargement or convexity noted. In view of erosions of the maxillary sinus walls and absence of cavernous sinus prominence, contrast CT study was deferred.

Culture from the necrotic material of lateral nasal wall revealed *S. aureus* growth. The child was started on intravenous antibiotics — cloxacillin 50 mg/kg intravenously every 6th hourly and ceftriaxone 75 mg/kg for 5 days — and started showing improvement in the form of decrease in peri-orbital swelling and purulent nasal discharge. The antibiotic regimen was continued for another 5 days followed by oral amoxicillin with clavulanic acid (15 mg/kg) 8th hourly for the next 2 weeks. She was discharged on 10th day with only minimal peri-orbital swelling, which also resolved on subsequent follow-up.

DISCUSSION

The presence of peri-orbital swelling of recent or sudden onset in the pediatric age group needs to be appropriately investigated by laboratory and radiological work-up to rule out possibility of infective lesions or their complications like the cavernous sinus thrombosis. Local infective foci in the paranasal sinuses or pharyngitis can extend to involve the orbit producing orbital cellulitis or more seriously lead to the cavernous sinus thrombo-phlebitis resulting in orbital congestion and swelling. However, the involvement of bony maxilla by osteomyelitis was rare, even in the pre-antibiotic era.[9]

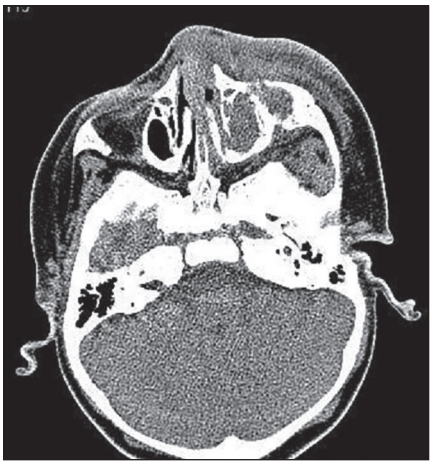

Figure 1a : Axial computed tomography sections showing opacification of left maxillary sinus with gross zygomatico-maxillary soft tissue swelling

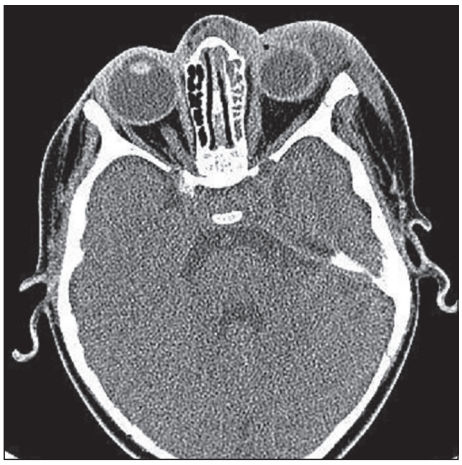

Figure 1b : Axial computed tomography sections at the level of orbits showing left orbital preseptal soft tissue swelling or phlegmon

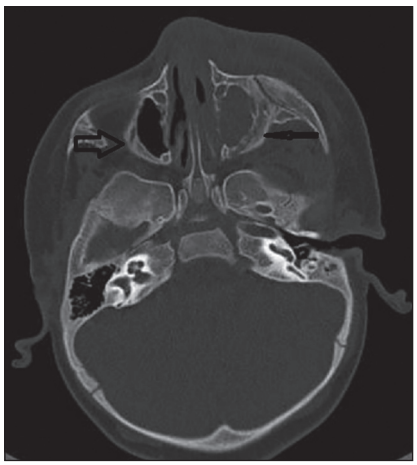

Figure 1c : Axial computed tomography sections (in bone window) showing erosions along the inner wall of the left maxillary sinus

The first reported cases of osteomyelitis of jaws in infants were by Wilensky in 1932.[12] He described such cases in

the age group of 2 to 10 weeks and 80 % of them were <2 months of age. He hypothesized the pathogenesis as hematogenous origin localizing in the maxillary sinus due to its greater volume and susceptibility to air-borne infections. The last reported case by Loh and Ling in 1993 was also in the infantile age group.

Our case showed good response to intravenous antibiotic regimen started with cloxacillin and ceftriaxone combination and continued for 10 days as culture showed sensitivity for the same. Recent reports of orbital cellulitis in infants have shown *S. aureus* and *Streptococcus anginosus* as the common pathogens leading to complications of sinusitis.[13-15] Antibiotic treatment is usually successful in the absence of post-septal involvement in this age group.[5]

In a recent review of 84 cases of osteomyelitis in the head and neck in all age groups over a period of 10 years, Prasad *et al*[16] found 10 cases of maxillary involvement, out of which, three each were due to sinusitis and odontogenic infections, and remaining four cases were of radiation-induced osteoradionecrosis. There is also predisposition of diabetics to develop maxillary osteomyelitis.[17] In another review of osteomyelitis of the jaw in West African population, Khullar *et al*.[18] found only six cases of osteomyelitis of maxilla out of the total 60 cases of osteomyelitis involving both jaw bones (maxilla and mandible). They ascribed various factors such as genetic, toxic and environmental apart from the infective etiology. The involvement of the maxilla is considerably less than the mandible and factors like aeration of the sinus, good vascularity and strut-like parts are possible reasons for the rarity of its involvement.[19]

In the present case, the child was otherwise healthy and upto date in her immunizations though the suggestive history of chickenpox 2 weeks prior to her presentation could possibly be the triggering factor. Post-varicella staphylococcal infections have been noted, commonly in the chest and rarely in the musculo-skeletal system.[20] This case illustrates the need for awareness of this entity so that appropriate antibiotic therapy may be instituted early in the course to avoid morbid complications.

REFERENCES

1. Hubert L. Orbital infections due to nasal sinusitis. NY State J Med 1937;37:1559-64.
2. Chandler JC, Lagenbrunner DL, Stevens ER. The pathogenesis of orbital complications in acute sinusitis. Laryngoscope 1970;80:1414-18.
3. Beech T, Robinson A, McDermott AL, Sinha A. Pediatric periorbital cellulitis and its management. Rhinology 2007;45:47-9.
4. Aïdan P, François M, Prunel M, Narcy P. Orbital cellulitis in children. Arch Pediatr 1994;1:879-85.
5. Eviatar E, Gavriel H, Pitaro K, Vaiman M, Goldman M, Kessler A. Conservative treatment in rhinosinusitis orbital complications in children aged 2 years and younger. Rhinology 2008;46:334-7.
6. Rudloe TF, Harper MB, Prabhu SP, Rahbar R, Vanderveen D, Kimia AA. Acute periorbital infections: who needs emergent imaging? Pediatrics 2010;125:e719-26.
7. Loh FC, Ling SY. Acute osteomyelitis of the maxilla in the newborn. J Laryngol Otol 1993;107:627-8.
8. Skouteris CA, Velegrakis G, Christodoulou P, Helidonis E. Infantile osteomyelitis of the maxilla with concomitant subperiosteal orbital abscess: A case report. J Oral Maxillofac Surg 1995;53:67-70.
9. Lieberman H, Brem J. Syndrome of acute osteomyelitis of the superior maxilla in Early Infancy. N Engl J Med 1959;260:318-22.
10. Dunphy DL, Frazer JP. Acute osteomyelitis of the maxilla in a newborn; report of a case successfully treated with penicillin and sulfadiazine. Yale J Biol Med 1947;19:877-81.
11. Goodé-Jolly D, Besson D, Lopez A, Cabanis EA. A case of acute osteomyelitis of the maxilla in infants. Current prognosis of ocular and dental manifestations. Bull Soc Ophthalmol Fr 1986;86:1141-44.
12. Wilensky AO. Osteomyelitis of jaws in nurslings and infants. Ann Surg 1932;95:33.
13. Kobayashi D, Givner LB, Yeatts RP, Anthony EY, Shetty AK. Infantile orbital cellulitis secondary to community-associated methicillin-resistant Staphylococcus aureus. J AAPOS 2011;15:208-10.
14. McKinley SH, Yen MT, Miller AM, Yen KG. Microbiology of pediatric orbital cellulitis. Am J Ophthalm 2007;144:497-501.
15. Seltz LB, Smith J, Durairaj VD, Enzenauer R, Todd J. Microbiology and antibiotic management of orbital cellulitis. Pediatrics 2011;127:e566-72.
16. Prasad KC, Prasad SC, Mouli N, Agarwal S. Osteomyelitis in the head and neck. Acta Otolaryngol 2007;127:194-205.
17. Pandey A, Bansal V, Asthana AK, Trivedi V, Madan M, Das A. Maxillary osteomyelitis by mucormycosis: report of four cases. Int J Infect Dis 2011;15:e66-9.
18. Khullar SM, Tvedt D, Chapman K, Herlofson BB. Sixty cases of extreme osteonecrosis and osteomyelitis of the mandible and maxilla in a West African population. Int J Oral Maxillofac Surg 2012;41:978-85.
19. Akinmoladun VI, Akadiri OA, Adeleye JO, Lasisi OA. An unusual case of total maxillary sequestration in a diabetic patient. Afr J Med Med Sci 2008;37:395-8.
20. Lim JB, Huntley JS. Musculoskeletal sequelae of Varicella-zoster infection: Two case reports. Scott Med J 2012;57:121.

How to cite this article: Krishnan N, Ramamoorthy N, Panchanathan S, Balasundaram JS. Infantile maxillary sinus osteomyelitis mimicking orbital cellulitis. J Global Infect Dis 2014;6:125-7.

Source of Support: Nil. **Conflict of Interest:** None declared.