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Case Report

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# Osteomyelitis of Zygoma in 10-Month Old Infant: A Case Report

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## Abstract

*Skull bone osteomyelitis in infants is a rare yet serious condition necessitating prompt evaluation and intervention to prevent complications. This study presents a unique case of zygomatic bone osteomyelitis in a 10- month-old female infant, a remarkably uncommon occurrence in the literature. The infant exhibited facial swelling and fever, with a history of upper respiratory tract infection preceding the onset. The diagnostic process involved imaging modalities such as X-ray, ultrasound, and magnetic resonance imaging, confirming left zygomatic bone involvement with a non-drainable collection. Positive methicillin-resistant Staphylococcus aureus (MRSA) nasal swab PCR further guided antibiotic therapy. The patient responded well to conservative management, highlighting the importance of early recognition and appropriate treatment in infantile osteomyelitis cases. This case contributes to the limited literature on zygomatic bone involvement, emphasizing the need for vigilance, interdisciplinary collaboration, and thorough follow-up in managing this rare condition.*

***Keywords:*** *Face, Zygomatic, Skull, Infant, Osteomyelitis, Craniofacial, Swelling, Zygoma, Collection.*

## Introduction

Skull bone osteomyelitis is a rare diagnosis that needs urgent evaluation and treatment to avoid the serious complications. Anatomically, the bones involved in osteomyelitis of the skull include the mandible, frontal bone, maxillae, nasal bones, temporal bone and skull base bone. Osteomyelitis is defined as an inflammatory condition of the bone that commences as an infection of the medullary cavity, rapidly involving the Haversian system and the adjacent periosteum in the infected area. [1], Invasion of the bacteria into the cancellous bone result in compression of the blood vessels secondary to inflammation and oedema of the marrow space. Severe compression of the blood supply results in the development of ischemic and necrotic bone. Immobility of the stagnant blood serves as a critical nidus for development of infection. [2].

Osteomyelitis may result from trauma, bone surgery, bacteremia or a contagious infectious focus and is further influenced by diseases that affect the vascularity of the bone, (e.g.: radiation, malignancy, osteopetrosis and osteoporosis), as well as systemic diseases that produce an alteration of host defenses, (e.g.: diabetes, anemia and malnutrition). [1], The causative organisms of craniofacial osteomyelitis include: staphylococcus aureus, streptococcal species, bacteroides, klebsiella, tuberculous and non-tuberculous mycobacteria, pseudomonas aurginosa, salmonella spp, fungal infection as aspergillus, candida parapsilosis in immune compromised patients. [3], Functional imaging of the craniofacial skeleton is necessary for a complete treatment regimen in patients with osteomyelitis. [4]

Computerized tomography (CT) and magnetic resonance imaging (MRI) can be used for early detection. Bone scintigraphy is more accurate than CT scan when used in detection of craniofacial osteomyelitis. [4], Midface osteomyelitis is very rare due to its abundant blood supply. [5], Hence, zygomatic bone osteomyelitis is extremely rare. Few reported cases in the literature.

**Case:** 7 months old female infant presented to PEC with 1 day left fascial swelling plus fever of 10 days' duration. Detailed history revealed that the infant had fever associated with URTI for the last 10 days. Developed lower lip swelling on the third day of illness.

Patient was seen in ER and started on oral antibiotics with paracetamol as URTI plus lower lip allergy. However, patient continued to spike fever with the development of generalized macular skin rash after three days of oral antibiotics for which antibiotic was discontinued and her lip swelling became better. The patient started to have left fascial swelling one day prior to admission. Seen at ER again where she was still febrile and was admitted as a case of fascial cellulitis and started on iv ceftriaxone and iv clindamycin.

**On admission**

Patient was in fair general condition and her growth parameters were within normal. Her vitals as follow: T39, PR 130, RR24, Sat99%, RA, her physical exam revealed mild lower lip swelling and redness with no ulcer or vesicles in oral cavity. There was mild diffuse swelling of the left side of the face over the temporal bone and zygoma. The overlying skin was normal without hotness or redness and no site of insect bite. The swelling was firm but with point tenderness over left zygomatic bone. Left submandibular lymph nodes were palpable, Other systemic examination was within normal. Next day of admission, the swelling extended to the left periorbital area with greenish discoloration of the left upper eye lid. The initial labs showed WBC 19000/ mm^3 mainly neutrophils, CRP 29, blood c/s negative. Nasal swab PCR came positive for MRSA. The initial impression was osteomyelitis of skull bone and to rule out trauma, X-ray skull done and showed no fracture.

U/S skull showed evidence of inflammatory process over the zygomatic bone with minimal fluid collection and underlying cortical bone irregularities. Magnetic Resonance Imaging showed left zygomatic bone osteomyelitis with non-drainable collection, see Fig 1. Maxillofacial and plastic surgeons were consulted, both recommended conservative management as the collection was small and non-drainable. So no organism could have been identified as the cause of infection. Infectious disease team was consulted and recommended to continue iv ceftriaxone and clindamycin, considering the positive nasal MRSA swab. The patients fascial and lip swelling improved gradually with subsidence of fever over five days. The patient was discharged well with no swelling or tenderness over the affected area on oral cefixime and clindamycin with outpatient follow up.

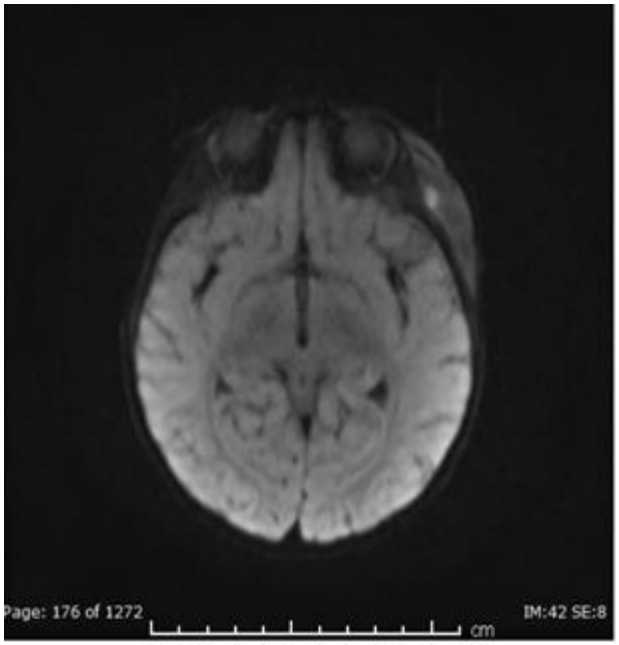


**Figure. 1:** MRI sequencing and post contrast studies showed subtle irregularities and signal changes noted in left temporal bone which is associated with an overlying tiny fluid pockets with diffusion restriction. Diffuse edema and swelling of overlying temporal muscle on its entire course.

## Discussion

Infantile osteomyelitis was first described by Wilnesky as a separate entity in 1932 [6], [7]. Its Distinctive features include, fever, emesis, pain, loss of function, fascial swelling, jaw swelling, sinus discharge, purulent discharge from oral cavity, lymph node enlargement, periorbital/orbital involvement, nasal congestion, trismus and Vincent symptoms.

Craniofascial osteomyelitis usually caused by maternal suppurative mastitis, odontogenic, sinus infection, ear infection, spread from skin and skin appendages, nasolacrimal duct or dacrocytitis, tumor, fracture, trauma, infected cephalhematoma post vacuum extraction, extension from nearby organs like pneumonia, spine infection and meningitis. Hematogenous spread, oesteogenesis imperfecta, osteopetrosis and cryptogenic causes. [8], [9], [10], [11], [12].

Complications include, subperiosteal abscess formation, airway involvement, ophthalmological complications, intracranial extension, permanent deficit, disfigurement, sepsis and death. [13], [26], Skull bone osteomyelitis is rare. Maxillae and jaws are the commonest reported sites, mostly related to birth trauma. Due to the proneness of infants to URTI it was hypothesized that the large maxillary sinus is affected causing the infection of maxillary bone. [14],

Staphylococcus aureus is the commonest cause of infantile osteomyelitis. Odontogenic bacteria including staphylococcus aureus are the cause of skull bone infection. [15], [16], Infantile osteomyelitis can be caused by factors other than infection, such as genetic, toxic and environmental. [18], The diagnosis of infantile osteomyelitis needs high index of suspicion supported by clinical manifestations and always depends on radiological evidence of infection. Positive biopsies for microbiology and negative histopathology for malignancy. [17], [9].

Adekeye et al. published a review of 141 cases of all ages of osteomyelitis of the jaws and reported the incidence of malar bone osteomyelitis to be only 1.42%. [5], Cutchavaree et al [20] and Gupta et al [21] in the past decade reported single cases of zygomatic bone osteomyelitis.

Most of the reported cases of zygomatic bone osteomyelitis are due to tuberculosis and fungal causes, in adults and older children. The mode of spread reported was direct spread from neighboring structure, hematogenous, trauma, ear infection, self-inoculation of fungus through oral mucosa and idiopathic. [22], [23], [24], [25].

Our patients radiological and clinical history suggest hematogenous spread with occult bacteremia due to minor trauma as the current patients developmental milestones explain recurrent falls, moreover, she had high fever with Upper respiratory tract symptoms, with positive methicillin resistant staph aureus nasal swab PCR. Patient was discharged after two weeks of IV antibiotics on oral cefixime and oral clindamycin for total of 8 weeks' antibiotics. Follow up imaging on week 4 of treatment showed resolution of abscess with mild underlying bony irregularities noted comparable to prior ultrasound. The Clinical exam was normal with no focal tenderness or swelling.

## Result

The patient, following two weeks of intravenous antibiotics and subsequent oral medication for a total of 8 weeks, demonstrated resolution of the abscess with mild underlying bony irregularities noted in follow-up imaging. Clinical examination at discharge revealed no focal tenderness or swelling, indicating a positive response to the treatment regimen.

## Conclusion

Infantile osteomyelitis, though rare, demands vigilant recognition and timely intervention to avert potential complications. This case of zygomatic bone involvement underscores the significance of interdisciplinary collaboration, early imaging, and appropriate antibiotic therapy. Dentists and maxillofacial surgeons play a crucial role in managing this rare entity, emphasizing the need for continuous monitoring post-discharge. Early diagnosis and comprehensive treatment strategies are imperative to mitigate the risks associated with infantile osteomyelitis.

### Declarations

Ethics approval and consent: The current Case Report was carried out in accordance with the principles of the Declaration of Helsinki, Good Clinical Practice, and following the laws and regulations of MOPH (Ministry of Public Health) in Qatar., informed consent was Taken.

**Consent for publication:** It will be provided as per request from journal. identity disclosure has been done in this manuscript.

**Availability of data and materials:** It will be provided as per request from journal.

**Competing interests:** There are no conflicts of interest in this work to declare. No conflict of interest among authors.

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