



## Successful Treatment of Chronic Osteomyelitis of Calcaneum by Intravenous Linezolid

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### Abstract

*Osteomyelitis in children is a potentially serious condition and have potential for lifelong disability and morbidity. The early diagnosis and appropriate treatment is critically important. The common causative organisms for chronic osteomyelitis are staphylococcus aureus, streptococci, H influenza and salmonella. In children with sickle cell anaemia the most common organisms are salmonella. The collection of appropriate sample like discharging pus or even bone sampling for microbiological and pathological examination may allow choosing the most effective antibiotics. Methicillin resistant S.aureus which earlier used to be considered as nosocomial infection is increasingly being identified in community acquired infections. We present here a case of acute osteomyelitis caused by methicillin resistant staphylococcus aureus. The patient was a 8 year old male child with no significant past medical history was admitted with complaints of heel pain and inability to bear weight on affected limb since 4-6 weeks. Patient earlier took treatment from local physician who prescribed some oral medicine. There was no improvement in the pain and at the time of presentation to our institute the patient had more definitive signs of infection including fever and local tenderness and a discharging sinus. An MRI was done which revealed features of osteomyelitis in the form of sequester and soft tissue gas. Since the history was that of more than 1 month a diagnosis of chronic osteomyelitis was made and the discharging pus was sent for microbiological examination which showed growth of methicillin resistant staphylococcus aureus sensitive to linezolid. Patient was successfully treated with linezolid in appropriate doses.*

*Our case emphasise the importance of proper investigations (Imaging, microbiological and pathological examinations) and treatment with appropriate antibiotics in patients suspected to be having osteomyelitis.*

**Keywords:** Chronic osteomyelitis, Methicillin Resistant Staphylococcus aureus, Linezolid, Computed Tomography.

## Introduction

Osteomyelitis is the inflammation of bone caused by an infecting organism. Bones are relatively resistant to colonisation by organisms however there are certain conditions which predispose a patient for development of osteomyelitis. Since the common route of infection is by hematogenous spread anything which may cause bacteraemia may be responsible for acute or chronic osteomyelitis. indwelling intravascular catheters, distant foci of infection, and intravenous drug abuse, immunosuppression, trauma, surgery or foreign body are important factors predisposing a patient for osteomyelitis <sup>[1]</sup>. Osteomyelitis has been classified into three categories on the basis of mechanism of infection. In the first category the infection has spread from hematogenous spread secondary to bacteraemia or septicaemia this type of osteomyelitis is called hematogenous osteomyelitis. The second type of osteomyelitis is caused by direct entry of organisms from outside . This type of osteomyelitis is caused usually after trauma or surgery. After extensive injury the infection may spread to underlying bone from adjacent infected soft tissue. Third type of osteomyelitis is caused by infection at a site where there is compromised blood supply. This type of osteomyelitis is usually seen in lower limbs of diabetic patients or patients with extensive atherosclerosis <sup>[2]</sup>. Osteomyelitis is further divided into acute or chronic depending upon whether symptoms were present for more than 4 weeks. Osteomyelitis producing signs and symptoms even after adequate treatment is called chronic osteomyelitis. Chronic osteomyelitis is further subdivided into 4 types osteomyelitis where the nidus is endosteal (Type 1). Superficial osteomyelitis, where outer surface of bone is infected (Type II), localized osteomyelitis with sequestration of cortical bone (Type III) and where the entire segment of the bone is involved (Type IV) <sup>[3]</sup>. Calcaneal osteomyelitis is often difficult to diagnose. Chronic calcaneal osteomyelitis usually doesn't cause severe signs and symptoms and in

comparison with long bone osteomyelitis manifests late. Even X-Rays taken at initial stages and blood investigations done may not reveal any abnormality. The diagnosis is more likely to be delayed in children because of non-specific complaints in some and a long list of other "more common" differential diagnoses in others. It is an irony that the paediatric population which is more prone for developing long term complications and sequel are also the one in whom the diagnosis is often delayed. In many children delayed diagnosis and treatment may cause spread of infection to adjacent joints, chronic osteomyelitis and growth disturbances. Early diagnosis and prompt treatment of calcaneal osteomyelitis is the cornerstone of therapy specially in paediatric patients to avoid disastrous complications <sup>[4]</sup>. Diagnosis of chronic osteomyelitis of calcaneum is usually done by blood picture, Imaging techniques like X Rays, Computed tomography and MRI. Doing culture and sensitivity of the infected sample is of utmost importance. Adequate antibiotics therapy based upon culture and sensitivity reports greatly influence the course of the disease and prevent complications <sup>[5]</sup>.

## Case Report

An 8 year old male child was admitted with a history of heel pain since 5-6 weeks. He had no history of trauma. There was history of gradually increasing pain in left heel since 5-6 weeks. Pain began 5-6 weeks back and used to subside intermittently. The severity of pain was more in the morning initially but later the pain use to remain round the clock. Child had difficulty in walking due to pain in heel. For these complaints he was shown to a local doctor and was given oral medications. Despite taking oral medicine for 15 days the pain didn't subside and there was gradually increasing intensity of pain. Since 4-5 days the pain has become severe and also there was local redness over heel and pus could be seen draining from the site of inflammation. On examination the patient had constitutional symptoms like fever, pain and excessive crying

(due to pain). The investigations revealed that there was neutrophilic leukocytosis, CRP was raised (120 mg/lit) and ESR was 60 mm/hour. There was a pus discharging sinus at the site overlying left calcaneum. Also swelling and tenderness was present on left ankle. An X-Ray left foot was done which showed osteopenia, periosteal reaction and endorseal scalloping in left calcaneum . Based upon these findings a diagnosis of chronic osteomyelitis of calcaneum was made and MRI was done. Magnetic resonance imaging confirmed the diagnosis of osteomyelitis. Soft tissue swelling and oedema was also noted on magnetic resonance imaging. Patient was given IV antibiotics and IV fluids. A transverse incision was made at the site and pus was drained . The pus was sent for Gm staining, Zn staining, culture and sensitivity. The wound was sutured and packed. The culture and sensitivity report was obtained. There was growth of methicillin resistant staphylococcus aureus sensitive to linezolid. Patient was switched on to IV linezolid to which he responded dramatically. His fever subsided within 48 hours and pain was also reduced. IV linezolid was continued for 2 weeks. Eventually patient was switched over to oral linezolid and discharged. On follow up after 4 weeks all symptoms and pain has resolved with no residual complications.

### Discussion

Chronic osteomyelitis of calcaneum in paediatric age group is uncommon. Moreover it runs an indolent course. This atypical feature is responsible for late diagnosis of this condition specially in children. Sometimes the delay in diagnosis and treatment have a devastating effect and complications. Like in our patient who initially was treated with analgesics. Any child with severe heel pain and inability to walk or bear weight on heel should at once be subjected to MRI. A normal Xray may be the cause of missed diagnosis as in the initial stages of osteomyelitis the Xray is usually normal <sup>[6]</sup>.

Osteomyelitis of calcaneum , like that of any other bone, either can be caused by haematogenous spread following common infective conditions like otitis media, gastroenteritis or urinary tract infection or it may caused by direct inoculation of organisms after puncture wound in the calcaneum <sup>[7]</sup>.

The typical signs and symptoms include local redness, swelling, pain while walking and inability to bear the pain on affected side. A characteristic “Heel up sign” is described by wang et al in which the child keep his affected ankle on the opposite knee to avoid the heel from coming in contact with the bed <sup>[8]</sup>. This sign is not specific to osteomyelitis and may be seen also in sever’s disease, contusion and calcaneal fracture . Other constitutional signs and symptoms may also be present like fever, malaise and anorexia. On blood picture leukocytosis, elevated ESR and CRP may be seen. Plain Xray may be normal in early stages of osteomyelitis and it is one of the important cause delayed or missed diagnosis <sup>[9]</sup>. MRI can pick up the features s/o osteomyelitis in its early stages. Moreover it may also demonstrate surrounding soft tissue oedema. Hence it is of utmost importance that the patients especially children should be advised MRI if there is a clinical suspicion of osteomyelitis. In our case MRI confirmed the diagnosis of osteomyelitis and could well demonstrate the presence of surrounding soft tissue oedema.

The causative organism in most of the instance is staphylococcus. Although many other organisms like pseudomonas, streptococcus pyogenes and streptococcus pneumoniae. Methicillin resistant staphylococcus aureus earlier was thought to be exclusively of nosocomial origin but of late there are several case reports of community acquired methicillin resistant staphylococcus aureus like in this case. The treatment is usually proper antibiotics in appropriate doses. Incision and drainage of pus may be required in some patients. In some cases surgical debridement may be required <sup>[10]</sup>.

**Conclusion**

Chronic Osteomyelitis of calcaneum is an uncommon occurrence in paediatric age group. Its diagnosis is difficult in children because of its indolent course. High index of suspicion is necessary to diagnose it in early stages. Xray may be normal in early stages and MRI is the investigation of choice. Methicillin resistant staphylococcus aureus is one of the commonly involved organism. IV Linezolid can effectively treat this otherwise difficult to manage condition.

**Conflict of Interest: None****References**

1. Fritz JM, McDonald JR. Osteomyelitis: Approach to Diagnosis and Treatment. *The Physician and sportsmedicine*. 2008;36(1):nihpa116823.
2. Roesgen M, Hierholzer G, Hax PM. Post-traumatic osteomyelitis. *Pathophysiology and management*. *Arch Orthop Trauma Surg*. 1989;108(1):1-9.
3. Ikpeme I, Ngim N, Ikpeme A. Diagnosis and treatment of pyogenic bone infections. *African Health Sciences*. 2010;10(1):82-88.
4. Wilensky AO. The joint complications of acute osteomyelitis or acute epiphysitis: and the principles underlying their treatment. *Annals of Surgery*. 1927;86(5):737-746.
5. Rao N, Ziran BH, Lipsky BA. Treating osteomyelitis: antibiotics and surgery *Plast Reconstr Surg*. 2011 Jan;127 Suppl 1:177S-187S.
6. Pineda C, Espinosa R, Pena A. Radiographic Imaging in Osteomyelitis: The Role of Plain Radiography, Computed Tomography, Ultrasonography, Magnetic Resonance Imaging, and Scintigraphy. *Seminars in Plastic Surgery*. 2009;23(2):80-89.
7. Mujoomdar M, Russell E, Dionne F, et al. Optimizing Health System Use of Medical Isotopes and Other Imaging Modalities [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2012. APPENDIX 2.5, Diagnosis of Acute Osteomyelitis. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK174851/>
8. Wang EH, Simpson S, Bennet GC. Osteomyelitis of the calcaneum. *J Bone Joint Surg Br*. 1992;74(6):906-9.
9. Malcius D, Jonkus M, Kuprionis G, Maleckas A, Monastyreckiene E, Uktveris R, et al. The accuracy of different imaging techniques in diagnosis of acute hematogenous osteomyelitis. *Medicina (Kaunas)* 2009;45:624-31.
10. Rayner CR, Baddour LM, Birmingham MC, Norden C, Meagher AK, Schentag JJ. Linezolid in the treatment of osteomyelitis: results of compassionate use experience. *Infection*. 2004 Feb;32(1):8-14.