

Case Report

A rare case of acute osteomyelitis in a 13-year-old with physeal involvement

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ABSTRACT

Osteomyelitis of epiphyses in adolescents is a rare finding. We evaluate one such case in which high degree of clinical suspicion and prompt surgical intervention yielded good functional results. This is a case report of 13-year-old girl diagnosed with osteomyelitis of right knee. MRI is suggestive of physeal involvement. Physeal involvement makes the management very challenging. Surgical intervention was planned to reduce bacterial load and minimize possibility of damage to knee joint (articular cartilage and joint capsule). Lateral and posterior compartment of leg was decompressed, fibular osteotomy done, drilling in tibial epiphyseal and metaphyseal region of tibia done avoiding any injury to growth plate. Pus for culture and sensitivity and specific antibiotics started with monitoring of blood parameters for infection like ESR, CRP, TLC. Patient taken up for second debridement after one week of index surgery. After 6 weeks of intravenous antibiotic patient discharged in afebrile state with reduced values of blood parameters and acceptable range of knee movement. Lower extremity functional scoring (LEFS) of 45/80 i. e., 56.83 % at the end of 4 months. Good functional outcome at the end of 1 year. Early clinical suspicion with prompt investigation, surgical and medical management gives promising result.

Keywords: Osteomyelitis, Knee joint, Physis, Pediatric joint infection

INTRODUCTION

Osteomyelitis is an infection of bone. It usually affects children of all age groups.^{1,2} Clinical features include pain in affected limb and fever.^{1,2}

Early diagnosis and treatment is the key to minimize complications and long-term sequelae.² Osteomyelitis usually affects metaphyseal region. There are documented cases where physis is involved. Such cases pose challenging situation in management. Infection must be evacuated properly and at the same time physis should not be injured in order to prevent long term sequelae related to growth disturbances.

Literature search to the best of our efforts did not reveal any method as to how to manage such a case of osteomyelitis which has physeal involvement.

CASE REPORT

A 13-year-old started complaining of low intensity dull pain in her right knee. She was administered oral Paracetamol by her parents which did not provide much relief in pain. The pain kept increasing in intensity in the following days. She was brought to hospital on fourth day of symptom onset. Clinical examination revealed no significant finding. No H/O fever was given, and no sign of local inflammation was noted. X rays revealed no bony

injury. Patient was discharged with above knee POP slab and NSAIDs.

She was brought back to the hospital on 5th day from symptom onset. Clinical examination revealed mild joint effusion and raised local temperature. Range of motion was restricted and painful. X ray findings were normal. But due to high clinical suspicion of Septic arthritis she was admitted, and thorough investigations were done.

Lab work showed total leucocyte count (TLC) to be 12,800/mm³, with differential neutrophil count of 88%, erythrocyte sedimentation rate (ESR) 59 mm/1st hour and C-Reactive Protein (CRP) OF 33.13.

Since the initial X rays (Figure 1) were normal, urgent magnetic resonance imaging (MRI) was ordered (Image 2). MRI was suggestive of acute osteomyelitis in Epiphyseal-Metaphyseal region of right tibia.



Figure 1: X-ray knee-AP and lateral view.

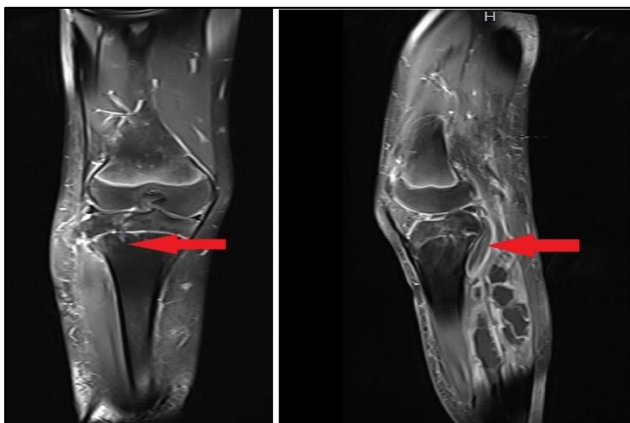


Figure 2: MRI coronal and sagittal section showing epiphyseal involvement

Patient was taken up for surgery. It was a challenge to address to the osteomyelitis as the growth plate was involved. As per MRI report both tibia and fibula were

involved. Both needed to be addressed to completely eradicate septic foci.

Incision taken as per standard anterolateral approach (image 3). Proximal tibia exposed. Through debridement of the wound required exposure and isolation of common peroneal nerve at around the fibula neck (Figure 4).



Figure 3: Skin marking.



Figure 4: Common peroneal nerve isolation.

Partial fibulectomy was also done and fibular canal was thoroughly irrigated with normal saline.

Pouring pus was noted in the wound which was allowed to drain (Figure 5).

Pus from the epiphyseal region was drained by carefully drilling multiple holes in the epiphyseal region 1.5 cm apart under fluoroscopic guidance away from the physis using drill of 2.7 mm. Then wide bore 18 G needles were inserted into the drill holes and normal saline was used to thoroughly irrigate and wash out the epiphysis by sing the drill holes alternately as inlet and outlet for the lavage. Similar method was used to decompress the metaphysis. Multiple holes 1.5 to 2 cm apart were made carefully using 2.7 mm drill bit under image intensifier fluoroscopic guidance taking utmost precaution to not damage the physeal plate. Then saline was pushed using 20 cc syringe and needle and allowed to drain through other drill holes

with 18 g needles inserted in them. The insertion of needles in the drill hole allowed us a good degree of freedom to angulate the needles in all directions to ensure thorough lavage of all corners of the epiphysis and metaphysis (Figure 6). Thorough washing of wound done with plenty of NS (Figure 7). Closure done over drain in layers.

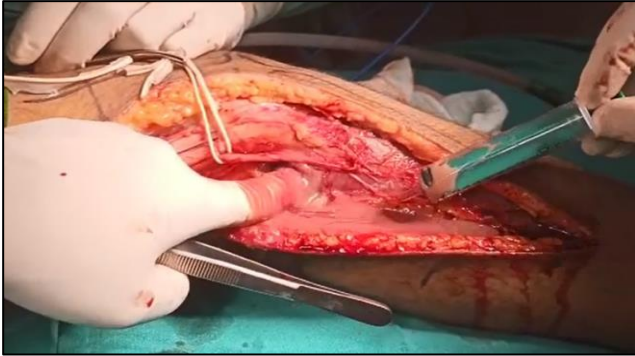


Figure 5: Pouring pus.



Figure 6: Intraoperative C arm image describing technique.



Figure 7: After fibulectomy thorough lavage and drain insertion.

Intraoperatively collected pus samples were sent for gram staining and culture sensitivity. Causative organism identified was *Staphylococcus aureus*. Appropriate antibiotic was started.

She was taken back to OT after one week for wound re-exploration, debridement and lavage.

Finally, secondary closure was done 2 weeks following the index surgery. IV antibiotics were given for 2 weeks. Once inflammatory markers returned to normal, IV antibiotics were switched to oral antibiotics.



Figure 8: Follow up x ray at 1 year.



Figure 9: 1 year follow up showing ability to squat fully and cross leg sitting.

Serial monitoring of TLC, ESR and CRP was done. Physiotherapy in the form of passive and active knee mobilization, DVT prophylaxis was given. Weight bearing was allowed after 1 month of index surgery when her overall general condition improved. She was discharged after 6 weeks in afebrile state with fair range of motion at knee (5 to 110 degrees), TLC of 5800/ mm³, ESR 53 mm in 1st hour and CRP of 0.35.

At the end of 2 months from index surgery her knee range of motion was 0 to 120 degrees, TLC of 6100/mm³, ESR of 19 mm in 1st hour and CRP of 0.19.

Lower extremity functional scoring (LEFS) of 45/80 i.e., 56.83 % at the end of 4 months. She could sit comfortably in cross leg and squatting position with no limitation in activities of daily living.

Follow up X ray at the end of 1 Year shows good healing (Figure 8). Patient is sitting comfortably in cross leg and squatting position (Figure 9).

DISCUSSION

Osteomyelitis is an infection of bone, most commonly caused by bacteria. Acute osteomyelitis in pediatric age group is most commonly seen in 5 to 15 years.^{1,2} Most common mechanism of spread of infection to bones is via bloodstream infection. However open injuries where bones are exposed, can also lead to osteomyelitis. Direct spread from adjoining infected tissues has also been documented. Primary hematogenous osteomyelitis most commonly involves metaphysis of long bones of lower extremity.^{3,4} Classically associated with triad of pain, fever and increased inflammatory markers. But this may not be seen in every case.⁵

Possible complications include septic arthritis, subperiosteal abscess, pyomyositis, deep vein thrombosis, sepsis, and multiorgan failure. Permanent disabilities can occur such as growth arrest leading to limb length discrepancy. Moreover, acute osteomyelitis can evolve to the chronic form.⁶

Complete blood picture, inflammatory markers including ESR, CRP and procalcitonin are done. X rays can be normal up to 14 days of onset of symptoms. MRI is the diagnostic tool of choice with high sensitivity and specificity.⁷ Bone scan using ⁹⁹Tc can also be used to localize the lesion and when establishing the diagnosis is difficult.⁸ Most common organism involved in acute hematogenous osteomyelitis is *Staphylococcus aureus*.⁹

Pyogenic osteomyelitis most commonly affects proximal tibia. Usually, the infection does not involve physis. In a study by Gilbertson and et al it has been found that infections involving distal metaphyseal region of tibia are more likely to involve physis.¹⁰ Although rare but there have been previously documented cases where physis is involved in cases of osteomyelitis.

Treatment consists of urgent surgical debridement followed by organism specific iv antibiotics. Early treatment is the key to successful treatment and avoiding complications.

In this study we have tried to address an issue where clear cut guidelines is lacking. This may act a guide for other surgeons managing epiphyseo metaphyseal osteomyelitis with physeal involvement. Long term functional outcome needs to be seen. The child needs to be kept in follow up

to observe for any discrepancy in limb length or any other functional deficit.

CONCLUSION

Septic arthritis is always a challenging scenario for orthopedic surgeons. High clinical suspicion and prompt surgical management saved the limb of the child.

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Ethical approval: Not required

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