

Case Report

Complete incorporation of long diaphyseal sequestrum without surgical intervention in chronic hematogenous osteomyelitis of tibia in an immunocompetent child

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Abstract

Traditionally, the management of chronic osteomyelitis emphasizes the excision of necrotic and infected material (sequestrectomy/debridement) followed by prolonged administration of antibiotics. Most children with chronic osteomyelitis undergo surgery with the inherent risk of damage to their growth plate. Treatment regimen based on findings of imaging with emphasis on antibiotics to potentially reduce the rate of surgical interventions is being increasingly reported. An 8-year-old thin built Indian boy belonging to lower socio-economic group presented to the orthopedic department with the chief complaints of pain in the left upper leg for the last 3 months. Radiograph of the affected limb showed features of chronic osteomyelitis with a large diaphyseal sequestrum on the medial cortex of tibia with incomplete involucrum. No surgery was performed; not even incision and drainage. The sinuses healed completely in 6 weeks time with appropriate antibiotics alone. Gradually, over a period of 8 months, the large tibial diaphyseal sequestrum got fully incorporated into the healthy diaphyseal bone indistinguishable from normal bony architecture with complete clinical remission of sepsis. Our rare case is an example of the evolving notion that antibiotics and supportive care alone may be sufficient enough in the treatment of chronic osteomyelitis even with large diaphyseal sequestrum in paediatric cases where excellent healing potential of the immune-competent child may potentially make surgical intervention redundant.

Key Words: Chronic osteomyelitis, diaphyseal sequestrum, involucrum, sequestrectomy

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INTRODUCTION

Chronic osteomyelitis is often associated with sequestrum. Sequestrum is defined as a fragment of dead bone that is partially or entirely detached

from the surrounding or adjacent healthy bone.^[1] The integrity of the involucrum determines the final form and function of the limb.^[2] Injury to the periosteum, either from overwhelming infection or from premature surgical debridement, results in incomplete involucrum formation and impaired limb morphology.^[2] Traditionally, the management of chronic osteomyelitis emphasizes the excision of necrotic and infected material (sequestrectomy/debridement) followed by prolonged administration of antibiotics. Most children with chronic osteomyelitis undergo surgery with the inherent risk of damage to their growth plate.^[3] Treatment regimen based on findings of imaging with emphasis on antibiotics to

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potentially reduce the rate of surgical interventions is being increasingly reported.^[3]

CASE REPORT

An 8-year-old thin built Indian boy belonging to lower socio-economic group presented to the orthopedic department with the chief complaints of pain in the left leg for the last 3 months. There was no fever at presentation. On examination there were three small and scantily draining sinuses in the proximal and middle third of his left leg. The ipsilateral inguinal lymph nodes were not significantly enlarged. There was history of high grade fever for a few days three months back with spontaneous acute onset pain and swelling around the upper left leg with inability to walk, which was managed by a local doctor with some medication that provided some symptomatic relief within a matter of a few days time. The three small non-healing wounds however persisted. After

three months the patient attended our hospital for further treatment.

The child had no fever or palpable abscess on examination. Clinically, swelling was minimal in the affected site of the leg. Radiograph of the affected limb showed features of chronic osteomyelitis with a large diaphyseal sequestrum on the medial cortex of tibia with incomplete involucrum [Figure 1]. The total lymphocytic count was within normal limits and differential counts were unremarkable. Sedimentation rate was 38 mm per hour. Tuberculin test and fungal smears were negative. The patient could not afford to do magnetic resonance (MR) imaging or a computerized tomography (CT). Wound swab taken from the proximal draining sinus yielded methicillin sensitive *Staphylococcus aureus* (MSSA) sensitive to 3rd generation of cephalosporin and aminoglycoside (Amikacin), which were started and continued for a period of six weeks. No surgery was performed; not even incision and drainage. The sinuses healed completely in 6 weeks time. Gradually, over a period of 8 months, the large tibial diaphyseal



Figure 1: AP and Lateral view radiograph at presentation: Large diaphyseal sequestrum in the medial cortex of tibia



Figure 3: Radiological healing & incorporation of the sequestrum (lateral view radiograph)



Figure 2: Radiological healing & near total incorporation of the same sequestrum without surgery (AP view radiograph)



Figure 4: Clinical healing of sinuses and complete resolution of sepsis: Full knee extension



Figure 5: Clinical healing of sinuses and complete resolution of sepsis: Full knee flexion

sequestrum got fully incorporated into the healthy diaphyseal bone indistinguishable from normal bony architecture [Figures 2 and 3]. The functional outcome also was excellent as demonstrated by full range of motion at the knee joint [Figures 4 and 5].

DISCUSSION

Sequestrectomy may be easy when the size of sequestrum is small, but it may be difficult when the size of the sequestrum is large; its surgical removal may threaten mechanical stability and increase potential of an iatrogenic pathological fracture especially when involucrum formation is incomplete.^[2,3] Sequestrectomy has been advocated even before an involucrum has formed depending on patient's condition; resulting in a longitudinal bone defect that can be difficult or even challenging to fill.^[4] Plastic reconstructive surgery for gap management procedures like vascularised grafts are complicated by a high rate of recurrent infection and thrombosis besides technical issues.^[4] Large diaphyseal sequestrum is common when presentation is delayed.^[5]

Evolving nonaggressive protocol presently available in the literature arguably recommends that patients should undergo open biopsy and surgical treatment only if imaging procedures showed signs highly suggestive of pus formation, joint infection or osteonecrosis (or features indistinguishable from malignancy).^[3] Surgical treatment of chronic osteomyelitis may not be always necessary especially in cases where necrosis (sequestrum), joint infection, and abscess are absent; complete recovery solely with appropriate antibiotics may be expected with minimum or no surgical intervention.^[3,5] MR imaging and CT scan can easily rule out joint infection

and significant abscess in osteomyelitis with a sequestrum, thus helping to decide a conservative versus operative approach in such cases. These are otherwise excellent imaging tools to delineate the sequestrum and objectively measure the amount of medullary pus, besides ruling out neoplastic conditions that may mimic infection of bone. Such nonsurgical approach in presence of a large sequestrum is however not without controversy. Chronic osteomyelitis has been an important health problem in developing countries of the world. In African rural setting,^[6] a huge 21.6% cases were found to be in the tibia; the most common location out of the long bones. Sequestrum is a fragment of dead bone and such nonviable tissue theoretically may harbor bacterial biofilm or glycocalyx facilitating bacterial resistance to antibiotics.

Therefore, cautious optimism and selective avoidance of surgical intervention according to objective criteria (not yet well defined on evidence base to the best of our knowledge) may be a huge advantage in children suffering from chronic osteomyelitis. It appears that serious systemic signs and symptoms of sepsis, frank large pus pocket or collection in the medullary canal or elsewhere, clinic-radiological possibilities of other diagnosis like tuberculosis, fungal, or neoplastic conditions are contraindications to employ conservative approach in such cases. A culture report of virulent drug resistant strain may be other contraindications. Conservative unconventional approach must be supported by more numbers of visits by the child and his or her family for better monitoring. Our case supports the notion that antibiotics and supportive care alone may be sufficient enough in the treatment of chronic osteomyelitis with large diaphyseal sequestrum in pediatric cases where there is excellent healing potential in an immune-competent child. This may be particularly true where chronic osteomyelitis is not associated with large frank abscess or serious systemic features of sepsis.

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