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Unusual case of adult onset proximal tibia gram negative osteomyelitis presenting as septic arthritis knee: A Case report

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Abstract
Case: A 58-year-old male patient came walking to casualty with the sole complaint of proximal tibia bone pain of one week duration. The patient was treated symptomatically after proper evaluation. One week later the patient presented with features of septic arthritis and was treated with arthrotomy and lavage. Non resolution of symptoms lead to a repeat surgery which identified acute osteomyelitis which had progressed to septic arthritis. This was inferred retrospectively considering the evolution of the patient's symptoms.
Conclusion: A high index of suspicion should be kept in mind regarding the possibility of adjacent osteomyelitis in patients presenting with septic arthritis.

Keywords: Floating hip, Acetabulum Fracture, Femur Fracture

Introduction
The estimated incidence of septic arthritis in industrialized countries is six per 100,000 of population per year [1]. Osteomyelitis and septic arthritis are commonly noted in over two age groups: young children and the elderly. Other at-risk groups for the development of septic arthritis include the immunocompromised, patients with diabetes, patients who are on haemodialysis [2] and intravenous drug users [3, 4]. Septic arthritis most frequently affects the knee, followed by the hip, shoulder and elbow. The majority of cases are due to Gram-positive organisms (e.g., Staphylococcus aureus), with approximately 15% being due to Gram-negative organisms. Anaerobes are also isolated in a small percentage of cases, usually in diabetic patients and patients with prosthetic joints [5, 6]. Approximately 10% of patients with nongonococcal septic arthritis have polymicrobial infections. Klebsiella producing osteomyelitis is rare in adults [7, 8].
Whereas osteomyelitis mainly affects the metaphysis of long bone in children and pelvis and vertebrae in adults [9]. Tibia is an atypical site of osteomyelitis in adults [10]. Osteomyelitis can spread to the adjacent joint in cases where the metaphysis is intracapsular as in shoulder, hip and elbow. The development of septic arthritis with a combination of osteomyelitis is rare in the post antibiotic era. It is most likely due to an area of osteomyelitis which remained undiagnosed at the time of arthrotomy and lead to re infection of the joint [11].
Statement of Informed Consent: The patient was informed that data concerning the case would be submitted for publication and the patient has agreed.

Case Report
58 year old south Indian male patient came to casualty with complaints of pain in the right proximal tibia and pain while walking. The patient has hypertension and coronary artery disease and had underwent angioplasty in 2011. On examination, the patient was afebrile. No local rise of temperature, swelling, erythema, induration, abnormal mobility were noted. Localized tenderness was present in medial aspect of the proximal tibia. Knee joint was normal with full range of motion. Patient was further evaluated with x-rays of the knee and leg, which appeared normal. The patient was given analgesics. CT scan taken to rule out occult fractures/stress fracture appeared normal. The patient was treated symptomatically for pain and advised to review in outpatient clinic one week later for reassessment. 7 days later patient presented in orthopedics outpatient clinic with swelling of knee joint and erythema and induration of skin around knee joint and in the proximal tibia area.

Knee aspiration showed frank pus. Aspirate study came out to have a total count of 36,500 cells with a differential count of 96% neutrophils. The blood parameters were as follows: ESR- 120mm/1st hr and C-reactive protein – 50mg/L, total count-14990 and 87% neutrophils. The patient was diagnosed to have septic arthritis of knee joint, and the prior symptoms were considered as prodromal for the septic arthritis. The patient underwent emergency arthrotomy and lavage. During preoperative evaluation, the patient was noted to have very high RBS value-450mg/dl but urine acetone was negative. The patient was started on insulin infusion stat to control the hyperglycemia, following which basal bolus regimen for diabetic control was continued. Pus was sent for culture and sensitivity and synovium for the biopsy. Post operatively patient was started on Inj. Cefotaxime 1g Iv Q12h and Inj. Gentamicin 80mg IV Q12h empirically (as per hospital protocol). On post-operative day 3 wound was inspected. The drain was noted to contain frank pus, with pus oozing from distal 4 cm of the surgical site. Patient was again posted in emergency operation theatre for wash out. Intraoperatively, a collection of pus was noted to be encased within the Hoffa fat pad. The pus was washed out and the Hoffa fat pad excised near totally. As the triangular area in the anterior aspect of the proximal tibia, came into view after the Hoffa fat pad was excised, pus was found to be welling out from the proximal tibia retro patellar extra articular triangular area. A drill hole was made in the proximal medial cortex of tibia metaphysis, and frank pus oozed out of the drill hole. A cortical window of size 3 x1.5 cm was made. The proximal tibia metaphysis and the proximal third diaphysis were full of pus and necrotic material (Figure 1). The entire infected tissue was curetted out. Thorough wash given with 6L normal saline. Pus and necrotic bone were sent for culture and sensitivity and biopsy. Wound closed in layers with a separate drain for knee joint and one for the proximal tibia bone window site. A posterior above knee slab in 20 degree knee flexion was applied. Postoperatively, patient was continued on Inj. Cefotaxime 1 mg IV Q 12h and Inj Gentamicin 80mg IV Q12h. On the immediate post-operative day, first culture report came out as scanty growth of Klebsiella spp sensitive to meropenam, ciprofloxacin only. Inj. Meropenam 1g IV Q8H was started. The culture report from the second surgery came out to be Klebisella spp moderate growth sensitive to meropenam, piperacillin-tazobactam, cefoperazone-sulbactam, amikacin, gentamicin and ciprofloxacin. The antibiotic was continued. The wound over the distal third aspect showed soddening and edema and pus discharge (figure 2). Sutures were removed and wash given and wound left open to heal by secondary intention. AK slab continued. The patient became symptomatically better. The patient was discharged on postoperative day 10, after the wound became clean and granulating, with advices to continue Inj. Meropenam 1g IV Q8h and strict glycemic control from a local hospital with insulin.

Fig 1: Bone window made in proximal tibia. Pus and necrotic material found

Fig 2: Sutures in the distal aspect of the wound was removed in view of pus discharge, even after second surgery and wash was given. The wound was allowed to heal by secondary intention.

Follow-up

The patient was reassessed after a total of 3 weeks postoperatively in the OPD. The wound appeared clean and granulating. The patient was symptomatically better. Slab was removed and range of motion exercises of knee started. The patient was continued on Tab. Ciprofloxacin 500 mg twice daily dose for another three weeks. The patient was reassessed again after total of 6 weeks postoperatively. Wounds healed. Full range of knee motion was obtained and patient was weight bearing comfortably (figure 3). Repeat esr-26mm/hr and crp-0.8mg/L. Patient's diabetic status was well controlled. Antibiotic was discontinued and patient was advised to adhere to strict glycaemic control. Thereafter the patient has been followed up every two months for the past 6 months.

Fig 3: 6 weeks follow up- Patient symptomatically better with full range of motion of the knee.

Discussion

This case is unique in a few aspects.

A. Unusual causative organism-Klebsiella spp.
B. Unusual age for osteomyelitis-adult
C. C. Unusual site for an adult osteomyelitis-proximal tibia
D. Unusual presentation lead to delay in diagnosis. This lead to progression of the disease and thus gave an insight into the natural progression of the disease if untreated, which is rare in this era of antibiotics.
E. The proximal tibia metaphysis being extra articular, proximal tibia osteomyelitis progressing into septic arthritis is very rare, and the route of spread is controversial. We propose that the anatomically tangible route of spread to the knee occurred from metaphysis into the retro patellar pretibial area then though the hoffa fat pad into the joint.
F. This case gives insight into the fact that non-resolution of septic arthritis post arthrotomy and lavage should raise in our mind the possibility of adjacent septic arthritis.
G. The dilemma of which came first egg or the chicken is applicable here. Patients can progress to septic arthritis from osteomyelitis of the adjacent bone or vice versa. This can be identified by retrospectively assessing the patient's clinical symptoms and clinical examination. In this case since the patient had the proximal knee localized pain following which he developed septic arthritis, we came to the conclusion that the septic arthritis was a complication of the untreated proximal tibia osteomyelitis.
H. In cases of suspected septic arthritis and osteomyelitis, an MRI is a valuable diagnostic tool [9]. We did not perform an MRI because the patient had clear cut clinical features suggestive of septic arthritis and we opted for intraoperative assessment for confirmation of diagnosis.

The takeaway points from this case report are-

1. Prodrome of acute osteomyelitis in an adult patient might be pain alone and hence a high index of suspicion should be maintained in adults presenting with acute onset bone pain.
2. CT scan and x-rays may not be useful in the acute period of osteomyelitis.
3. A patient presenting with acute bone pain with no significant history of trauma should be assessed with ESR, CRP and CBC.
4. A high index of suspicion about adjacent osteomyelitis to be kept in mind in all cases of septic arthritis.
5. In cases with non-resolution of septic arthritis symptoms even after arthrotomy and lavage, always suspect adjacent osteomyelitis.
6. Hematogenous osteomyelitis and septic arthritis in adults commonly will be due to an immunocompromised state of a patient. So, always try to identify and the root cause. In this case the root cause was uncontrolled undetected diabetes mellitus.
7. Hematogenous osteomyelitis even though commonly caused by gram positive organisms, in rare cases as in this case gram negative organisms can also be the culpri t.
8. The pathway of spread of osteomyelitis into the joint as identified in this case-pus from the proximal tibia metaphysis passed through the extra articular pretibial retro patellar area,into the hoffa fat pad and then into the joint - can be considered as an important route of spread into joint.

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