(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 6, Page No: 573-578
November-December 2021

IJMSCR

Chronic Osteomyelitis In A Non United Proximal Shaft Of Tibia Fracture And Its Management

[1]Prof. U.Thyagarajan, [2]Dr. Karthik Seetharaman, [3]Dr. Raghavendran, [4]Dr. Rohit.R
MS, [1]Professor and Chief, [2,4]III Year Postgraduate, [3]Assistant Professor,
Department of Orthopedics, Sri Ramachandra Institute of Higher Education and Research

***Corresponding Author:**
Dr. Karthik Seetharaman
MS III Year Postgraduate, Department of Orthopedics,
Sri Ramachandra Institute of Higher Education and Research

Type of Publication: Case Report
Conflicts of Interest: Nil

Abstract

Orthopedic surgeons face a constant struggle in treating chronic osteomyelitis, which necessitates a significant deal of attention and endurance. We describe the successful limb salvage of a 48-year-old man who had persistent osteomyelitis of the left tibia with soft tissue damage. A comprehensive wound debridement of devitalized tissues and necrotized bone was performed, followed by the administration of culture-directed local antibiotics, repair with a vascularized gastrocnemius flap cover, and hybrid external fixator. In comparison to available methods to eradicate infection and achieve union at the fracture site, the outcome in this case is more hopeful in terms of mobility and function

Keywords: Osteomyelitis, wound debridement, bacterial colony, antibiotics

Introduction

Chronic osteomyelitic infection in long bones is difficult to treat in adult patients. The typical causative organisms have characters that make them more resistant to the host's immune system and systemic antimicrobial treatments. Acquired post operative infections are on the increase because of increase in number of surgical and orthopaedic implantations. In patients with implant related infection the bacteria usually will persist in the biofilm. This necessitates the removal of implant which will render the bone healing incomplete. In chronic wounds the infection are usually poly microbial. Recurrence of infection in chronic cases requires repeated course of antibiotics. Despite appropriate duration of systemic antibiotic usage the efficacy of the antibiotics are reduced by low tissue penetration due to reduced blood supply at the wound site. Thus multiplicity of problems means that the treatment plan should be methodical and multidisciplinary.

Case Presentation

We present a forty-eight year old gentleman who was brought to the outpatient department with complaints of pain and discharging sinus over his left leg for the past two months. He previously had an alleged history of road traffic accident two years back and was diagnosed with closed left proximal tibia fracture at the time of incident for which he underwent proximal tibia bi-columnar plating for the same.

After a period of 1 year following surgery, patient developed a discharging sinus over the proximal third of anterior aspect of leg, following which he was treated with IV antibiotics but the patient continued to have persistent discharge. In view of persistent infection not responding to local debridement and antibiotics, the implant was removed and the patient was started on appropriate IV antibiotics as per culture and sensitivity report.

Patient again developed a discharging sinus from surgical wound site six months post implant removal for which he was again managed with IV antibiotics. Patient had no known co-morbidities, no recent history of trauma following surgical fixation.

On examination of his left leg, there was a varus deformity in the proximal third leg and no obvious limb length discrepancy. Diffuse swelling over the left leg was noted. An active discharging sinus (Fig 1) was present over the proximal third over the anterior aspect of his leg. Hyper pigmented scar was present around the discharging sinus. Localized warmth was present surrounding the discharging sinus. Tenderness was present over the proximal third of tibia. Abnormal movement was present at the fracture site in the anteroposterior direction. Patient had functional active range of movements in his ankle and knee. There were no signs of any distal neurovascular deficit.

Fig 1-Preoperative wound showing hyperpigmented skin and adherent scar and discharging sinus over the proximal third leg

Fig 2-X ray showing non-union at the fracture site with varus alignment of the fragments and periosteal reaction

Fig 3-CT scan sagittal and coronal view showing sequestrum within the fracture site and cavity

Volume 4, Issue 6; November-December 2021; Page No 573-578

Radiological evaluation of the leg was done. X ray (Fig 2) of the tibia showed non-union at the fracture site and evidence of infection. The x-ray also revealed bone substitutes which were left in place during the previous surgery. The anterolateral cortex of the proximal fragment was dense and sclerosed. Disorganised periosteal reaction was seen in the medial proximal third fragment. CT scan (Fig 3) of the involved extremity showed non-union at the fracture site and extensive periosteal new bone. A cavity was seen in the coronal view with a sequestrum.

A swab was taken from the discharging sinus and was sent for culture and sensitivity which showed E.Coli and Pseudomonas growth. These were sensitive to third generation Cephalosporin. The patient was started on inj.Cefeperazone and Sulbactum 1.5grams twice daily based on the culture and sensitivity report. The blood investigations revealed raised ESR and CRP, and the total counts were within normal limits.

The patient was diagnosed as fracture non-union of the proximal third tibial shaft with chronic osteomyelitis (Cierny and Mader stage 3 Bl).Under the above mentioned appropriate antibiotic cover the patient was initially treated with wound debridement, Sequestrectomy and removal of bone substitutes which were left in place during the previous surgery. Following the extensive debridement the leg was stabilized in a hybrid external fixator, Twenty grams of antibiotic cement (Gentamycin) was prepared as small beads threaded in a stainless steel wire and left in place of the bone defect.Post debridement a soft tissue defect of 12X10 cm resulted in the anteromedial proximal third leg exposing the fracture site and bone. Post debridement culture from the wound was obtained. The intraoperative repeat culture showed growth of coagulase negative Staphylococcus aureus. Patient was appropriately started on Inj. Linezolid 600mg IV based on the sensitivity reports.

On the first post-operative day the wound was inspected and negative pressure wound therapy was started. After a week of NPWT the wound was re-inspected and culture obtained from the wound site. After confirming the absence of any organism growth in the culture. The antibiotic beads threaded with stainless steel wire were removed under aseptic precautions. After confirming the absence of any active infection for the next one week, under prophylactic antibiotic cover patient was then treated with vascularized local gastrocnemius flap cover over the wound site. The wound was then inspected on the fifth post-operative day and flap was found to be healthy. Through the course of treatment patient did not develop any constitutional symptoms. Patient was then followed up with 4 months post operatively with no evidence of clinical or radiological infection. Patient walks full weight bearing with the hybrid external fixator. Patient is planned for hybrid external fixator removal after confirmation of fracture union. With this we managed to salvage the limb and restore its function.

Volume 4, Issue 6; November-December 2021; Page No 573-578

Fig 4-Post operative x ray showing hybrid external fixator insitu

Fig 5-Post operative image showing the presence of antibiotic beads threaded in stainless steel wire

Fig 6a and 6b-Healthy Flap with no signs of discharge with intact hybrid external fixator Insitu on fifth post-operative day.Post operative x ray at 1 month with signs of bony callus formation

Fig 7a and 7b-Post operative flap cover at 3 months and Xray showing evidence of callus formation in the anterior and medial cortex

DISCUSSION

Volume 4, Issue 6; November-December 2021; Page No 573-578

Osteomyelitis associated with orthopaedic implant surgery occurs at a rate of 6-8% (1). proximal tibial fracture (Schatzker type -V) usually requires bicolumnar plating of proximal tibia which results in extreme soft tissue dissection and hence devascularisation of this region.

Implant surgery for fracture is usually associated with the risk of developing osteomyelitis due to various systemic and local factors (2). Osteomyelitis is classified as acute or chronic based on duration and histopathological findings.Chronic osteomyelitis is characterized by the presence of bone destruction with formation of sequestrum in 10-30% patients of acute osteomyelitis(3).The infection can be confined to the bone or propagate to the surrounding soft tissues thereby leading to wound dehiscence. This further compromises the vascularity at the fracture site resulting in healing complications.

In our case the chronic osteomyelitis was of Type 3BL according to Cierny and Mader classification with localized osteomyelitis in a locally compromised host. Though the patient underwent implant exit, the local infection continued to persist due to inadequate soft tissue cover and unstable fracture site. It is of paramount importance to obtain positive microbiological positive culture before commencing any anti microbial treatment. Removal of all necrotized tissue and sequestered bone during debridement is a crucial step for successful treatment of osteomyelitis. Intraoperatively we noted that there was diffuse osteomyelitis at the fracture site and localized necrotic segment of the antero lateral cortex of the proximal tibia. Meticulous removal of dead bone (Sequestrum) and bone substitutes present inside medullary canal facilitated in negating the foreign body effect of bacterial colonization. Treatment of chronic osteomyelitis is challenging with high morbidity and treatment cost to the patient.

Local segmental defect and degree of soft tissue damage are important factors in affecting the osteogenic response at fracture site(4).Local antibiotic carriers can elute antibiotics at high concentrations above the MIC. Polymethyl methacrylate represent a major class of non-biodegradable carrier system. Cement impregnated with aminoglycosides have been used successfully in local elution of antibiotics and to avoid formation of bio film(5,6). In our patient, following the initial wound debridement the dead space was less than 5cm and the soft tissue loss was 12x10 cm at the fracture site. The dead space was managed by antibiotic cement beads at the fracture site to eradicate the infection locally and then plan for soft tissue cover of the wound. This was pre planned and discussed with plastic surgery team. The fracture site was stabilized with a hybrid external fixator as this construct allows for early joint movement decreasing the risk of joint stiffness. After removal of the antibiotic beads and confirming the absence of infection by serial cultures from the site the patient underwent local vascular gastrocnemius flap to cover the wound.

CONCLUSION

In conclusion, treatment of combined infected tibial nonunion with soft tissue defects remains challenging. Local antibiotic delivery using bone cement is a cost effective method to treat polymicrobial infection associated with implant related infection. Both soft tissue free flap reconstruction with hybrid external fixator are feasible techniques in eradicating infection at the fracture site.

ADDITIONAL INFORMATION

Disclosures

Human subjects: Consent was obtained by all participants in this study. All authors declare the following- Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationship or activities that could appear to have influenced the submitted work.

ACKNOWLEDGEMENTS:

Dr D. Rajakeerthana Post Graduate, MS General Surgery

REFERENCES

1. Panteli M, Giannoudis PV: Chronic osteomyelitis: what the surgeon needs to know. EFORT Open Rev. 2016, 1:128-135.
2. Kwiatt ME, Seamon MJ: Fat embolism syndrome. Int J Crit Illn Inj Sci. 2013, 3:64-68.

Volume 4, Issue 6; November-December 2021; Page No 573-578

3. Walter G, Kemmerer M, Kappler C, Hoffmann R: Treatment algorithms for chronic osteomyelitis. Dtsch Arztebl Int. 2012, 109:257-264.
4. Bajuri MY,Razak KAA:Chronic osteomyelitis of the femur with segmental bone defect:concepts and treatment.J Krishna Inst Med Sci Univ.2017,6:127-130
5. Chuah SK, Bajuri MY, Mohd Nor F. Chronic Osteomyelitis Revisited: A Case Report. Cureus. 2019 Jun 28;11(6):e5023.PMID: 31501722; PMCID: PMC6721869.
6. Markakis K, Faris AR, Sharaf H, Faris B, Rees S, Bowling FL. Local Antibiotic Delivery Systems: Current and Future Applications for Diabetic Foot Infections. The International Journal of Lower Extremity Wounds. 2018;17(1):14-21.
7. Ariffin HM, Mahdi NM, Rhani SA, Baharudin A, Shukur MH. Modified hybrid fixator for high-energy Schatzker V and VI tibial plateau fractures. Strategies Trauma Limb Reconstr. 2011;6(1):21-26

Volume 4, Issue 6; November-December 2021; Page No 573-578