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Persistent Infection in a Patient with Tibial Non-union

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ABSTRACT

This report presents a case of persistent pin site infection that resulted in the removal of hardware in a patient who underwent Ilizarov stabilization for compound tibial fractures. Despite antibiotics, the infection worsened, necessitating removal of the entire Ilizarov frame to prevent permanent damage or non-union. Bone marrow stimulators were subsequently placed for healing support. The report emphasizes the importance of rigorous pin site care, meticulous monitoring, low threshold for diagnosis of complications and swift escalation of treatment when needed. However, vigilance alone may not be enough, especially in those with co-morbidities, open injuries or hardware applications simplifying opportunities for nosocomial infection. The patient's recovery process involved early, optimized rehabilitation, medical and social supports, leading to a return to partial mobility and function despite a prolonged recovery process. Diligent follow-up was necessary at each stage to recognize complications before permanent damage and revise treatment plans as needed. The report aims to share lessons learned and strengthen preparedness for future cases facing similar challenges. Success emerged from determination, vigilance and partnership. Close monitoring makes the difference between catastrophic loss and maximal benefit from an ordeal already threatened by overcoming disability.

Introduction

Persistent infection following orthopedic trauma surgeries poses a significant threat to recovery and return of function [1]. Vigilant monitoring for early warning signs, prompt diagnosis of complications and expedient treatment are essential to optimizing outcomes and mitigating poor prognosis [2,3]. We present a case of prolonged pin site discharge and medullary infection leading to removal of hardware in a 66-year-old male who underwent Ilizarov stabilization of compound tibial fractures. Though the infection initially responded to antibiotics, it revealed vulnerabilities in the complex repair and immobilization that demanded surgical intervention to ensure healing and mobility [2]. This case highlights the importance of meticulous pin site care, close monitoring, early recognition of infection and willingness to take aggressive action when threats emerge despite best efforts. Without reactive problem-solving and patience through the rehabilitation process, good functional results can be easily lost [4].

Patients with severe, open injuries and prolonged surgeries/immobilization represent a particularly fragile segment of the population. While beneficial in stabilizing the damaged and enabling repair, these treatment approaches also introduce numerous opportunities for deterioration if not managed vigilantly [5]. There are few second chances once damage has been done, so diligence must be the rule.

We provide this report as a reminder of the responsibilities that come with managing such complex cases and a call to prioritize predictive prevention over reactive damage control wherever possible through optimal practices, multidisciplinary teamwork and follow-up.

Though setbacks are disappointing, commitment to the goals of surgery and enthusiasm for rehabilitation can help transcend them. This patient's case demonstrates how, with time and determination, good outcomes can still be achieved despite a loss of hardware and prolonged recovery. The journey is long, but not without hope if we learn from mistakes and persevere.

Case presentation

A 66-year-old male with a past medical history of tibial fractures 6 months ago, is treated with open reduction and internal fixation using an Ilizarov frame. He was presented with mild discharge from the pin sites of the frame for the past 2 weeks.

Six months ago, the patient sustained compound type 3B fractures of both the tibiae due to a motor vehicle accident. He underwent open reduction and internal fixation with an Ilizarov frame to stabilize the bones during healing. X-rays confirmed that the fractures were bridging, and the patient was discharged with instructions to return for suture removal and frame removal in 2 weeks.

However, the patient returned 2 weeks later complaining of increased pain and swelling over the pins, along with discharge. Examination revealed erythema, tenderness and purulent discharge from 4 of the 12 pin sites. X-rays showed the fractures had healed, so the orthopedic team recommended keeping the frame for immobilization while starting antibiotics. After 1 week of treatment with cloxacillin, the pain and swelling improved but discharge persisted from 2 pin sites. Culture of the discharge grew methicillin-sensitive Staphylococcus aureus. However, the patient's condition did not deteriorate clinically, so the orthopedic team decided to continue immobilization and change antibiotics to ciprofloxacin.

After 2 weeks of treatment with ciprofloxacin with improved symptoms but persistent pin site discharge, the team elected to remove the Ilizarov frame and surgically debride the pin sites under anesthesia. Intraoperatively, purulence was seen tracking along the pin tracts into the medullary canals, so the entire frame along with involved segments of bone were removed. Bone marrow stimulators were placed, and the patient began mobilization assisted by crutches. At the time of follow-up, x-rays showed the nonunions are healing and the patient can bear weight. Though disappointing, this case highlights the importance of meticulous pin site care, recognizing infection early, diligent follow-up and expeditious treatment of any complications in such complex surgeries. With commitment to rehabilitation and patience, good functional outcomes can still be achieved despite setbacks.

Some key things that could have been done differently in this case to possibly improve the outcome include:

Improved pin site care and monitoring

Closer inspection of pin sites, gentle cleaning, dry dressing changes, etc. could have detected infection earlier and prevented the tract formation. Daily monitoring for signs of infection is crucial in external fixation [6].

Expedited surgical debridement

Once infection was detected, more prompt surgical exploration and debridement of pin sites may have limited the extent of infection and need for hardware removal. Earlier, aggressive intervention could have preserved fixation [4].

Alternate antibiotics

If initial antibiotics did not completely clear infection, switching to alternative antibiotics may have resolved infection without major surgery. Multiple antibiotics or combinations may have been required in some cases [7].

Internal fixation

If infection was severe or persistent, converting to internal fixation using plates/screws could have stabilized the bone sufficiently for healing while removing the infection source. This may have achieved better results than removing the entire construct [8].

Bone grafting

In the event of nonunion after hardware removal, bone grafting could have been helped to bridge any gaps and encourage healing. Stimulators alone may not produce enough new bone formation in some cases. Grafts provide scaffolding and osteoinductive/osteoconductive support for regeneration [9].

Bone Morphogenetic Proteins (BMP)

Similar to grafts, BMP could have been provided biological cues to stimulate new bone formation and heal the nonunions seen after external fixator removal in this case. These proteins have shown promise in nonunion repair and may have improved the outcome [10].

Re-application of external fixator

If soft tissues and swelling had improved enough after initial fixator removal, re-application of an external fixator could have re-established stabilization for continued healing. Fixators can be customized/modified as needed to avoid pin sites that harbored infection. Re-fixation provides more options/control over the recovery process [11].

Conclusion

In conclusion, we present this case of medullary infection leading to Ilizarov removal and bone stimulator placement to highlight the critical importance of vigilance, proactive problem-solving, patience and the coordination among the specialists, patients and families. Close monitoring can literally make the difference between disability and mobility.

Conflict of interest

The authors declare no conflict of interest

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