

Closed Humeral Shaft Fracture with Osteomyelitis in an Elderly Patient Managed by Open External Fixation and Holistic Approach for Wound Management: A Case Report

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ABSTRACT

Background: Subacute hematogenous osteomyelitis in closed fractures is rare but clinically significant, especially in elderly patients with delayed presentation. In rural areas, traditional bone manipulation before referral increases infection risk. Optimal care requires surgery supported by effective communication and wound care education.

Case Presentation: An 80-year-old woman developed swelling and purulent discharge two weeks after a fall treated by a bonesetter. Radiographs showed a closed midshaft humeral fracture with subacute osteomyelitis. She underwent open reduction, debridement, and open reduction external fixation (OREF). Postoperatively, structured wound care education was provided to patient and family, whose active role was essential due to limited access to orthopedic care.

Result: At six months, radiographs confirmed complete fracture union, infection resolution, and restoration of arm function. Family involvement was pivotal in maintaining wound hygiene, ensuring compliance, and sustaining patient motivation during recovery.

Discussion: This case highlights the value of family-centered care in infection

management for elderly fracture patients. Evidence shows that engaging families improves adherence, reduces infection risk, and supports early detection of complications. Routine follow-ups also reinforce education and provide ongoing monitoring.

Conclusion: In elderly patients with humeral shaft fractures complicated by subacute osteomyelitis, combining surgical treatment with structured family-focused wound care education and regular follow-up optimizes both infection control and functional outcomes. Family engagement should be recognized as a cornerstone of holistic fracture management.

Keywords: osteomyelitis, closed fracture, family education, holistic wound management

INTRODUCTION

In rural areas where orthopedic specialists are not available, the role of family members becomes even more central in daily wound care, ensuring adherence to treatment and providing emotional support for elderly patients. Osteomyelitis is a severe complication in fracture cases, particularly in elderly patients whose

immune systems are weakened and bone healing capacity is delayed.¹

Although uncommon in closed fractures, infection in such circumstances can result in significant morbidity and disability if not managed promptly.² In many resource-limited regions, patients often first seek help from traditional bonesetters, which delays hospital treatment and increases infection risk.^{3,4} Therefore, effective communication is not only essential for explaining surgical interventions but also crucial for ensuring adherence to wound care and follow-up.⁵

Recent studies emphasize that structured, family-centered education reduces reinfection rates and improves compliance with postoperative care. Family participation is critical as they frequently act as the primary caregivers of elderly patients at home.^{6,7}

This case highlights not only the surgical management of osteomyelitis but also the importance of communication and holistic

wound care education in achieving successful outcomes.

CASE PRESENTATION

Because the patient lived in a rural area without access to orthopedic specialists, family participation was essential in bridging hospital-based treatment with long-term wound care at home.

An 80-year-old woman presented with a two-week history of swelling and purulent discharge from her left upper arm. One month earlier, she had sustained a fall at home and developed pain and deformity of the arm. Instead of immediate hospital care, she sought treatment from a local bonesetter, where traditional manipulation was performed. Symptoms gradually worsened with severe pain and restricted movement. Clinical examination revealed swelling, tenderness, erythema, and purulent discharge through a draining sinus. Neurovascular examination was intact.



Figure 1: Initial clinical image showing swelling and sinus formation of the left humeral.

Radiographs demonstrated a closed oblique midshaft humeral fracture with periosteal reaction and cortical irregularity, consistent

with subacute osteomyelitis. Laboratory tests revealed mild elevation of Leukosit.



Figure 2: Initial radiograph before surgery.

The patient underwent open reduction, extensive debridement, and open reduction external fixation (OREF). Intraoperatively, necrotic bone fragments and pus were observed. Non-viable bone and infected tissue were debrided.



Figure 3: Post-operative radiograph after application of OREF.

Following surgery, a structured wound care education program was delivered to the patient and her family, covering; wound hygiene and proper dressing changes, recognition of infection warning signs,

importance of routine follow-up visits, family participation in ensuring adherence and psychological support to maintain patient motivation.

During follow-up, progressive wound healing and functional improvement were noted. After radiographic evidence of bone consolidation, the external fixator was removed, and pin sites were inspected to ensure no residual infection.



Figure 4: Radiograph before OREF removal.



Figure 5: Clinical Image before OREF removal.

RESULT

At 6 months, radiographs confirmed complete fracture union with no recurrence of infection. The patient regained full mobility of the arm, reported no pain, and expressed satisfaction with the treatment.



Figure 6: Radiograph after OREF removal.

DISCUSSION

This case highlights the role of families in rural or rural areas. When orthopedic specialists are not locally available, families act as the main caregivers, ensuring adherence to wound management and maintaining patient motivation, which are vital for successful outcomes.^{8,9} This case

emphasizes the challenges of managing osteomyelitis complicating a closed humeral fracture in an elderly patient.

The role of OREF in infection control is significant. It provides stability while enabling repeated wound access. OREF reduces the risk of bacterial colonization in contaminated fields compared to internal fixation, making it a valuable tool for infection-related fractures.^{10,11}

There are several challenges associated with wound treatment in elderly patients. Older patients have impaired vascularity, slower healing, and often multiple comorbidities. These factors increase susceptibility to infection and delay recovery.¹² Therefore, surgical success must be complemented by strong postoperative support and infection surveillance.⁸

Communication and family-centered education the cornerstone of this case's success was effective communication. Clear explanations, practical wound care demonstrations, and reinforcement of infection warning signs were essential. Recent evidence supports that family-centered communication reduces postoperative complications and enhances long-term adherence.^{7,13} Beyond clinical benefits, communication has a psychosocial dimension. Elderly patients often feel anxious or pessimistic about recovery. Family involvement provided emotional

reassurance and motivation, encouraging the patient to follow wound care instructions and attend routine follow-up visits.^{14,15}

This case also reflects the importance of teamwork. Orthopaedic surgeons provided definitive surgical care, nurses reinforced wound care techniques, and family members ensured daily adherence. Such multidisciplinary and family-integrated care is crucial for long-term outcomes.^{16,17}

In rural regions with limited access to orthopedic specialists, empowering families through structured communication is a practical strategy. Literature highlights that family caregivers can successfully bridge the healthcare gap when properly guided. Thus, this case provides an example of how holistic, communication-driven approaches can optimize recovery even in challenging healthcare environments.^{17,18}

CONCLUSION

This case also demonstrates that in patients from rural areas without orthopedic specialists, family engagement becomes indispensable for wound care and follow-up. Family involvement should be recognized not only as supportive, but as a cornerstone of recovery in resource-limited settings.

Management of osteomyelitis in elderly patients requires more than surgical intervention. In this case, open reduction, external fixation, and extensive debridement controlled the infection, but the decisive factor for long-term success was effective communication and structured wound care education involving the family. Communication should be considered a central pillar in infection management, especially in resource-limited healthcare settings.

Declaration by Authors

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