

Antibiotic Cement-Coated Intramedullary Nails for the Treatment of Infected Nonunion of Long Bones

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Purpose: Antibiotic-impregnated cement nails are used to treat postoperative deep infections after primary intramedullary nailing of long bone fractures. These are often complicated by a nonunion as well. There are limited data on the effectiveness of this treatment on both the eradication of infection and the achievement of union after treatment. We hypothesized that the treatment of long bone-infected nonunion with exchange nailing using an antibiotic-impregnated nail and 6 weeks of culture-specific antibiotics would be a successful treatment.

Methods: This was a retrospective observational cohort study conducted at an urban Level I trauma center. 40 consecutive patients who received an antibiotic cement nail for treatment of intramedullary osteomyelitis were monitored for nonunion status after primary intramedullary nailing. Minimum follow-up was 12 months. Outcomes of interest were eradication of infection and radiographic union.

Results: Antibiotic nailing successfully eradicated infection and resulted in union in 34 patients (85%), while 6 patients (15%) had persistent infection and required further surgical treatment. Of the 6 patients who required further treatment, 5 eventually went on to heal with fracture union and eradication of their infection, while one required a salvage procedure. Of the 5 patients who eventually went on to heal, 4 of them healed with repeat antibiotic or intramedullary nails, while one required segmental resection and bone grafting before healing. The lone patient who did not heal was treated with a plate and an antibiotic nail for his humerus and is functioning with a persistent nonunion but has no evidence of infection.

Conclusion: Our study suggests that antibiotic nailing technique is a viable therapeutic option to eradicate intramedullary osteomyelitis and support fracture union.

Outcomes of patients who failed treatment with antibiotic nailing intramedullary nail

| Sex | Age (years) | Fracture type | Infecting organism | Surgical Intervention | Outcome |
|-----|-------------|---------------|---------------------------|---|---------------------------------------|
| M | 64 | Closed | MRSA | Antibiotic nails (2) to resection arthroplasty to external fixator to fusion | Ankle resection arthroplasty & fusion |
| F | 66 | Unknown | MSSA | Segmental femur resection with antibiotic spacer placement, intramedullary nailing, and iliac crest bone grafting | Union/Infection Eradication |
| M | 28 | IIIC | Proteus Mirabilis | Antibiotic nails (3) to ORIF to Antibiotic nails (2) | Union/Infection Eradication |
| M | 23 | Unknown | MRSA | Intramedullary nail (1)* | Union/Infection Eradication |
| M | 29 | IIIB | MRSA | Antibiotic nail (1) | Union/Infection Eradication |
| M | 21 | IIIB | Citrobacter <u>Koseri</u> | Antibiotic nail (3) | Union/Infection Eradication |

See the meeting app for complete listing of authors' disclosure information. Schedule and presenters subject to change.