

Institutional Costs Associated with Ankle Fusion Nonunion

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Introduction/Purpose: Ankle arthrodesis is the most favored surgical treatment for several tibiotalar pathologies. Nonunion requiring revision occurs in 5.7% - 6.5% of patients. Nonunion is a challenging surgical complication and bone graft substitutes are costly. This study aimed to summarize all institutional expenditures related to ankle fusion nonunion needing revision, presuming that cost and skin-to-skin time would exceed that of the index surgery.

Methods: Reviewing electronic charts from a foot and ankle center, a patient list with two or more entries for tibiocalcaneal, pantalar and tibiotalar fusions was generated. Out of 44 cases found, 21 patients had bilateral surgery and were excluded. Three had TAR or surgery in the periphery as index surgery; four had revision not for nonunion. Demographic factors and skin-to-skin time of the 16 remaining patients were compiled. Supplemental clinic visits and investigations were included either after CT to assess union, or 365 days post-index procedure in the absence of CT. Total cost of the revision was calculated from surgical billing codes, length of operation, and period of hospitalization. Post-revision outpatient fees were all included. This cohort included 16 patients (6F : 10M) with an average age of 60 years (52 - 67) and BMI of 33 (29 - 38). 14 revisions were performed open; 13 patients received bone graft.

Results: Average hospitalization post-operatively was 5.5 days (1.87 - 9.28). The additional cost associated with nonunion were \$1,538 (CAD) for imaging, \$737 for pre-revision visits, \$12,483 for the revision and hospital stay, and \$1,990 for post-revision follow-up. The total average amount was \$14,982, equivalent to 10 nights of acute inpatient stay. Index average skin to skin time was 2:00:50 and for revisions 2:18:20, for a p-value of 0.26. The cost of nonunion per 100 primary procedures is therefore \$85,397 to \$97,383. If an intervention reduces the incidence of nonunion by 50% the cost saved would be \$486 per procedure. As grafting or bone graft substitutes cost over \$1,000, grafting should be limited to at risk patients.

Conclusion: Additional care related to ankle fusion nonunion represents a financial burden equivalent to 10 nights of acute inpatient stay. Revision surgery is not significantly longer intraoperatively than index surgery. Bone graft and/or substitute should only be considered if its cost is less than \$486 CAD at our institution.

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