Economic Cost Analysis Between Open Reduction and Internal Fixation Versus Distal Femur Replacement

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Purpose: Recent literature and systematic reviews have compared open reduction and internal fixation (ORIF) versus distal femur replacement (DFR) for distal femur fractures. Systematic review results have been equivocal in terms of functional outcomes. DFR might result in fewer postoperative complications such as nonunion, fixation failure, and a faster time to weightbearing in certain comminuted, intra-articular injuries.

Methods: We looked at patients who underwent ORIF or DFR for distal femur fractures at Texas Tech University Health Sciences Center, including all fractures, both native and periprosthetic, within our data collection set. For each initial ORIF and DFR, we pulled the price of each surgery that the hospital billed to insurance. For complication prices, we included both direct and indirect costs, including cost of surgery, hospital stay costs, and additional inpatient services.

Results: We found 315 ORIF patients and 24 DFR patients who met our inclusion criteria. The average patient age was 61.4 years. Of the 315 ORIF patients, 62 patients required hardware revisions. In total, complications of ORIF cost the hospital $2,860,462.75. Of these 62 ORIF patients, 13 went on to total knee arthroplasty (TKA) with revision implants and 59 went on to removal of hardware. The overall average cost of initial ORIF surgery was $3,266.97 per patient; including hardware complications and subsequent revision surgeries, cumulative costs increased to $12,347.80 per injury. Approximately 12% of patients dealt with infection and the average time each complication spent in the hospital was an additional 7 days. On the other hand, 22 DFRs have been performed at our institution for fractures and have resulted in 3 patients needing hardware revisions. None of the patients had fixation failure; almost all revisions were due to loosening of hardware. The overall initial DFR cost averaged $8,320 per patient. Complications and subsequent surgeries after DFRs cost the hospital $179,075.19, increasing to $16,459 per injury. Approximately 9% of patients dealt with infection and the average time spent in the hospital for each complication was 4 days.

Conclusion: Our ORIFs showed a 20% revision rate with 4% converting to TKA. Revision rates after DFR at our hospital were approximately 14%. While it is typically assumed that DFR is significantly more expensive than ORIF, our study showed that, in the long term, it is approximately $4,000 more per patient and includes faster healing time and time to weightbearing. Additionally, DFR had less fixation failure and infection rates as well as shorter lengths of stay associated with their complications.