Arthroplasty for Garden I/II Femoral Neck Fractures Is Associated with 164% Cost Increase Over Internal Fixation: Arthroplasty Not Justified for Garden I/II Fractures

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Purpose: Literature suggests that Garden I and II femoral neck fractures (FNFs) may benefit from arthroplasty rather than internal fixation (IF) based on secondary rates of conversion to arthroplasty. This study sought to determine the difference in actual monetary costs and outcomes of IF versus arthroplasty.

Methods: A retrospective review of FNF patients identified by CPT codes from 2014-2021 at a Level I center was conducted. Age, gender, fracture pattern, posterior tilt, Charlson Comorbidity Index (CCI), mortality, disposition, complications, conversion to arthroplasty, PROMIS (Patient-Reported Outcomes Measurement Information System) Physical Function (PF) and all index and subsequent hospitalizations were recorded. Using a unique database of actual dollar costs, expenses associated with all hospitalizations for each patient were recorded. Three groups were analyzed: Garden I/II treated with IF, Garden I/II treated with arthroplasty, and Garden III/IV treated with arthroplasty. Statistical comparisons were made between groups. Confidentiality agreement with the hospital only allows real dollar charges to be expressed as percentages of a baseline or reference point.

Results: 403 patients were included with results outlined in Table 1. PROMIS PF outcomes did not differ at 1, 3, 6, or 12-month follow-up. Arthroplasty at index cost 164% more than IF. Assuming 0% arthroplasty complications, IF would have to fail at a greater than 34% rate for arthroplasty to be a cost-effective index procedure, assuming outcomes are not different.

Conclusion: This study of actual hospital costs examines the monetary impact of treatment choices in FNFs. Garden I/II fractures treated with arthroplasty showed 164% cost increase over IF. IF would need to fail one-third of the time to warrant wide-spread adoption of arthroplasty as first-line treatment in Garden I/II fractures from a cost and outcomes perspective. The secondary conversion rate in this series was only 5%, perhaps due to only performing fixation for posterior tilt less than 20°. Complication rates, mortality rates, and disposition did not vary between groups or favored IF. Further study is necessary to balance post-surgical function with hospital costs, but a recent randomized controlled trial does not support a difference in function between IF and arthroplasty for Garden I/II fractures, and this monetary analysis lends further evidence to that position.

	Garden I/II – Internal Fixation	Garden I/II - Arthroplasty	Garden III/IV - Arthroplasty	p-value
Cohort Size, (N)	119	29	255	----------
Age, Mean (years)	71.2	72.3	76.5	0.04
Gender, Female	73.9%	55.2%	62.7%	0.04
CCI, Mean	4	4	3	0.60
> 20° Posterior Tilt	0%	53.30%	-	----------
Follow-Up, Mean (months)	13	8.4	9.4	0.11
Index Hospitalization Cost	Baseline	1.5 x Baseline	1.5 x Baseline	----------
Failure Rate	5.0 % (6)			----------
Surgeries for Failure or Complication	8.5%	24%	11%	0.68
Complications (Not Failure Conversion to Arthroplasty)	2.5 % (3 exchanges of proud screws)	13.8 % (4 (3 infection, 1 cup malposition causing dislocation))	7.4 % (4 revisions for dislocation, 15 for infection)	0.13
Total Cost Per Person With Complications	1.13 x Baseline	1.99 x Baseline	1.70 x Baseline	
Death	24 % (29 @1.7 years post)	24% (7 @ 0.23 years post)	18% (46 @ 1.23 years post)	0.12
Disposition to SNF	47.9 % SNF	44.8 % SNF	64.7 % SNF	0.001

*Legend: N – Number; CCI – Charleston Comorbidity Index; SNF – Skilled Nursing Facility