

Intermediate to Long-Term Outcomes Following Initial Treatment of Proximal Humerus Fractures in Ontario Canada: A Population-Based Retrospective Cohort

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Purpose: Proximal humerus fractures are a common fragility fracture in older adults. Intermediate to long-term outcomes following both surgical and nonsurgical initial treatment of proximal humerus fractures have not been evaluated at a population level. The purpose of this study was to utilize administrative data from Ontario, Canada to evaluate intermediate-term outcomes following initial treatment of proximal humerus fractures.

Methods: We used data from the Canadian Institute for Health Information to identify all patients aged 50 and older who presented to an ambulatory care facility with a "main diagnosis" of proximal humerus fracture from April 1, 2004 to March 31, 2013. Intervention codes from the Discharge Abstract Database (DAD) and procedure codes from the Ontario Health Insurance Plan (OHIP) were used to categorize patients into fixation, replacement, closed reduction, or nonoperatively treated with no reduction groups. We used intervention and procedure codes to identify instances of complication-related operations following initial treatment (including fixation, replacement, hardware removal, rotator cuff repair, and irrigation and debridement) at 2 to 5 years post initial treatment.

Results: The majority of patients (25,104 [76.6%], 95% confidence interval [95% CI] 76.2-77.1%) were initially treated nonsurgically, while 2979 (9.1%, 95% CI 8.8-9.4%) underwent initial fixation, 1419 (4.3%, 95% CI 4.1-4.6%) received primary joint replacement, and 3258 (10.0%, 95% CI 9.5-10.3%) were initially treated with a closed reduction procedure. Complete 2- and 5-year outcome data are presented in Table 1. In the nonoperatively treated group, the total number of complication-related operations increased from 434 (1.7%, 95% CI 1.6-1.9%) 2 years post initial treatment to 492 (2.0%, 95% CI 1.8-2.1%) at 5 years. A total of 799 patients (26.8%, 95% CI 25.3-28.4%) initially treated with operative fixation returned to the operating room for a complication-related operation at 2 years post initial treatment, and this number increased to 896 (30.1%, 95% CI 28.5-31.8%) at 5 years post initial treatment. In the group treated initially with a replacement procedure, 123 (8.7%, 95% CI 7.3-10.3%) returned for a complication-related operation at 2 years post initial treatment, and 192 (13.5%, 95% CI 11.9-15.4%) returned at 5 years post initial treatment. For the patients treated with an initial closed reduction procedure, the total number of complication-related operations increased from 660 (20.3%, 95% CI 18.9-21.7%) at 2 years to 689 (21.2%, 95% CI 19.8-22.6%) at 5 years post initial treatment.

Conclusion: The majority of proximal humerus fractures in patients 50 and older in Ontario, Canada are treated nonsurgically. Complication-related operations in the 5 years following initial nonoperative treatment are relatively low. The high risk of complication-related operations at 2 (26.8%) and 5 (30.1%) years following initial fixation of these injuries is concerning and suggests alternate approaches should be considered.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.

Table 1: Two and Five Year Outcomes Following Initial Treatment of Proximal Humerus Fractures

Outcome	Replacement	Fixation	Rotator cuff repair	Hardware removal	Repair	Irrigation & debridement	Total
Two-Year Outcomes							
<i>Non-operative (n = 25,104)</i>	0 (0.0%)	111 (0.4%)	80 (0.3%)	8 (0.0%)	28 (0.1%)	21 (0.1%)	248 (1.0%)
<i>Reduction (n = 3,258)</i>	148 (4.5%)	274 (8.4%)	147 (4.5%)	33 (1.0%)	24 (0.7%)	0 (0.0%)	660 (20.3%)
<i>Fixation (n = 2,979)</i>	98 (3.3%)	160 (5.4%)	87 (2.9%)	412 (13.8%)	15 (0.5%)	19 (0.6%)	799 (26.8%)
<i>Replacement (n = 1,419)</i>	62 (4.4%)	14 (1.0%)	14 (1.0%)	20 (1.4%)	7 (0.5%)	0 (0.0%)	123 (8.7%)
<i>Total (n = 32,760)</i>	308 (0.9%)	559 (1.7%)	328 (1.0%)	473 (1.4%)	74 (0.2%)	45 (0.1%)	1787 (5.5%)
Five-Year Outcomes							
<i>Non-operative (n = 25,104)</i>	0 (0.0%)	123 (0.5%)	97 (0.4)	10 (0.0%)	0 (0.0%)	25 (0.1%)	286 (1.4%)
<i>Reduction (n = 3,258)</i>	157 (4.8%)	284 (8.7%)	156 (4.8%)	34 (1.0%)	24 (0.7%)	0 (0.0%)	689 (21.1%)
<i>Fixation (n = 2,979)</i>	115 (3.9)	182 (6.1%)	105 (3.5%)	447 (15.0%)	16 (0.5%)	20 (0.7%)	896 (30.1%)
<i>Replacement (n = 1,419)</i>	93 (6.6%)	24 (1.7%)	25 (1.8%)	33 (2.3%)	11 (0.8%)	0 (0.0%)	192 (13.5%)
<i>Total (n = 32,760)</i>	365 (1.1%)	613 (1.9%)	383 (1.2%)	524 (1.6%)	82 (0.3%)	52 (0.2%)	2019 (6.2%)