

A Prospective Randomized Trial of Nonoperative versus Operative Management of Olecranon Fractures in the Elderly

Andrew Duckworth, MBChB, BSc, MRCSed, MSc, PhD¹;

Nicholas Clement, MRCSed, PhD¹; Jane McEachan, FRCSEd; Timothy White, MD, FRCSEd¹;

Charles Court-Brown, MD, FRCSEd¹; Margaret McQueen, MD, FRCS¹

¹*Edinburgh Orthopaedic Trauma Unit, Royal Infirmary of Edinburgh, UNITED KINGDOM;*

²*Department of Orthopaedic Surgery, Queen Margaret Hospital, Dunfermline, UNITED KINGDOM*

Purpose: Recent retrospective studies have advocated primary nonoperative treatment for isolated displaced olecranon fractures in elderly lower-demand patients. The aim of this multicenter, prospective randomized controlled trial was to compare patient-reported and functional outcomes, complications, and economic costs for displaced olecranon fractures in patients 75 years or older who were managed with either primary open reduction and internal fixation (ORIF) or nonoperative treatment. The null hypothesis was that there is no difference between groups in the patient-reported outcome at 1 year postinjury.

Methods: We performed a registered prospective randomized two-center trial in elderly patients (≥ 75 years of age) with an acute displaced fracture of the olecranon. Patients were randomized to either operative (tension band wire or plate fixation) or nonoperative (2 weeks immobilization followed by early active motion) management. The primary outcome measure was the Disabilities of the Arm, Shoulder and Hand (DASH) score at 1 year post injury. Secondary outcome measures included surgeon-reported outcome measures, complications, pain, and cost. Power analysis determined a total sample size of 50 patients (25 per arm) was required to provide 80% power to detect significant difference (0.05) in the DASH at 1 year (effect size 0.8).

Results: There were 19 patients randomized to receive nonoperative ($n = 8$) or operative ($n = 11$) management. Two patients died in the year following surgery, with the follow-up rate in those available 100%. There was a significant improvement in elbow function in both groups over the 1-year period following injury ($P = 0.001$). There was no difference in the DASH between groups at all time points over the 1 year following injury, with the mean DASH at 1 year 22 (range, 2.5-57.8) in the operative group and 23 (range, 0-59.6) in the nonoperative group ($P = 0.763$). At 1 year following injury, the elbow flexion arc was just significantly better in the operative group (129 vs 106; $P = 0.049$). There was no other significant difference between groups in terms of elbow flexion arc, forearm rotation arc, Broberg and Morrey Score, or the Mayo Elbow Score at all the assessment points over the 1 year following injury (all $P = 0.05$). There was a significantly higher rate of complications (81.8% vs 14.3%; $P = 0.013$) and cost (\$15,295 vs \$4947; $P = 0.008$) following surgical intervention.

Conclusion: In older lower-demand patients, these data provide further evidence to support the primary nonoperative management of isolated displaced olecranon fractures. This trial was stopped early due to the high rate of complications found in the operative treatment arm on interim analysis and safety monitoring.