Outcomes after Surgical Treatment of Anterior and Posterior Trans-Olecranon Fracture Dislocations

Hannah Jacqueline Szapary, Jort Pieter Wiersma, Huub H De Klerk, Neal C Chen, Abhiram Bhashyam

INTRODUCTION: Trans-olecranon fracture dislocations, with either anterior or posterior displacement of the forearm and an intact proximal radioulnar joint, are rare injuries and considered difficult to treat. Few studies have described postoperative outcomes for patients with these fractures and there is little existing comparison between anterior and posterior injuries. This study aimed to report postoperative outcomes for both trans-olecranon fracture dislocation types and identify reoperation risk factors.

METHODS: A retrospective cohort study was performed, identifying 32 patients for inclusion from an initial screen of over 800 individuals by radiograph and computed tomography imaging review, with injuries that occurred between 2014 and 2023 at two urban level 1 Trauma Centers in the same metropolitan area. Of 32 patients, 21 had anterior and 11 had posterior injuries. A manual chart review was performed to collect demographic, radiographic, and surgical outcome information, and bivariate analysis was used to evaluate predictors for reoperation.

RESULTS: The mean age at the time of injury was 56.6 (standard deviation (SD): +/- 18.7) years, and mean time to follow up postoperatively was 1.36 (SD: +/- 2.18) years. Posterior injuries were more likely to have an associated radial head fracture (81.8% vs. 33.3%, p=0.02) and Mayo type 3 (ulnar basal coronoid type) olecranon fracture (63.6% vs. 19.0%, p=0.02), a classification system described by Barlow et al, and were also more often associated with a mechanical ground level fall (54.5% vs. 33.3%) or fall from height (45.5% vs 14.3%, p=0.02) as mechanism of injury. While there was no difference in extension/flexion range of motion (ROM) at latest follow up, posterior fracture-dislocations were less likely to have full pronation/supination ROM (11.1% vs 66.7%, p=0.01, **Table 1**). Reoperation rate did not differ between fracture types (36.4% vs 28.6%, p=0.49). A younger age (42.6 vs. 62.9 years, p=0.006) and male sex (70.0% vs. 27.3%, odds ratio: 5.82, p=0.049) were associated with reoperation of both injury types in bivariate analysis.

DISCUSSION AND CONCLUSION: While anterior and posterior trans-olecranon fracture dislocations have similar reoperation rates, posterior injuries have poorer recovery of ROM with pronation and supination, and a higher rate of radial head fractures. Reoperation rates associated with a younger population may reflect a decreased tolerance for stiffness and hardware prominence. This information will aid in preoperative counseling for this group, who may necessitate closer follow up and more aggressive physical therapy in the postoperative period.

Table 1. Outcomes and complications

Variable	Anterior fracture-dislocation	Posterior fracture-dislocation	P-value
Extension-Flexion ROM			>0.99
Less than 30-130 degrees, n (%)	5 (31.3)	4 (36.4)	
At or greater than 0-130 degrees, n (%)	11 (68.8)	7 (63.6)	
Pronation-Supination ROM			**0.01**
Less than 90-90 degrees, n (%)	5 (33.3)	8 (88.9)	
At or greater than 90-90 degrees, n (%)	10 (66.7)	1 (11.1)	
Primary complication			**0.02**
Pain, n (%)	5 (23.8)	0 (0.00)	
Stiffness, n (%)	1 (4.76)	1 (9.09)	
Non-union/mal-union, n (%)	0 (0.00)	1 (9.09)	
Infection, n (%)	0 (0.00)	2 (18.2)	
Reoperation number			0.49
0 reoperations, n (%)	15 (71.4)	7 (63.6)	
1 reoperation, n (%)	6 (28.6)	3 (27.3)	
2 reoperations, n (%)	0 (0.00)	1 (9.09)	
Primary reoperation type*			0.06
Ulnar nerve transposition, n (%)	1 (16.7)	1 (25.0)	
Irrigation and debridement, n (%)	0 (0.00)	2 (50.0)	
Hardware removal, n (%)	4 (66.7)	0 (0.00)	
Revision fixation, n (%)	0 (0.00)	1 (25.0)	
Manipulation under anesthesia/contracture release,	1 (16.7)	0 (0.00)	

ROM = range of motion. *Percentages reflected as a porportion of total reoperations. P-value of <0.05 is boldface.

Missing values: Extension-Flexion ROM (5), Pronation-Supination ROM (8)