Comparing Outcomes of Immediate Fixation versus Fixation After Failed Conservative Management of Distal Radius Fracture

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Purpose: Although distal radius fractures (DRFs) are common injuries, there remains little consensus regarding the best treatment strategy for displaced injuries. Attempted closed reduction with cast application may be preferred if acceptable alignment is obtained. This study aimed to identify the outcomes of patients who underwent initial closed management but converted to surgical intervention for failed closed treatment.

Methods: This was a retrospective chart review of DRFs from 2007-2015 at a single Level I trauma center. Demographic data, radiographic measurements, surgical variables, and outcomes were collected. Patients who failed conservative treatment (FC) were defined as patients who were initially treated conservatively but failed after at least 5 days of attempted conservative management. Reasons for failure included loss of reduction, patient intolerance, or change in neurovascular examination. The immediate surgery (IS) group was defined as those patients with an initial plan for surgery that occurred within 7 days. 159 FC patients were 1:1 match-paired to an IS group by age, American Society of Anesthesiologists (ASA) score, sex, and AO fracture classification.

Results: Demographic and fracture characteristics were matched between IS and FC cohorts (Table 1). FC average time to surgery was 18.65 days compared to IS 4.62 days. IS had better immediate postoperative measurements in radial height (m = 13.2 vs 11.98, P = 0.001), inclination (23.2 vs 21.4, P = 0.001), and fewer patients with positive ulnar variance (8.8% vs 32.7%, P = 0.001). Postoperative volar tilt did not differ between groups (7.7° vs 6.2°, P = 0.081). Length of surgery, fixation type, and postoperative complications also did not differ between groups.

Conclusion: Attempted closed management of distal radius fractures may be unsuccessful secondary to certain patient or fracture characteristics. In this study, a delay in surgical treatment with attempted closed management led to worse postoperative radiographic outcomes associated with reestablishing fracture length (radial height, radial inclination, and ulnar variance). However, volar tilt was able to be corrected and surgical time did not significantly increase in the FC cohort. Long-term patient-reported outcome data may reveal if these findings are clinically important. The decision for closed management in DRFs remains dependent on the patients' individual circumstances, although IS may provide superior radiographic outcomes.

Table 1. Statistical analysis of match-paired groups comparing failed conservative management vs. immediate surgery for distal radius fractures.

	Failed Conservative (FC) (n=159)	Immediate Surgery (IS) (n=159)	P-Value
Match-Paired Variables:			
Age (m, SD)	47.94, 15.025	47.83, 15.091	0.947 %
Gender (% female)	39%	39%	
ASA score (m, SD)	1.87, .691	1.89, .671	0.805 %
AO Fracture Class (DRF - "23"):			0.250*
A	28.3%	23.3%	
B	32.1%	40.9%	
C	39.6%	35.8%	
Radiographs @ Time of Injury (m, SD):			
Radial Height	9.499, 4.7318	9.327, 6.0999	0.779 %
Radial Inclination	15.972, 8.2945	15.651, 9.5073	0.749 %
Volar Tilt	-15.882, 18.6721	-6.801, 22.7841	**<0.001 %**
Ulnar Variance			
Positive	40.3%	49.7%	0.206*
Neutral	40.3%	49.7%	
Negative	1.9%	0.6%	
Radiographs @ Post-Op (m, SD):			
Radial Height	11.987, 2.2300	13.250, 2.6254	**<.001 %**
Radial Inclination	21.366, 3.6778	23.183, 4.1624	**<.001 %**
Volar Tilt	6.262, 6.2240	7.743, 8.6529	.081 %
Ulnar Variance			
Positive	32.7%	8.8%	**<0.001$**
Neutral	64.2%	90.6%	
Negative	3.1%	0.6%	
Time to Surgery (days) (m, SD)	18.65, 19.450	4.62, 4.306	**<0.001 %**
Fixation Type			
CRPP	0.0%	1.9%	0.054$
Volar ORIF	88.1%	91.8%	
Dorsal ORIF	10.7%	4.4%	
EX-fix	0.6%	0.6%	
Other	0.6%	1.3%	
Length of Surgery (in minutes) (m, SD)	77.87, 27.23	75.050, 64.32	.702%

%- ANOVA, *Chi Square, $ Fisher, m=mean, SD= Standard deviation, DRF=Distal Radial Fracture, FC=Failed conservative management cohort, IS=Immediate surgery cohort, ASA=American society of anesthesiologist physical status score, CRPP=Closed Reduction Percutaneous Pinning, Ex-fix=External fixation, ORIF= open reduction internal fixation

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