Impact of Parkinson's Disease on Complication Rates Following Distal Radius Fracture Treatment

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Introduction: This retrospective cohort study aims to compare rates of complication between conservative treatment and surgery for distal radius fractures (DRFs) in patients with Parkinson's disease (PD) and in those without a mobility-impairing disorder. We hypothesize that there was no difference in complication rates following DRF treatment in patients with PD or without a movement disorder, regardless of treatment approach.

Methods: A database retrospective cohort study was performed using the Mariner PearlDiver database with adjudicated claims data from over 165 million patients spanning from January 2010 to October 2022. Subsequently, complications rates with DRFs that had received a previous diagnosis of PD to those with no mobility-impairing conditions were compared. Data included population demographics, treatment rendered, presence of mobility-impairing diagnosis, diagnosis of post-treatment complication, and complication type. Chi-square tests were used to analyze the differences in complication rates between patients receiving open reduction and internal fixation (ORIF) and those receiving closed reduction treatment within each population. Additionally, chi-square tests compared complication rates between patients with PD and controls within each treatment modality. Significance level was set at 0.05. A Bonferroni correction was applied to adjust for multiple comparisons when necessary.

Results: Overall, there was no significant difference in rate of complication between patients treated for DRFs with previous diagnosis of PD and those without a mobility-impairing diagnosis across both ORIF (5.31% vs 4.16%, p = 0.12) and non-operative (5.18% vs 5.04%, p = 0.82) treatment approaches. There was, however, a significant decrease in post-surgical DRF malunions in non-movement disorder patients compared to patients with PDs (1.93% vs 3.38%, p = 0.01).

Discussion: Contrary to prior institutional studies reporting higher complication rates in PD patients, this large national analysis demonstrated similar overall complication rates between PD and non-mobility-impaired patients after DRF treatment. However, the elevated malunion rate in PD patients following ORIF highlights the need for careful surgical planning and vigilant follow-up in this population. Limitations include reliance on claims data, lack of patient-specific clinical detail, and limited long-term functional outcomes.

Significance/Clinical Relevance: PD patients undergoing DRF treatment are not at overall increased risk of complications compared with controls, but they face a higher risk of malunion after surgery. These findings support individualized treatment planning and underscore the importance of tailored fixation strategies in this population.

References:

1. Nellans KW, Kowalski E, Chung KC. The epidemiology of distal radius fractures. Hand Clin. 2012 May;28(2):113-25. doi: 10.1016/j.hcl.2012.02.001. Epub 2012 Apr 14. PMID: 22554654; PMCID: PMC3345129.
2. Corsino CB, Reeves RA, Sieg RN. Distal Radius Fractures. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK536916/
3. Sveinbjornsdottir, S. (2016), The clinical symptoms of Parkinson's disease. J. Neurochem., 139: 318-324. https://doi.org/10.1111/jnc.13691
4. Fink HA, Kuskowski MA, Orwoll ES, Cauley JA, Ensrud KE; Osteoporotic Fractures in Men (MrOS) Study Group. Association between Parkinson's disease and low bone density and falls in older men: the osteoporotic fractures in men study. J Am Geriatr Soc.
5. Chou T-FA, Chang CY, Huang C-C, et al. The outcome for surgical fixation of distal radial fractures in patients with idiopathic Parkinson's disease: a cohort study. J Orthop Surg Res. 2020;15:125.
6. Logli AL, Rizzo M. Operative Treatment of Distal Radius Fractures in Patients With Parkinson Disease. Hand (N Y). 2022 Dec;17(1suppl):37S-42S. doi:10.1177/15589447211028931. Epub 2021 Jul 3. PMID: 34218706; PMCID: PMC9793611.

Closed Reduction		Parkinson's DRF	Non-Movement Disorder DRF	p value
		2,895	2,895	
Complications Total	30 days	21	58	
	90 days	62	64	
	1 year	112	102	
	Total	150	146	p = 0.82
Delayed Healing	30 days	0	11	
	90 days	0	20	
	1 year	18	29	
	Total	26	32	p = 0.43
Malunion	30 days	0	29	
	90 days	41	59	
	1 year	77	87	
	Total	105	90	p = 0.27
Nonunion	30 days	0	11	
	90 days	0	19	
	1 year	17	28	
	Total	24	31	p = 0.34

Abbreviations: DRF = distal radius fracture

Table 1: Comparison of total complications, delayed union, malunion, and nonunion of distal radius fractures treated with closed reduction, comparing patients with a pre-injury diagnosis of Parkinson's disease to those without a pre-injury diagnosis of a movement disorder.

ORIF		Parkinson's DRF	Non-Movement Disorder DRF	p value
		1,658	1,658	
Complications Total	30 days	28	37	
	90 days	48	57	
	1 year	73	67	
	Total	88	69	p = 0.12
Delayed Healing	30 days	0	0	
	90 days	11	14	
	1 year	14	21	
	Total	16	23	p = 0.27
Malunion	30 days	15	11	
	90 days	25	18	
	1 year	48	27	
	Total	56	32	**p = 0.01**
Nonunion	30 days	0	0	
	90 days	0	0	
	1 year	13	0	
	Total	15	22	p = 0.25

Abbreviations: DRF = distal radius fracture

Table 2: Comparison of total complications, delayed union, malunion, and nonunion of distal radius fractures treated with open reduction and internal fixation, comparing patients with a pre-injury diagnosis of Parkinson's disease to those without a pre-injury diagnosis of a movement disorder.