Workers' Compensation Status Is an Independent Risk Factor for Complications Following Distal Radius Fracture Open Reduction Internal Fixation

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INTRODUCTION: Workers' compensation (WC) patients are known to experience worse outcomes after orthopedic injuries. While distal radius fracture (DRF) open reduction internal fixation (ORIF) is one of the most common upper extremity procedures, complication patterns specific to the WC population remain poorly defined, as prior studies have been limited by small, regional cohorts. By leveraging Epic Cosmos, this study represents the first large-scale, nationwide analysis of WC patients undergoing DRF ORIF, comparing complication rates between WC and non-WC cohorts.

METHODS: This retrospective cohort study queried the Epic Cosmos database, a multicenter data network aggregating de-identified electronic health records from participating institutions to identify DRF ORIF procedures between 2017 and 2024. WC patients (N = 3,799) were matched with non-WC patients (N = 19,000) using the variables shown in Table 1. All standardized mean differences were less than 0.1 post-matching, indicating balanced cohorts. The study cohort included both male and female patients. Sex distribution was 55% female and 45% male in the WC group and in the 56% female and 44% male non-WC group. Postoperative complications were identified using International Classification of Diseases 10, Clinical Modification (ICD-10-CM) and Current Procedural Terminology (CPT) codes. A subgroup analysis excluding patients with prior tendon injuries was conducted to evaluate whether WC status independently contributed to complication risk. Odds ratios (OR) with 95% confidence intervals (CI) were calculated, and statistical significance was defined as $p < 0.05$.

RESULTS: Compared to the non-WC cohort, WC patients had significantly higher odds of complex regional pain syndrome (CRPS; 1.99% vs. 1.05%; OR = 1.91, 95% CI: 1.44–2.50, $p < 0.001$), secondary tendon repair (0.71% vs. 0.39%; OR = 1.83, 95% CI: 1.13-2.88, $p = 0.01$), and stiffness (20.97% vs. 19.38%; OR = 1.10, 95% CI: 1.01–1.20, $p = 0.03$). No significant differences were observed in infection, venous thromboembolism, myocardial infarction, pulmonary embolism, or mechanical failure. In the subgroup analysis excluding patients with prior tendon injury, CRPS remained significantly elevated in WC patients (OR = 1.83, 95% CI: 1.36 – 2.44), indicating that worse outcomes persist despite adjusting for previous tendon pathology.

DISCUSSION: WC status was associated with higher risk of CRPS, tendon-related reinterventions, and postoperative stiffness. Notably, CRPS risk remained significantly elevated even after excluding patients with prior tendon injuries, suggesting that WC status independently contributes to worse outcomes. This is the largest WC-specific complication study for DRF ORIF and establishes payer status as a clinically meaningful predictor of postoperative morbidity.

SIGNIFICANCE/CLINICAL RELEVANCE: WC patients undergoing DRF ORIF represent a higher-risk group for postoperative complications. The elevated risk of CRPS even after accounting for tendon pathology, highlights the importance of recognizing payer status as an independent risk factor that has direct implications for counseling, postoperative surveillance, and resource planning.

Table 1. Patient Demographics and Comorbidities Before and After Matching

Characteristic	Unmatched Cohort			Matched Cohort		
	Non-WC N = 165,403[1]	WC N = 3,799[1]	p-value[2]	Non-WC N = 19,000[1]	WC N = 3,799[1]	p-value[2]
Age Group			<0.001			>0.9
30-40	16,971 (10%)	560 (15%)		2,762 (15%)	560 (15%)	
40-50	19,796 (12%)	687 (18%)		3,396 (18%)	687 (18%)	
50-60	35,271 (21%)	1,303 (34%)		6,511 (34%)	1,303 (34%)	
60-70	54,034 (33%)	1,021 (27%)		5,135 (27%)	1,021 (27%)	
70-80	39,331 (24%)	228 (6.0%)		1,196 (6.3%)	228 (6.0%)	
BMI Group			<0.001			>0.9
<25	56,426 (34%)	895 (24%)		4,512 (24%)	895 (24%)	
25-30	52,600 (32%)	1,322 (35%)		6,544 (34%)	1,322 (35%)	
30-35	31,716 (19%)	836 (22%)		4,291 (23%)	836 (22%)	
35-40	14,517 (8.8%)	443 (12%)		2,180 (11%)	443 (12%)	
40+	10,144 (6.1%)	303 (8.0%)		1,473 (7.8%)	303 (8.0%)	
Sex			<0.001			0.3
Female	126,648 (77%)	2,074 (55%)		10,549 (56%)	2,074 (55%)	
Male	38,755 (23%)	1,725 (45%)		8,451 (44%)	1,725 (45%)	
Procedure Type			<0.001			>0.9
Extra-Articular Fracture (CPT - 25607)	40,837 (25%)	789 (21%)		3,967 (21%)	789 (21%)	
Intra-Articular with 2 Fragments (CPT - 25608)	37,287 (23%)	841 (22%)		4,201 (22%)	841 (22%)	
Intra-Articular with 3 or More Fragments (CPT - 25609)	87,279 (53%)	2,169 (57%)		10,832 (57%)	2,169 (57%)	
Hypertension	71,548 (43%)	1,222 (32%)	<0.001	6,092 (32%)	1,222 (32%)	>0.9
Diabetes (No Complications)	21,277 (13%)	373 (9.8%)	<0.001	1,711 (9.0%)	373 (9.8%)	0.12
Diabetes (with Complications)	14,343 (8.7%)	202 (5.3%)	<0.001	874 (4.6%)	202 (5.3%)	0.067
COPD	14,147 (8.6%)	144 (3.8%)	<0.001	719 (3.8%)	144 (3.8%)	>0.9
Heart Failure	8,179 (4.9%)	68 (1.8%)	<0.001	301 (1.6%)	68 (1.8%)	0.4
Cerebrovascular Disease	13,052 (7.9%)	137 (3.6%)	<0.001	577 (3.0%)	137 (3.6%)	0.069
Chronic Kidney Disease	11,686 (7.1%)	113 (3.0%)	<0.001	478 (2.5%)	113 (3.0%)	0.094
Liver Disease	15,274 (9.2%)	197 (5.2%)	<0.001	859 (4.5%)	197 (5.2%)	0.086
Osteoporosis (Pathologic)	3,636 (2.2%)	34 (0.9%)	<0.001	122 (0.6%)	34 (0.9%)	0.10
Osteoporosis (No Pathologic)	26,337 (16%)	221 (5.8%)	<0.001	1,106 (5.8%)	221 (5.8%)	>0.9
Race			<0.001			0.6
American Indian or Alaska Native	1,827 (1.1%)	55 (1.4%)		212 (1.1%)	55 (1.4%)	
Asian	4,296 (2.6%)	107 (2.8%)		535 (2.8%)	107 (2.8%)	
Black or African American	10,430 (6.3%)	255 (6.7%)		1,271 (6.7%)	255 (6.7%)	
Native Hawaiian or Other Pacific Islander	593 (0.4%)	17 (0.4%)		73 (0.4%)	17 (0.4%)	
Other Race	6,982 (4.2%)	455 (12%)		2,344 (12%)	455 (12%)	
White	141,275 (85%)	2,910 (77%)		14,565 (77%)	2,910 (77%)	
Charlson Comorbidity Index	1.6 (2.3)	0.9 (1.6)	<0.001	0.8 (1.5)	0.9 (1.6)	0.081

[1]n (%); Mean (SD)

[2]Pearson's Chi-squared test with simulated p-value (based on 2000 replicates); Wilcoxon rank sum test

Table 2. Patient Demographics and Comorbidities Before and After Matching (Tendon Injury Exclusion)

Characteristic	Unmatched Cohort			Matched Cohort		
	Non-WC N = 143,665[1]	WC N = 3,354[1]	p-value[2]	Non-WC N = 16,764[1]	WC N = 3,354[1]	p-value[2]
Age Group			<0.001			>0.9
30-40	14,742 (10%)	502 (15%)		2,478 (15%)	502 (15%)	
40-50	17,289 (12%)	614 (18%)		3,043 (18%)	614 (18%)	
50-60	31,225 (22%)	1,147 (34%)		5,687 (34%)	1,147 (34%)	
60-70	46,963 (33%)	893 (27%)		4,523 (27%)	893 (27%)	
70-80	33,446 (23%)	198 (5.9%)		1,033 (6.2%)	198 (5.9%)	
BMI Group			<0.001			>0.9
<25	47,575 (33%)	772 (23%)		3,896 (23%)	772 (23%)	
25-30	44,319 (31%)	1,121 (33%)		5,595 (33%)	1,121 (33%)	
30-35	26,705 (19%)	727 (22%)		3,649 (22%)	727 (22%)	
35-40	12,213 (8.5%)	371 (11%)		1,803 (11%)	371 (11%)	
40+	12,853 (8.9%)	363 (11%)		1,821 (11%)	363 (11%)	
Sex			<0.001			0.6
Female	109,778 (76%)	1,792 (53%)		9,034 (54%)	1,792 (53%)	
Male	33,887 (24%)	1,562 (47%)		7,730 (46%)	1,562 (47%)	
Procedure Type			<0.001			0.7
Extra-Articular Fracture (CPT - 25607)	35,968 (25%)	699 (21%)		3,425 (20%)	699 (21%)	
Intra-Articular with 2 Fragments (CPT - 25608)	32,871 (23%)	742 (22%)		3,796 (23%)	742 (22%)	
Intra-Articular with 3 or More Fragments (CPT - 25609)	74,826 (52%)	1,913 (57%)		9,543 (57%)	1,913 (57%)	
Hypertension	60,821 (42%)	1,058 (32%)	<0.001	5,227 (31%)	1,058 (32%)	0.7
Diabetes (No Complications)	18,035 (13%)	317 (9.5%)	<0.001	1,446 (8.6%)	317 (9.5%)	0.13
Diabetes (with Complications)	11,997 (8.4%)	170 (5.1%)	<0.001	752 (4.5%)	170 (5.1%)	0.2
COPD	11,925 (8.3%)	115 (3.4%)	<0.001	606 (3.6%)	115 (3.4%)	0.6
Heart Failure	6,747 (4.7%)	57 (1.7%)	<0.001	241 (1.4%)	57 (1.7%)	0.3
Cerebrovascular Disease	10,748 (7.5%)	120 (3.6%)	<0.001	545 (3.3%)	120 (3.6%)	0.3
Chronic Kidney Disease	9,648 (6.7%)	97 (2.9%)	<0.001	410 (2.4%)	97 (2.9%)	0.14
Liver Disease	12,495 (8.7%)	163 (4.9%)	<0.001	738 (4.4%)	163 (4.9%)	0.3
Osteoporosis (Pathologic)	2,948 (2.1%)	25 (0.7%)	<0.001	81 (0.5%)	25 (0.7%)	0.076
Osteoporosis (No Pathologic)	22,154 (15%)	197 (5.9%)	<0.001	932 (5.6%)	197 (5.9%)	0.5
Race			<0.001			0.6
American Indian or Alaska Native	1,565 (1.1%)	47 (1.4%)		188 (1.1%)	47 (1.4%)	
Asian	3,777 (2.6%)	86 (2.6%)		409 (2.4%)	86 (2.6%)	
Black or African American	8,930 (6.2%)	221 (6.6%)		1,069 (6.4%)	221 (6.6%)	
Native Hawaiian or Other Pacific Islander	509 (0.4%)	13 (0.4%)		47 (0.3%)	13 (0.4%)	
Other Race	6,092 (4.2%)	410 (12%)		2,109 (13%)	410 (12%)	
White	122,792 (85%)	2,577 (77%)		12,942 (77%)	2,577 (77%)	
Charlson Comorbidity Index	1.5 (2.3)	0.8 (1.5)	<0.001	0.8 (1.5)	0.8 (1.5)	0.10

[1]n (%); Mean (SD)

[2]Pearson's Chi-squared test with simulated p-value (based on 2000 replicates); Wilcoxon rank sum test