Differential Outcomes of Distal Radius Fractures in Patients With and Without Hepatitis C

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INTRODUCTION: Distal radius fractures (DRF) are one of the most common fractures in the United States, accounting for up to 2.5% of all emergency room visits. As the incidence of DRF continues to rise, so does its impact on patient functionality, medical costs, and disability. Bone health plays a significant role in the severity of DRF and how it may be treated. Patients with decreased bone mineral density and postmenopausal women are at higher risk of fractures, including DRF. Hepatitis C Virus (HCV) is one of the most common bloodborne infections, affecting over 185 million people worldwide, and is a condition that significantly affects the development of fractures and overall bone health. HCV can lead to hepatic osteodystrophy, which leads to increased bone metabolism and decreased bone mineral density, and studies have linked both acute and chronic HCV with an increased risk of fracture and osteoporosis. This retrospective cohort examines surgical outcomes following DRF in healthy patients versus HCV patients.

METHODS: The PearlDiver medical claims database was searched for patients who underwent DRF surgery, and populations were divided based on presence of HCV (n=2,587) or No HCV (n=157,774). The HCV group was 67.53% female (n=1,747) and 32.47% male (n=840), compared to the No HCV group, which was 75.67% female (n=119,380) and 24.32% male (n=38,364). Populations were matched based on age, gender, Elixhauser Comorbidity Index (ECI), diabetes mellitus, hypertension, chronic kidney disease (CKD), and tobacco use, and complications of interest were superficial site infection (SSI), deep site infection (DSI), wound dehiscence, malunion surgery, and complex regional pain syndrome (CRPS). Demographic continuous variables were analyzed before and after matching using independent t-tests, while categorical comorbidities were compared before and after matching using chi-square tests and multivariable logistic regression.

RESULTS: Before matching, HCV patients were 3.19 times more likely to experience any infection, 3.23 times more likely to experience SSI, and 3.47 times more likely to develop wound dehiscence than patients with no HCV (P<0.001). After matching, there were still higher incidence rates in the HCV group, although they were not significant (Table 1). Multivariate logistic regression analysis in unmatched groups showed a significantly higher incidence rate of any infection in HCV patients compared to No HCV patients (Table 2). However, this difference was no longer seen after matching.

DISCUSSION: Although initial analyses showed differences in complication and infection incidence, after matching, there was no significant difference between the two groups. Limitations include a retrospective design which limits causal inference, and the use of an administrative database may introduce selection bias. Our analysis depends on the accuracy of diagnosis codes provided by physicians. While our study population is large, it may not represent the general population or show substantial rates of each complication, and unmeasured variables such as socioeconomic status could also influence results. Future studies may further describe the microarchitecture of upper extremity bones with chronic liver disease, as has been done for hip and knee bones.

CLINICAL RELEVANCE: This study may encourage surgeons that surgical outcomes of DRF surgery in HCV patients are comparable to those of patients who do not have HCV. Although HCV patients experience longer hospital stay, increased orthopedic and medical complications, and worse patient-reported outcomes following joint arthroplasty, this does not appear to be the case for DRF, so surgeons should not delay DRF surgery based on HCV status.

	Unmatched				Matched			
Complication, n (%)	**No HCV (n=157,774)**	**HCV (n=2587)**	**HCV OR (95% CI)**	**P-value**	**No HCV (n=2,521)**	**HCV (n=2,521)**	**HCV OR (95% CI)**	**P-value**
Any Complications	22534 (14.28%)	308 (11.91%)	0.81 (0.72-0.91)	**<0.001**	338 (13.41%)	298 (11.82%)	0.87 (0.73-1.02)	0.10
Malunion Surgery	429 (0.27%)	8 (0.31%)	1.14 (0.56-2.29)	0.86	8 (0.32%)	8 (0.32%)	1.00 (0.37-2.67)	1.00
Any Infection	1067 (0.68%)	55 (2.13%)	3.19 (2.42-4.19)	**<0.001**	35 (1.39%)	50 (1.98%)	1.43 (0.93-2.22)	0.13
Superficial Infection	208 (0.13%)	11 (0.43%)	3.23 (1.76-5.94)	**<0.001**	4 (0.16%)	9 (0.36%)	2.25 (0.69-7.33)	0.27
Deep Infection	80 (0.05%)	4 (0.15%)	3.05 (1.12-8.34)	0.06	5 (0.20%)	4 (0.16%)	0.80 (0.21-2.98)	1.00
Wound Dehiscence	336 (0.21%)	19 (0.73%)	3.47 (2.18-5.51)	**<0.001**	10 (0.40%)	17 (0.67%)	1.70 (0.78-3.73)	0.25
CRPS	798 (0.51%)	10 (0.39%)	0.76 (0.41-1.43)	0.48	11 (0.44%)	10 (0.40%)	0.91 (0.39-2.14)	1.00

Table 1: Incidence of Complications. *OR: Odds Ratio, CI: Confidence Interval.

	Unmatched		Matched	
Outcome	**OR (Wald 95% CI)**	**P-value**	**OR (Wald 95% CI)**	**P-value**
Any Complications	1.04 (0.79 - 1.36)	0.79	0.96 (0.64 - 1.45)	0.85
Any Infections	2.18 (1.02 - 4.66)	**<0.05**	1.40 (0.44 - 4.78)	0.57

Table 2: Multivariate Logistic Regression Analyzing the Odds of Developing Any Complication, or Any Infection