

## Impact of Vitamin D on Outcomes in Patients Hospitalized for Cirrhosis: A Propensity Score Matched Analysis

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### Background

Vitamin D is a secosteroid hormone that regulates calcium and bone metabolism. Previous studies have associated vitamin D deficiency with poor outcomes for various gastrointestinal diseases. This study aims to evaluate inpatient outcomes in patients with concomitant vitamin D deficiency and cirrhosis.

### Methods

Inpatient diagnoses of cirrhosis with and without vitamin D deficiency were identified from the National Inpatient Sample. Baseline characteristics were analyzed. Patients with cirrhosis and vitamin D deficiency were propensity matched 1:1 against controls across patients demographics, hospital characteristics, Charlson Comorbidity Index (CCI), and etiology of underlying liver disease. Multivariable logistic, Poisson, and gamma log-link regression were used to measure primary outcomes of cost, mortality, disposition, and length of stay (LOS). Secondary outcomes of complication rates were examined via logistic regression.

### Results

A total of 4,066 patients with concomitant vitamin D deficiency and cirrhosis were identified and matched to controls. Prior to matching, these patients were older (58 vs 54,  $p < 0.001$ ), more likely to be female (45% vs 35%,  $p < 0.001$ ), and more likely to have a CCI  $\geq 5$  (80.6% vs 69.8%,  $p < 0.001$ ). Concomitant disease was associated with higher total charges (\$36,781 vs \$29,089,  $p < 0.001$ ) and length of stay (5 vs 4 days,  $p < 0.001$ ). There was no significant difference in mortality or disposition. After doubly robust regression adjustment, charges and LOS remained significantly higher (1.759, 95% CI 1.42 – 2.18 and aOR: 1.297, 95% CI 1.08 – 1.55) respectively). Vitamin D deficiency was associated with higher prevalence rate of decompensation-associated complications including hepatorenal syndrome, hepatic encephalopathy, and acute kidney injury. The odds of variceal bleeding were lower however.

### Conclusion

Inpatients with concomitant cirrhosis and vitamin D deficiency have higher cost, LOS, and more decompensation complications. The observed rate of esophageal varices with mention of bleeding, however, was lower.