

The Epidemiology and Clinical Associations of Portal Vein Thrombosis in Hospitalized Patients With Cirrhosis: A Nationwide Analysis From the National Inpatient Sample

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Portal vein thrombosis (PVT) is thought to be rare in the general population and is most commonly found among patients with cirrhosis.¹⁻³ The risk of developing PVT in patients with cirrhosis has been correlated with the severity of hepatic impairment.^{4,5} There is a lack of national-level data on the epidemiology of PVT and its related outcomes in the inpatient setting. The aim of our study was to describe the prevalence of PVT in hospitalized patients with cirrhosis in the United States. Using the National Inpatient Sample (NIS) database, we described the differences in hepatic decompensation, length of stay, in-hospital mortality, and total charges between patients with cirrhosis with PVT and those without.

METHODS

This study was performed using the 2012 NIS to assess the relationship between PVT and cirrhosis-related outcomes. The NIS has been used reliably to make national estimates of healthcare utilization and estimate disease burden, charges, and outcomes.⁶ All admissions with either a primary or secondary discharge diagnosis of an *International Classification of Diseases, 9th Revision—Clinical Modification* (ICD-9-CM) code for PVT (452) and cirrhosis (571.2, 571.5, and 571.6) were identified from the NIS and correlated with age, gender, inpatient length of stay, in-hospital mortality, total charges, and commonly associated diagnoses. Complications of cirrhosis, such as hepatic encephalopathy (572.2), abdominal ascites (789.5), and gastrointestinal bleeding (456 and 456.2), were also identified. Data were assessed using IBM Statistical Package for the Social Sciences Statistics version 19.0 (Chicago, IL). Statistical significance was defined as a *P* value < .05.

RESULTS

There were 7,296,968 total unweighted admissions in the 2012 NIS, which included 113,766 (1.6%) inpatient admissions for cir-

rhosis, with 61,867 for nonalcoholic cirrhosis, 49,698 for alcoholic cirrhosis, and 2202 for biliary cirrhosis. The prevalence of PVT among all inpatient admissions was 0.07% (*n* = 5046) and 1.8% (*n* = 2046) in patients with cirrhosis (*P* < .001). On univariate analysis, patients who had a diagnosis of both cirrhosis and PVT had higher proportions of hepatic encephalopathy (22.5% vs 17.7%; *P* < .00001) as well as gastrointestinal bleeding (11.6% vs 5.7%; *P* < .00001) as compared with patients with cirrhosis without PVT (Figure). Furthermore, patients with both cirrhosis and PVT incurred a greater average length of stay than did patients with cirrhosis and no PVT (7.7 vs 5.9 days, respectively; *P* < .05) and in-hospital mortality (9.5 vs 6%, respectively; *P* < .05). The median cost of an admission of a patient with cirrhosis and PVT was \$39,934 as compared to \$28,040 for an admission of a patient with cirrhosis without PVT (*P* < .05).

DISCUSSION

We found that hospitalized patients with concurrent diagnoses of cirrhosis and PVT had longer hospital length of stay, higher mean hospital charges, and a higher proportion of cirrhosis-related complications. Our study represents the largest examination of hospitalized patients with cirrhosis and PVT to date and contributes to the evolving understanding of PVT in end-

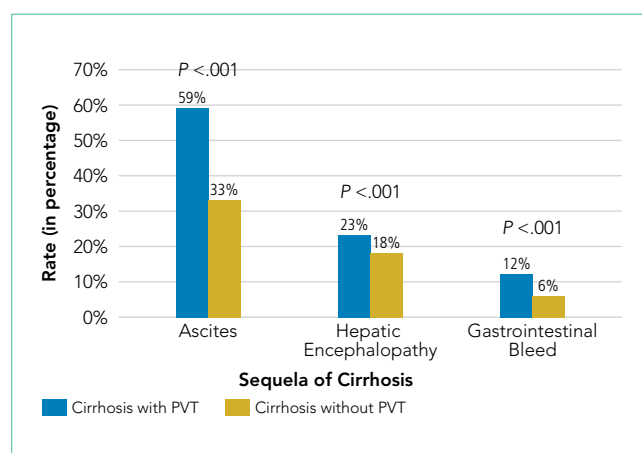


FIG. Primary outcome comparing rates of hepatic decompensation between admissions for patients with cirrhosis with PVT and those without.

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stage liver disease. The relationship between cirrhotic complications and PVT may be independent, but the 2 have similar underlying etiologic processes. Thus, given our findings, intervening to address the underlying factors leading to microvascular and/or PVT or mitigating the propagation of PVT in patients with cirrhosis may be beneficial to reducing morbidity and mortality in these patients. In addition, the prevalence of PVT in the overall hospitalized patient population in our study (0.07%) was similar to the 0.05% to 0.5% previously described in a US autopsy series, which should decrease the likelihood that PVT was missed in the cirrhotic population, which is more likely to have inpatient ultrasound imaging.² Our study is limited by its retrospective nature, dependency on ICD-9-CM codes for extracting data, and lack of clinical, physical exam, and laboratory results to allow for the calculation of a model for the end-stage liver disease and Child-Pugh score. Also, the study was not designed to evaluate causation, and it is possible that patients with more severe cirrhosis were more likely to be diagnosed with PVT. Further prospective studies directed not only toward the mechanism and treatment of both micro- and mac-

rovascular thrombosis but also at examining the prevention of PVT and attendant benefits are greatly needed.

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