

Title: Association of Preoperative Liver Disease and Cirrhosis with Postoperative Outcomes Following Total Hip Arthroplasty

Introduction: Patients undergoing total hip arthroplasty (THA) frequently endure comorbid liver disease, but little has been done to investigate the impact of this condition on surgical success. As such, we sought to assess the effects of liver disease on postoperative outcomes following THA.

Methods: The Premier Healthcare Database (PHD), a nationwide deidentified inpatient dataset from 2016 to 2022, was used to isolate primary THA patients using CPT codes. Cohorts were divided based on the presence or absence of liver disease as established by ICD-10 codes within 365 days prior to the operation. Patients were tracked for readmissions, reoperations, and common postoperative complications (e.g. PJI, DVT, PE, etc.). Rates of these adverse outcomes were compared using adjusted odds ratios (aORs) from multivariable logistic regression controlling for age, sex, race, ethnicity, insurance status, and comorbidity burden (Elixhauser Comorbidity Index). The liver disease cohort was subdivided based on presence or absence of cirrhosis, and a similar analysis was performed.

Results: The query found 747,732 THA patients. 12,463 of these patients had liver disease, of whom 3,480 had cirrhosis. Liver disease was associated with significantly increased odds of readmission (aOR=1.65 [1.55-1.75]), reoperation (aOR=1.13 [1.06-1.20]), and PJI (aOR=1.66 [1.50-1.83]) (all $p < 0.001$) (**Table 1**). When evaluating the effects of cirrhosis against non-cirrhotic liver disease, it was found that cirrhosis was correlated with increased rates of readmission (aOR=1.55 [1.37-1.76], $p < 0.001$) and PJI (aOR=1.59 [1.30-1.94], $p < 0.001$) (**Table 2**). However, there were no significant differences in odds of reoperation (aOR=1.13 [0.99-1.30], $p = 0.069$), DVT (aOR=1.28 [0.84-1.95], $p = 0.245$), and PE (aOR=0.61 [0.27-1.36], $p = 0.227$).

Discussion: Liver disease is associated with increased odds of readmissions, reoperations, and postoperative outcomes with cirrhosis further compounding this risk. Given this, liver disease ought to be more commonly viewed as an independent risk factor for postoperative THA complications and should be incorporated into risk evaluation scoring systems.

Table 1. Adjusted Postoperative Outcomes Following THA in Patients with and without Liver Disease

Outcome	Liver Disease (N=12,463)	No Liver Disease (N=735,269)	Adjusted OR (95% CI)	Adjusted p-value
Readmission (90 d)	1,246 (10.0%)	42,307 (5.8%)	1.65 (1.55–1.75)	<0.001
Reoperation (2 yr)	1,119 (9.0%)	55,686 (7.6%)	1.13 (1.06–1.20)	<0.001
PJI (90 d)	426 (3.4%)	13,836 (1.9%)	1.66 (1.50–1.83)	<0.001
DVT (90 d)	104 (0.8%)	4,377 (0.6%)	1.32 (1.08–1.60)	0.006
PE (90 d)	32 (0.3%)	2,013 (0.3%)	0.88 (0.62–1.24)	0.456
Stroke (90 d)	14 (0.1%)	832 (0.1%)	0.96 (0.57–1.64)	0.895
Delirium (90 d)	14 (0.1%)	428 (0.1%)	2.13 (1.21–3.76)	0.009
Myocardial infarction (90 d)	38 (0.3%)	1,143 (0.2%)	1.86 (1.33–2.59)	<0.001
Acute kidney injury (90 d)	298 (2.4%)	6,388 (0.9%)	2.52 (2.23–2.86)	<0.001
Urinary tract infection (90 d)	247 (2.0%)	8,075 (1.1%)	1.86 (1.63–2.12)	<0.001
Pneumonia (90 d)	113 (0.9%)	3,181 (0.4%)	1.77 (1.45–2.15)	<0.001
Anemia (90 d)	768 (6.2%)	24,647 (3.4%)	1.76 (1.63–1.90)	<0.001
Hypotension (90 d)	186 (1.5%)	4,562 (0.6%)	2.17 (1.86–2.53)	<0.001

Table 2. Adjusted Postoperative Outcomes Following THA in Patients with Liver Disease Based on Presence or Absence of Cirrhosis

Outcome	Cirrhosis (N=3,480)	Non-Cirrhotic Liver Disease (N=8,983)	Adjusted OR (95% CI)	Adjusted p-value
Readmission (90 d)	488 (14.0%)	758 (8.4%)	1.55 (1.37–1.76)	<0.001
Reoperation (2 yr)	344 (9.9%)	775 (8.6%)	1.13 (0.99–1.30)	0.069
PJI (90 d)	169 (4.9%)	257 (2.9%)	1.59 (1.30–1.94)	<0.001
DVT (90 d)	38 (1.1%)	66 (0.7%)	1.28 (0.84–1.95)	0.245
PE (90 d)	7 (0.2%)	25 (0.3%)	0.61 (0.27–1.36)	0.227
Stroke (90 d)	7 (0.2%)	7 (0.1%)	1.71 (0.64–4.61)	0.286
Delirium (90 d)	5 (0.1%)	9 (0.1%)	1.04 (0.36–3.03)	0.946
Myocardial infarction (90 d)	11 (0.3%)	27 (0.3%)	0.86 (0.43–1.72)	0.674
Acute kidney injury (90 d)	151 (4.3%)	147 (1.6%)	2.21 (1.74–2.81)	<0.001
Urinary tract infection (90 d)	93 (2.7%)	154 (1.7%)	1.37 (1.04–1.81)	0.025
Pneumonia (90 d)	43 (1.2%)	70 (0.8%)	1.22 (0.82–1.83)	0.331
Anemia (90 d)	324 (9.3%)	444 (4.9%)	1.72 (1.48–2.01)	<0.001
Hypotension (90 d)	80 (2.3%)	106 (1.2%)	1.61 (1.20–2.18)	0.002