CARDIAC INTERVENTION OUTCOMES IN PATIENTS PREVIOUSLY DIAGNOSED WITH LIVER DISEASE AND THE PREDICTIVE VALUE OF PREOPERATIVE MELD 3.0

Dartmouth Health

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BACKGROUND

Liver dysfunction increases the risk of perioperative and postoperative complications, including infection, hemorrhage, renal failure, and prolonged hospitalization (1,2). Patients with advanced cirrhosis or impaired liver function are often considered high-risk candidates for cardiac surgery, yet limited and inconsistent clinical data exist regarding their outcomes. Some studies report no significant increase in mortality or morbidity among patients with Child Class C or high Model for End-Stage Liver Disease (MELD) scores (3), while others show a clear association between worsening liver disease and postoperative complications (4–6).

Several scoring systems, including Child-Turcotte-Pugh (CTP), MELD, Society of Thoracic Surgeons (STS) score, and EuroSCORE II (ESII), are used to assess liver disease severity and surgical risk (7–9). These tools provide an objective measure of liver dysfunction, even in patients without a formal diagnosis of cirrhosis, and may help identify patients at elevated risk for adverse outcomes after cardiac surgery.

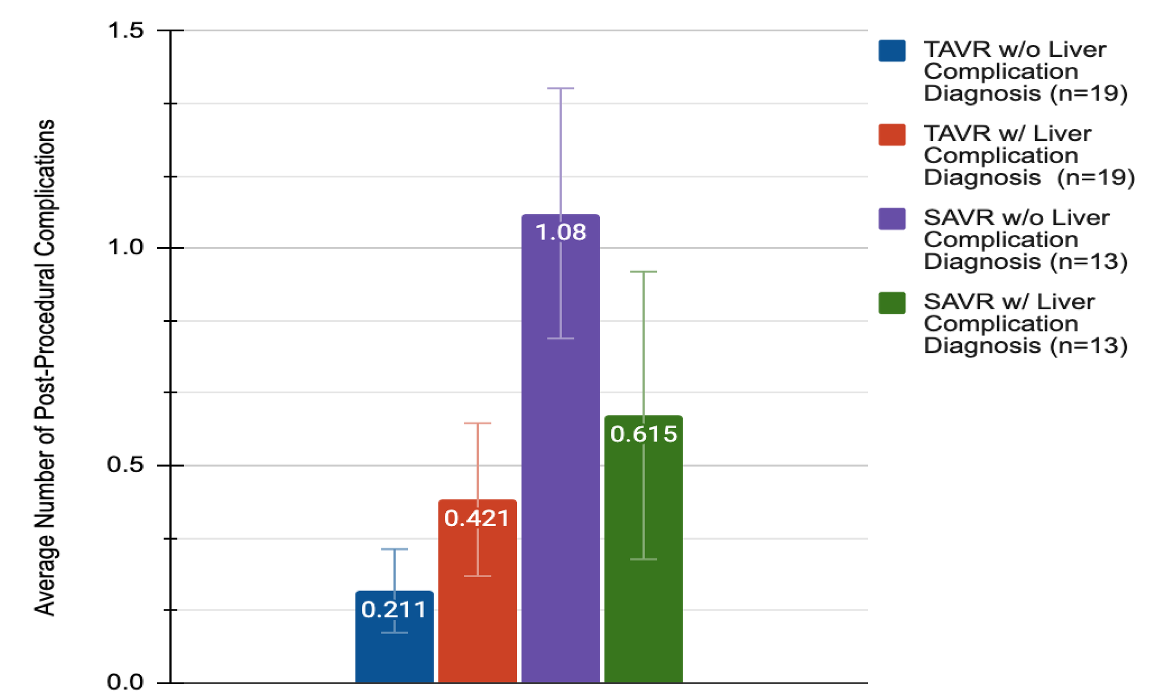
Patients with impaired liver function who require aortic valve replacement face a difficult clinical dilemma: they may be ineligible for liver transplantation due to comorbidities, yet require cardiac intervention for coronary artery disease (CAD) or aortic stenosis (AS) before transplant evaluation. While transcatheter aortic valve replacement (TAVR) is generally safer than surgical aortic valve replacement (SAVR), even TAVR may be deemed too risky in severe liver dysfunction. Consequently, patients with high MELD or CTP scores may be caught between two essential, life-saving interventions.

OBJECTIVES

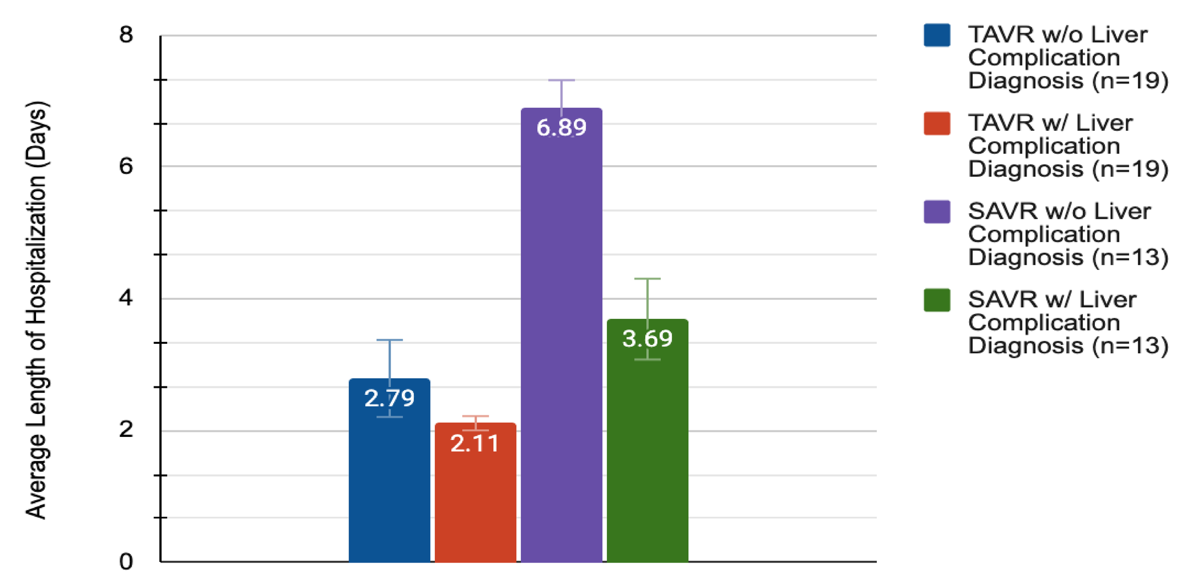
- Evaluate outcomes of TAVR and SAVR among patients with documented cirrhosis and/or high liver injury scores (e.g., MELD, CTP) at Dartmouth-Hitchcock Medical Center (DHMC)
- Conduct a retrospective chart review of approximately 500 valve patients (2011–2024), identifying those with cirrhosis diagnoses and/or elevated MELD scores.
- Examine associations between preoperative liver injury scores and postoperative complications, including mortality, and prolonged hospitalization.
- Compare outcomes between TAVR and SAVR procedures in patients with impaired liver function

RESULTS

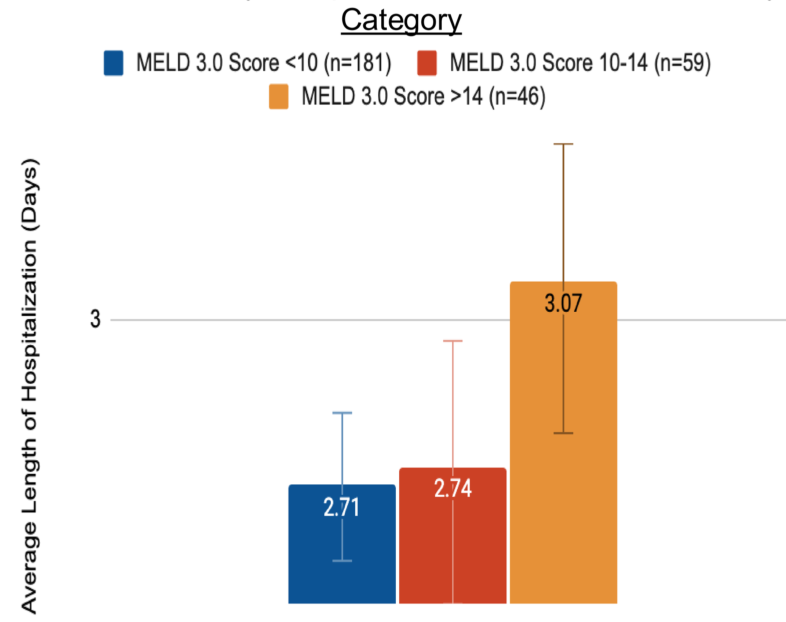
Graph1A: Average Number of Post-Procedural Complications in Patients Undergoing TAVR or SAVR, With and Without a History of Liver Disease



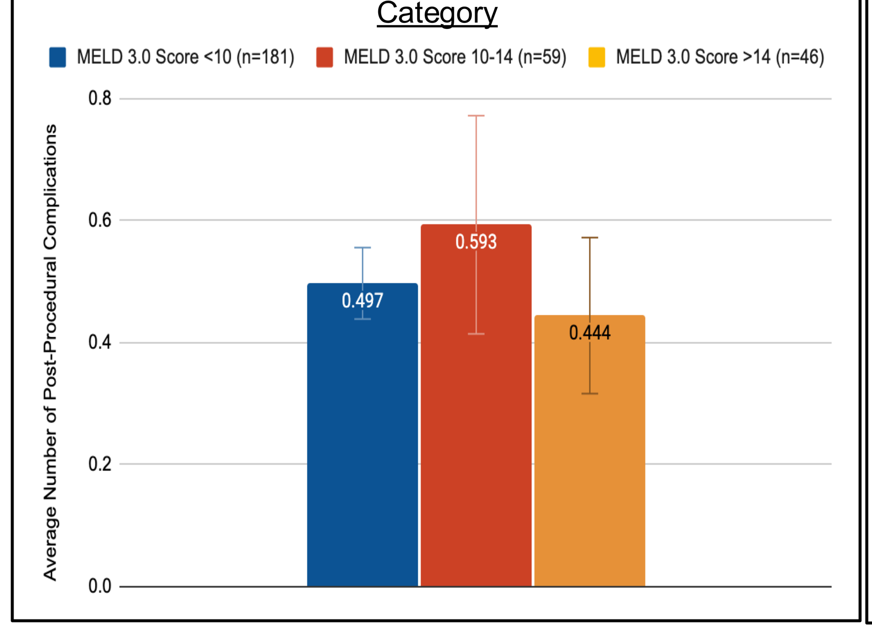
Graph 1B: Average Length of Hospitalization (Days) in Patients Undergoing TAVR or SAVR, With and Without a History of Liver Disease



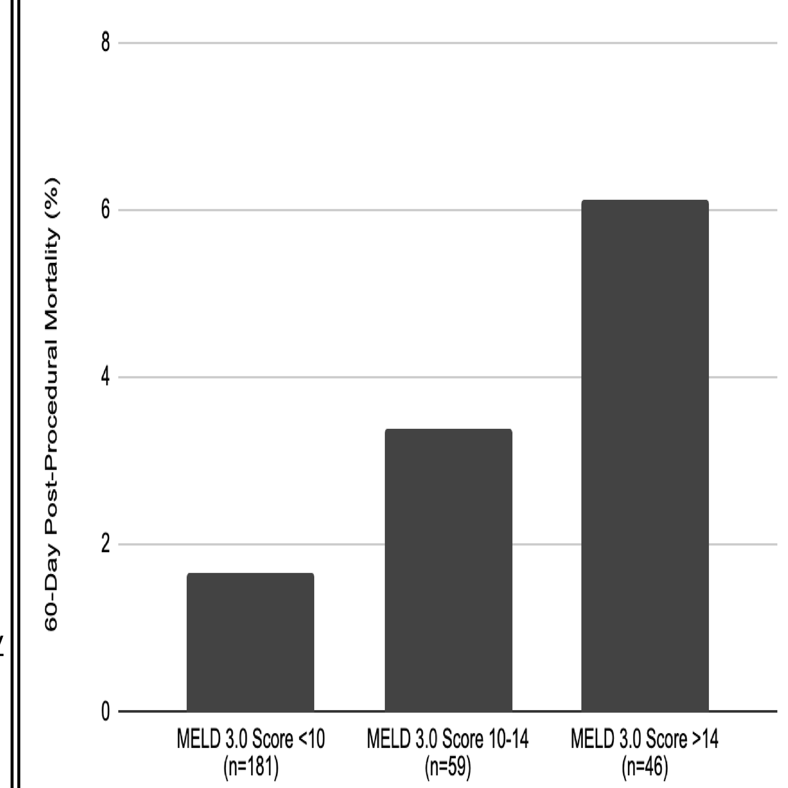
Graph 2A: Average Length of Hospitalization (Days) After TAVR or SAVR by Preoperative MELD 3.0 Score Severity Category



Graph 2B: Average Number of Post-Procedural Complications After TAVR or SAVR by Preoperative MELD 3.0 Score Severity Category



Graph3: 60-Day Post-Procedural Mortality (%) After TAVR or SAVR by Preoperative MELD 3.0 Score Severity Category



CONCLUSION

In our analysis of 500 patients who underwent TAVR or SAVR, we found no significant differences in post-procedural complications or length of hospitalization between patients with and without a documented history of liver disease within either procedural group. SAVR patients—regardless of liver-disease status—had higher complication rates and longer hospital stays compared to TAVR patients, likely reflecting the greater invasiveness and physiological stress of surgical replacement.

Our initial hypothesis that patients with documented liver disease would experience worse postoperative outcomes was not supported. We further examined outcomes by preoperative MELD 3.0 score to assess whether the severity of hepatic dysfunction, rather than the presence of a diagnosis alone, might better predict risk. While higher MELD scores were not associated with longer hospitalizations or increased complication counts, there was a stepwise increase in 60-day post-procedural mortality with greater MELD 3.0 severity. This suggests that hepatic dysfunction may contribute more directly to early postoperative mortality risk than to measures of postoperative morbidity.

FUTURE DIRECTIONS

Few patients with documented cirrhosis or liver disease were identified in the first 500 charts, limiting our ability to detect associations. To improve efficiency, we will request a refined data pull for the remaining ~2,500 patients, specifically targeting those with confirmed cirrhosis or advanced liver disease using structured criteria (diagnoses, hepatology consults, imaging, decompensation events, or labs for MELD-3.0). This enriched cohort will allow more robust evaluation of the impact of liver disease and MELD severity on postoperative outcomes.

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