

Transjugular intrahepatic portosystemic shunt (TIPS) outcomes in the elderly population: a systematic review and meta-analysis

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ABSTRACT

Introduction

Trans-jugular intrahepatic portosystemic shunt (TIPS) effectively treats refractory ascites and variceal bleeding (VB). However, it is associated with increased morbidity and mortality in advanced age. Therefore, our goal was to assess adverse events of TIPS in the elderly population.

Methods

A search strategy was developed using Embase, Cochrane library databases, and the Web of Science Core Collection. First, we separated patients into two age groups: <65-70 and >65-70 years. Due to a lack of data on specific outcomes, we ran a combined analysis first, then a sub-group analysis on ages <65 vs >65 and <70 vs >70.

Results

Six studies, with 1591 total patients, met our inclusion criteria and were included in the final meta-analysis. 1194 patients were in the group aged <65-70 years, and 432 were in the group aged >65-70 years. A combined analysis revealed a higher 90-day mortality rate after TIPS among patients aged >65-70 years. Subgroup analyses demonstrated a significantly higher rate of post-TIPS hepatic encephalopathy (HE) (RR: 0.42, CI: 0.185-0.953, p=0.03). Overall, 30-day mortality (RR: 0.37, CI: 0.188-0.74, p=0.005), and 90-day mortality (RR: 0.35, CI: 0.24-0.49, p=0.001) was higher among patients aged >70 years vs <70 years.

Discussion

This meta-analysis found that age is not a significant risk factor for increased 30-day all-cause readmission after TIPS. However, the age >70 years group was associated with a significantly higher risk of post-TIPS HE. In addition, the overall 30-day and 90-day mortality were significantly higher in patients age >70 years than <70 years. Differences in other outcomes did not achieve statistical significance. In conclusion, TIPS in the elderly is associated with higher overall 30-day and 90-day mortality rates, as well as increased risk for post-TIPS HE, especially in patients aged >70 years. Although results suggest caution be used with TIPS in the elderly population, it is inexpedient to draw firm conclusions at this point. Additional studies, particularly large RCTs, are warranted.

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INTRODUCTION

- Transjugular intrahepatic portosystemic shunt (TIPS) creation is typically used for treatment of variceal bleeding or refractory ascites in portal hypertension¹
- However, TIPS is associated with complications including hepatic encephalopathy (HE)¹
- Age is a risk factor for HE, as the elderly population tends to have decreased cognitive reserve and increased sarcopenia²
- Prior single-center studies have reported an association between advanced age and negative outcomes after TIPS, including increased morbidity and mortality^{3,4}
- Currently, data on post-TIPS outcomes in elderly populations are limited

OBJECTIVE

To conduct a systematic review and meta-analysis of the available literature to evaluate whether elderly patients have higher rates of adverse outcomes after undergoing TIPS.

METHODS

- A comprehensive search strategy was used to identify studies of the following outcomes in elderly patients after undergoing TIPS:
 - Post-TIPS hepatic encephalopathy (HE)
 - 30-day and 90-day mortality
 - Overall readmission
- Analyses were conducted on patients age groups of <65 vs >65 and <70 vs >70 years using Open Meta Analyst software

RESULTS

- Six studies, with 1194 patients age <65-70 years and 432 age >65-70 years, met inclusion criteria and were included in the final meta-analysis
- Three studies separated patients by age <65 vs >65 years (total 816 patients), and three studies by age <70 vs >70 years (total 775 patients)
- Age <70 vs >70 years: Patients age >70 years had significantly higher rates of post-TIPS HE, 30-day mortality, and 90-day mortality; there was no significant difference between the 30-day readmission rates
- Age <65 vs >65 years: There were no significant differences between rates of post-TIPS HE, 30-day readmission, 30-day mortality, or 90-day mortality

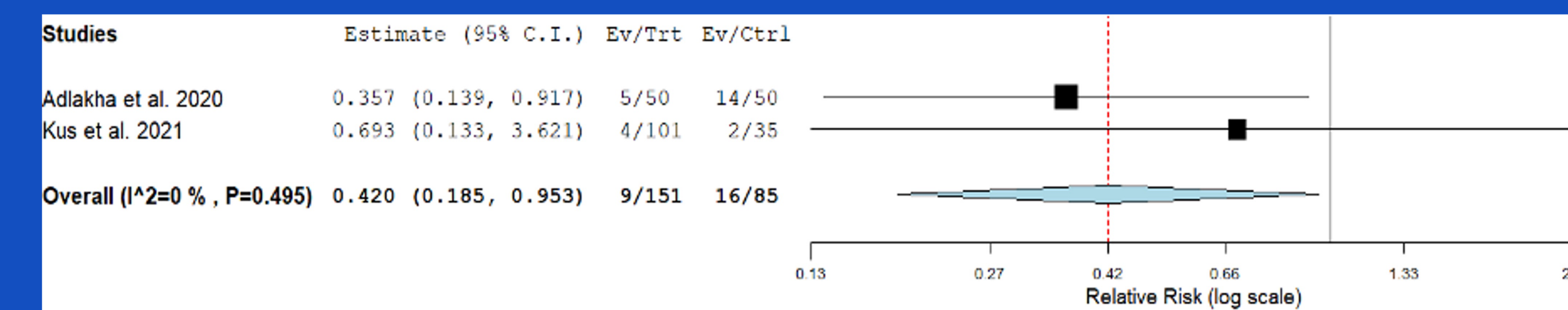


Figure 1. Post-TIPS HE. Higher rate of post-TIPS HE among patients age >70 years compared to <70 years (RR: 0.42, CI: 0.185-0.953, p=0.03, I²=0%).

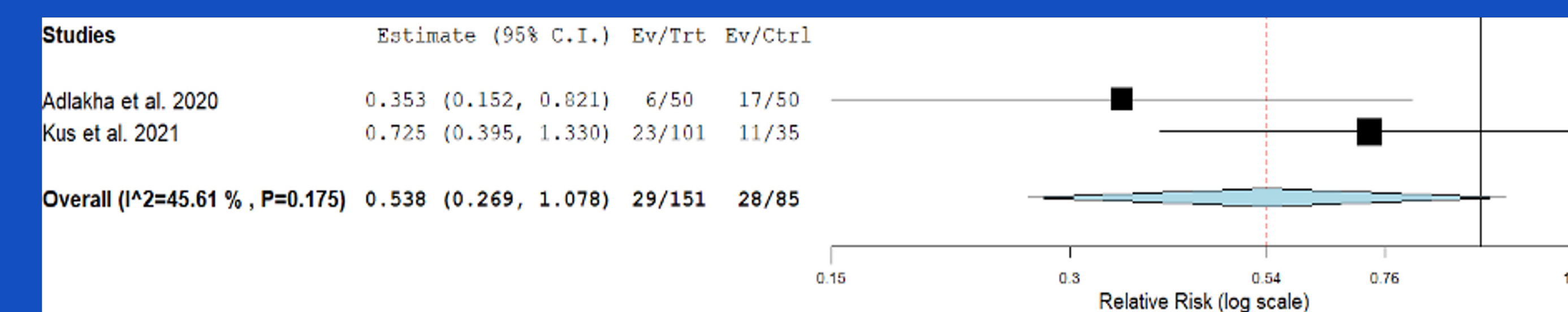


Figure 2. 30-day readmission. No significant difference between patients age >70 and <70 years (RR: 0.538, CI: 0.269-1.078, p=0.08, I²=45%).

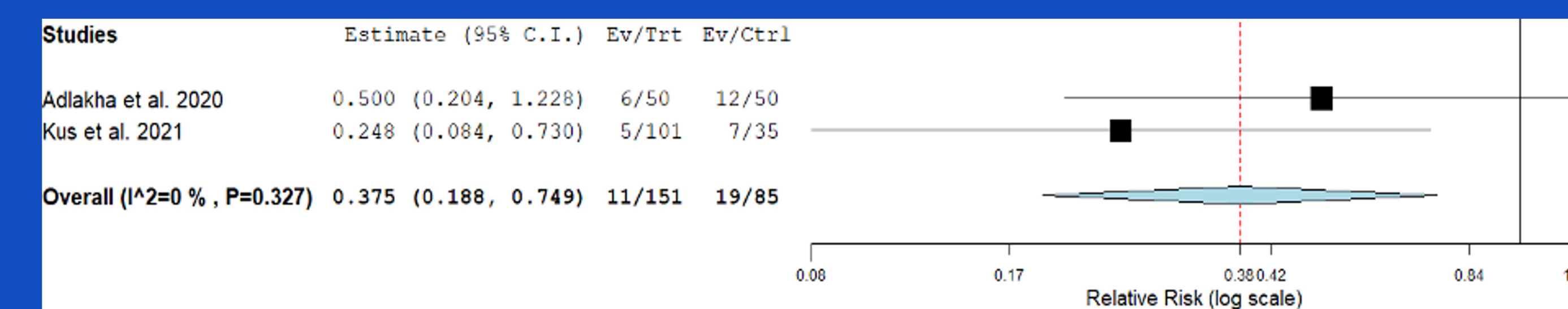


Figure 3. 30-day mortality. Higher rate of 30-day mortality among patients age >70 years compared to <70 years (RR: 0.375, CI: 0.188-0.749, p=0.005, I²=0%).

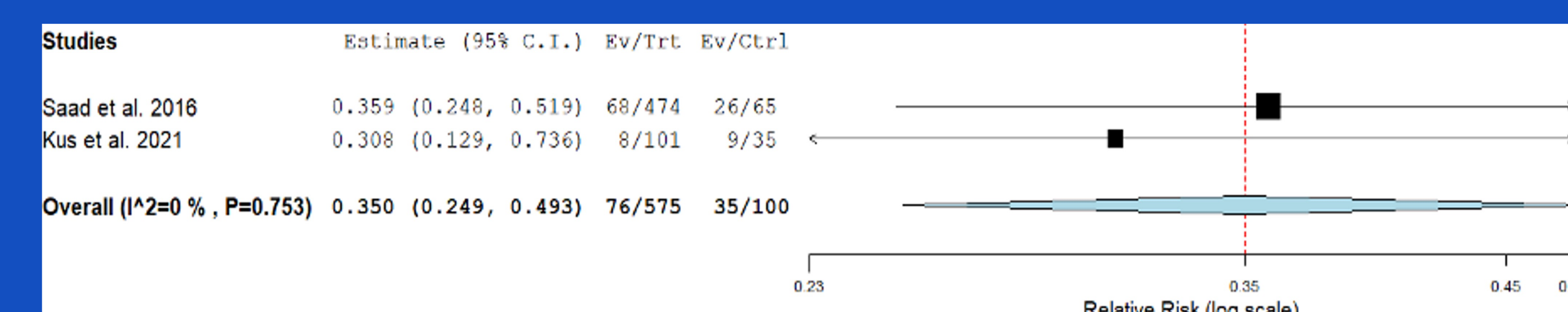


Figure 4. 90-day mortality. Higher rate of 90-day mortality among patients age >70 years compared to <70 years (RR: 0.35, CI: 0.249-0.493, p=0.001, I²=0%).

DISCUSSION

- Our results suggest caution should be used when considering TIPS creation in patients >70 years, although applicability of our study results is limited by the lack of standardized grading/documentation of severity of HE, lack of information regarding stent type, as well as inability to account for possible confounding factors such as comorbid conditions or rules for transplant allocation in patients <70 years
- Age may be a helpful prognosticator for post-TIPS outcomes, whose clinical utility may be maximized if used in combination with other indicators such as bilirubin, prothrombin time, and sodium

CONCLUSIONS

- Advanced age of >70 years is associated with significantly higher rates of HE and 30-day and 90-day mortality rates in patients after undergoing TIPS creation
- No significant differences in adverse event rates were found between patients age <65 and >65 years
- Age is not associated with 30-day all-cause readmission rates

References

- ¹Boyer, T.D. and Z.J. Haskal, The Role of Transjugular Intrahepatic Portosystemic Shunt (TIPS) in the Management of Portal Hypertension: update 2009. *Hepatology*, 2010. 51(1): p. 306.
- ²Tapper, E.B., et al., Incidence of and Risk Factors for Hepatic Encephalopathy in a Population-Based Cohort of Americans With Cirrhosis. *Hepatology*, 2019. 3(11): p. 1510-1519.
- ³Pan, J.J., et al., Factors predicting survival after transjugular intrahepatic portosystemic shunt creation: 15 years' experience from a single tertiary medical center. *J Vasc Interv Radiol*, 2008. 19(11): p. 1576-81.
- ⁴Casadaban, L.C., et al., Clearing the Confusion over Hepatic Encephalopathy After TIPS Creation: Incidence, Prognostic Factors, and Clinical Outcomes. *Dig Dis Sci*, 2015. 60(4): p. 1059-66.