

Sarcopenia is a risk factor for post-TIPS hepatic encephalopathy and mortality: a systematic review and meta-analysis

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ABSTRACT

Introduction

TIPS is a commonly performed procedure in patients with liver cirrhosis to treat portal hypertension-related conditions, including refractory ascites and variceal bleeding. However, currently, there is no widely utilized method to predict those likely to develop post-TIPS complications. Therefore, we conducted a systematic review and meta-analysis to evaluate Sarcopenia as a risk factor for post-TIPS hepatic encephalopathy and mortality.

Methods

A comprehensive search strategy was used to identify post-TIPS HE and post-TIPS mortality reports in sarcopenia vs non-sarcopenia patients with liver cirrhosis who received TIPS and was conducted till February 2022. Open Meta Analyst was used to compute the results.

Results

Nine studies, including 1439 patients, met our inclusion criteria and were included in the final meta-analysis. Sarcopenia was associated with significantly higher post-TIPS HE rate than non-sarcopenia non-sarcopenia (RR: 1.834, 95% CI: 1.377-2.443, p=0.14, I²=38%), as well as a significantly higher post-TIPS mortality rate (RR: 1.75, CI:1.027-2.98, p=0.04, I²=86%).

Discussion

Our study found significant associations between sarcopenia and increased rates of post-TIPS HE and mortality. To develop a reliable pre-procedure prognostic method to weigh the risks and benefits of TIPS in patients with cirrhosis, further studies are needed to determine the clinical relevance of important risk factors such as sarcopenia on post-TIPS outcomes.

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INTRODUCTION

- Transjugular intrahepatic portosystemic shunt (TIPS) is a commonly performed procedure in patients with liver cirrhosis for treatment of portal hypertension related conditions including refractory ascites and variceal bleeding¹
- New or worsening hepatic encephalopathy (HE) is one of the most common and challenging post-TIPS complications, with overt HE occurring in 35-50% of patients after TIPS²
- Sarcopenia has been described as a marker of liver disease severity, a risk factor for post-TIPS HE³, and an independent risk factor for mortality^{4,5}
- Identifying risk factors for post-TIPS HE such as sarcopenia may be useful for predicting complications as currently there is no standard method of pre-procedural evaluation for patients being considered for TIPS

OBJECTIVE

To conduct a systematic review and meta-analysis of the available literature to evaluate the role of sarcopenia as a risk factor for post-TIPS HE and mortality.

METHODS

- A comprehensive search strategy using Medline, Embase, Cochrane library, Web of Science Core Collection, and Global Index Medicus was used to identify studies of adverse events in cirrhosis patients with and without sarcopenia after receiving TIPS
- The random-effects model and DerSimonian-Laird approach were used as a priori to pool and compare outcomes
- RR with 95% CI and p-values were determined for binary products, and mean difference, 95% CI, and p-values for continuous outcomes
- All statistical analyses were conducted using Open Meta Analyst

RESULTS

The initial search revealed 93 studies. Nine studies, including 1439 patients, met our inclusion criteria and were included in the final meta-analysis.

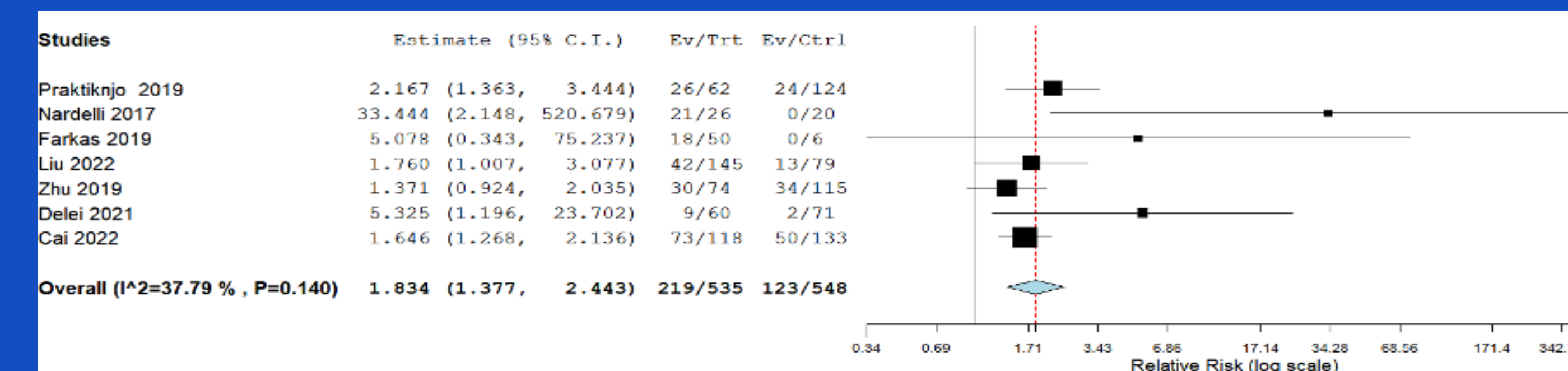


Figure 1. Post-TIPS HE. Sarcopenia was associated with a significantly higher post-TIPS HE rate than non-sarcopenia (RR: 1.834, 95% CI: 1.377-2.443, p=0.14, I²=38%).

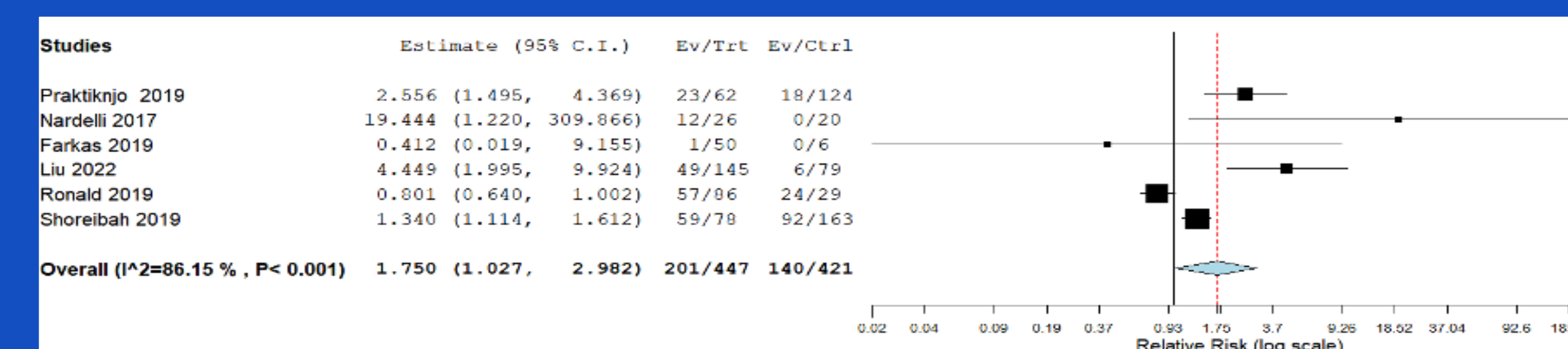


Figure 2. Mortality. Sarcopenia was associated with a significantly higher post-TIPS mortality rate than non-sarcopenia (RR: 1.75, CI:1.027-2.98, p=0.04, I²=86%).

DISCUSSION

- To our knowledge, this is the first comprehensive systematic review and meta-analysis performed to investigate the association between sarcopenia and post-TIPS outcomes in patients with cirrhosis
- Sarcopenia may be a useful criteria to determine whether a patient is at high risk of post-TIPS HE and mortality
- However, there is currently no established clinical criterion to define sarcopenia, presenting a limitation that may make our study vulnerable to measurement bias
- Included studies utilized varied methods to identify patients with sarcopenia, most assessing psoas muscle mass at the L2-L3 level, but others measured the muscle index, area, density, or thickness, or the level of the umbilicus. Cutoffs also varied by study, and some adjusted for sex, height, or adiposity

CONCLUSIONS

- We found significant associations between sarcopenia and increased rates of post-TIPS HE and mortality
- Further studies are needed to determine the clinical relevance of important risk factors such as sarcopenia on post-TIPS morbidity in order to develop a reliable pre-procedure prognostic method to assess individualized risks and benefits of TIPS in patients with cirrhosis

References

- ¹European Association for the Study of the Liver. Electronic address, e.e.e. and L. European Association for the Study of the Liver. Corrigendum to "EASL Clinical Practice Guidelines for the management of patients with decompensated cirrhosis" [J Hepatol 69 (2018) 406-460]. J Hepatol, 2018. 69(5): p. 1207.
- ²Loffroy, R., et al., Transjugular intrahepatic portosystemic shunt for acute variceal gastrointestinal bleeding: Indications, techniques and outcomes. Diagn Interv Imaging, 2015. 96(7-8): p. 745-55.
- ³Nardelli, S., et al., Sarcopenia Is Risk Factor for Development of Hepatic Encephalopathy After Transjugular Intrahepatic Portosystemic Shunt Placement. Clin Gastroenterol Hepatol, 2017. 15(6): p. 934-936.
- ⁴Kim, H.Y. and J.W. Jang, Sarcopenia in the prognosis of cirrhosis: Going beyond the MELD score. World J Gastroenterol, 2015. 21(25): p. 7637-47.
- ⁵Shergill, R., et al., Nutritional support in chronic liver disease and cirrhotics. World J Hepatol, 2018. 10(10): p. 685-694.