ISSN 1007-9327 (print)
ISSN 2219-2840 (online)

World Journal of *Gastroenterology*

World J Gastroenterol 2024 August 28; 30(32): 3726-3790

Published by Baishideng Publishing Group Inc

World Journal of Gastroenterology

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Weekly Volume 30 Number 32 August 28, 2024

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NAME OF JOURNAL

World Journal of Gastroenterology

ISSN

ISSN 1007-9327 (print) ISSN 2219-2840 (online)

LAUNCH DATE

October 1, 1995

FREQUENCY

Weekly

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PUBLICATION DATE

August 28, 2024

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World J Gastroenterol 2024 August 28; 30(32): 3743-3747

DOI: 10.3748/wjg.v30.i32.3743

ISSN 1007-9327 (print) ISSN 2219-2840 (online)

EDITORIAL

Road to recompensation: Baveno VII criteria and transjugular intrahepatic portosystemic shunt in liver cirrhosis

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Specialty type: Gastroenterology and hepatology

Provenance and peer review: Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's classification
Scientific Quality: Grade B
Novelty: Grade B
Creativity or Innovation: Grade B
Scientific Significance: Grade B

P-Reviewer: Xiao X

Received: March 28, 2024
Revised: July 15, 2024
Accepted: July 29, 2024
Published online: August 28, 2024
Processing time: 151 Days and 7.4 Hours

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Abstract

Liver cirrhosis has long been considered a point of no return, with limited hope for recovery. However, recent advancements, particularly the Baveno VII criteria and the utilization of transjugular intrahepatic portosystemic shunt (TIPS), have illuminated the concept of hepatic recompensation. In this editorial we comment on the article by Gao *et al* published in the recent issue. This editorial provides a comprehensive overview of the evolution of understanding cirrhosis, the criteria for recompensation, and the efficacy of TIPS in achieving recompensation. We discuss key findings from recent studies, including the promising outcomes observed in patients who achieved recompensation post-TIPS insertion. While further research is needed to validate these findings and elucidate the mechanisms underlying recompensation, the insights presented here offer renewed hope for patients with decompensated cirrhosis and highlight the potential of TIPS as a therapeutic option in their management.

Key Words: Decompensated hepatic cirrhosis; Hepatic recompensation; Transjugular intrahepatic portosystemic shunt; Variceal bleeding; Refractory ascites

Core Tip: Advancements in the understanding of hepatic recompensation and the use of transjugular intrahepatic portosystemic shunt (TIPS) offer new hope for patients with decompensated liver cirrhosis. Studies have shown promising results in achieving recompensation according to Baveno VII criteria post-TIPS insertion, highlighting the potential of TIPS as a therapeutic option. Further research is warranted to better understand the mechanisms of recompensation and optimize treatment strategies for patients with decompensated cirrhosis.

Citation: Anis MA, Majeed AA, Abid S. Road to recompensation: Baveno VII criteria and transjugular intrahepatic portosystemic shunt in liver cirrhosis. *World J Gastroenterol* 2024; 30(32): 3743-3747
URL: https://www.wjgnet.com/1007-9327/full/v30/i32/3743.htm
DOI: https://dx.doi.org/10.3748/wjg.v30.i32.3743

INTRODUCTION

Previously, liver cirrhosis appeared to be a dead end, offering little hope for recovery. The progression of cirrhosis typically unfolds silently, remaining asymptomatic until rising portal pressure and deteriorating liver function manifest in a clinical phenotype. As the disease progresses, hepatic decompensation occurs, which transforms cirrhosis into a systemic condition, leading to dysfunction across multiple organs or systems[1]. Hepatic decompensation is characterized by the occurrence of portal hypertension leading to ascites or variceal bleeding, which may progress to hepatic encephalopathy[2]. Median survival is estimated to decline from more than 12 years in cases of compensated cirrhosis to around 2 years in cases of decompensated cirrhosis[3].

With the pursuit of effective interventions for portal hypertension, Baveno VII in October 2021, illuminated the concept of hepatic recompensation. It implied the occurrence of at least a partial reversal of the structural and functional alterations associated with cirrhosis following the elimination of the underlying cause. According to the Baveno VII criteria, recompensation was defined as fulfillment of all of the following: (1) Removal of the etiological factor of cirrhosis; (2) Resolution of ascites and hepatic encephalopathy (indicated by the cessation of diuretics and lactulose/rifaximin use, respectively) along with no recurrence of variceal hemorrhage for a minimum of 12 months; and (3) Stable enhancement of liver function tests [albumin, international normalized ratio (INR), bilirubin][4].

The possibility of recompensation brought newfound hope for both patients and clinicians who had previously perceived the decompensated stage of liver cirrhosis as irreversible. Several studies have showed that removal of the etiological factor may lead to recompensation in the liver. An observational study on decompensated alcohol-related cirrhosis showed that abstinence of alcohol led to recompensation in 18.1% of patients, as seen by changes in hepatic venous pressure gradient measurement[5]. Similarly, in patients with decompensated cirrhosis due to hepatitis B virus infection, 12 months of treatment with entecavir resulted in improvement of liver function as seen by improved Child-Turcotte-Pugh and model for end-stage liver disease (MELD) scores[6,7]. Likewise, a prospective study in patients with decompensated cirrhosis due to hepatitis C infection saw an improvement in MELD scores after 15 months of treatment with antiviral therapy[8]. Even though these studies do show that etiological factor removal does lead to improvement in liver function and patient outcome, the results could not be generalized to all the patients treated.

Another crucial tool in the treatment of complications associated with decompensated liver cirrhosis such as variceal bleeding and refractory ascites is transjugular intrahepatic portosystemic shunt (TIPS). TIPS is a minimally invasive radiological procedure designed to alleviate portal hypertension by establishing a shunt between the portal venous system and the hepatic venous system. TIPS is considered second-line therapy for complications of decompensated cirrhosis that fail to improve after the trial of standard medical/endoscopic therapy and is seen as a transitional measure prior to liver transplantation. A major complication after TIPS insertion with bare stent grafts is the development of hepatic encephalopathy, potentially impacting up to 50% of patients[9,10]. However, the occurrence of this complication can be significantly decreased to around 18% by employing polytetrafluoroethylene-covered 8 mm stent grafts[11]. This outcome was validated by a randomized trial that compared the effectiveness of 8 mm and 10 mm stent grafts[12].

EFFICACY OF TIPS FOR TREATMENT OF VARICEAL BLEEDING AND/OR REFRACTORY ASCITES IN DECOMPENSATED LIVER CIRRHOSIS

Various studies have been conducted to assess the effectiveness of TIPS given earlier or pre-emptively in the disease process compared with standard treatment. One such retrospective study assessed the difference in control of variceal bleed in patients who received TIPS as first-line treatment compared with its administration as second-line therapy. It showed a significant difference (P = 0.009) in the cumulative survival rate of the two groups[13]. In addition, a multicenter observational study showed that in patients with acute-on-chronic liver failure, mortality was significantly lower in the patients who received TIPS pre-emptively (pTIPS) compared with the non-pTIPS group of patients (42-day mortality: 13.6% *vs* 51.0%, P = 0.002 and 1-year mortality: 22.7% *vs* 56.5%, P = 0.002)[14]. Similar studies have shown significantly decreased 1-year mortality in patients with cirrhosis who received early TIPS for control of variceal bleed and refractory ascites[15,16].

Many randomized control trials (commonly referred to as RCTs) have compared the effectiveness of early TIPS *vs* standard treatment for control of acute variceal bleed or ascites in patients with advanced liver cirrhosis. RCTs assessing the performance of TIPS compared to standard therapy and the difference in complications are included in Table 1[11,17-22]. It is evident from such studies that TIPS was effective in controlling the variceal bleeding and refractory ascites associated with decompensated liver cirrhosis. However, limited evidence is available on the potential of TIPS to lead further recompensation as per the Baveno VII criteria. One such study entitled "Impressive recompensation in TIPS-treated individuals with complications of decompensated cirrhosis based on Baveno VII criteria" was published in the recent issue of *World Journal of Gastroenterology*[23]. This retrospective analysis of 64 patients showed that 31% achieved

Table 1 Transjugular intrahepatic portosystemic shunt *vs* standard treatment for control of variceal bleed/ascites

Indication	Enrolled patients		Improvement of variceal bleed/ascites[1]		Development of hepatic encephalopathy		Mortality	
	TIPS, *n*	Standard[2], *n*	TIPS, %	Standard, %	TIPS, %	Standard, %	TIPS, %	Standard, %
Control of variceal bleeding								
Sauerbruch *et al*[11]	90	95	92	76	18	8	30	26
Lv *et al*[17]	84	45	86	73	35	36	18	36
Holster *et al*[18]	37	35	100	71	38	23	32	26
Hernández-Gea *et al*[19]	66	605	95.5	76.7	42.4	37.7	18	35
Control of refractory ascites								
Lebrec *et al*[20]	13	12	69	0	15	0	69	33
Ginès *et al*[21]	35	35	51	17	77	66	57	51
Rössle *et al*[22]	29	31	61	18	58	48	52	74

[1]Defined as no variceal rebleeding and no recurrence of ascites.
[2]Standard treatment = endoscopic ligation + B-blockers (for variceal bleed) and large volume paracentesis (for ascites).
TIPS: Transjugular intrahepatic portosystemic shunt.

recompensation after receiving TIPS. In this study, along with TIPS, patients were also provided with the medication or lifestyle modifications required to address their individual underlying etiologies of cirrhosis (for example: hepatitis B or C virus infection, alcoholic liver disease, nonalcoholic liver disease, *etc*). Furthermore, the criteria for stable improvement in liver function tests were derived from a recent study that validated the Baveno VII definition of recompensation. These values are defined as a MELD score below 10 and/or liver function tests within the Child-Pugh A range (albumin > 35 g/L, INR < 1.50, and total bilirubin < 34 μmol/L)[7]. The study also looked into the baseline and on-treatment characteristics of patients who had recompensation and those without recompensation. There was no statistically significant difference in the Child-Pugh scores of the two groups at baseline. However, patients without recompensation had MELD scores that were higher than in patients with recompensation at baseline (P = 0.019). Age and post-TIPS portosystemic pressure gradient of < 12 mmHg were also seen as independent predictors of recompensation.

Though the study results were encouraging, the limited sample size compromised its credibility. Moreover, inaccuracy of laboratory cutoffs is possible as not all enrolled patients had hepatitis B as the etiology of cirrhosis as in Wang *et al*[7] and from which these cutoffs were adopted. However, it should be appreciated that the said article[23] focused on all the parameters of recompensation according to the Baveno VII criteria after performing TIPS, whereas most previous studies focused only on the resolution of ascites and/or variceal bleeding post-TIPS, as seen by the studies mentioned above. It is unclear whether the recompensation resulted from TIPS or control of the primary etiology of liver cirrhosis. Further, patients who recompensate already had MELD scores of < 10 and Child scores of < 7/B at baseline, suggesting that liver synthetic functions were well preserved. Moreover, it is unclear how many of the patients received TIPS for variceal bleeding *vs* ascites, and whether the differences in outcome are based on the indication of TIPS. Furthermore, lack of a control arm limits its generalizability.

CONCLUSION

While the benefits and efficacy of TIPS in controlling variceal bleed and recurrent ascites in patients with cirrhosis have been well established in previous studies, the details of mechanisms to achieve recompensation have not yet been studied. The study recently published in *World Journal of Gastroenterology*[23] is the first to evaluate recompensation, and it successfully demonstrated that nearly one-third of the patients achieved recompensation according to the Baveno VII criteria *via* TIPS. This is a promising start for clinicians in understanding the efficacy of TIPS in achieving recompensation, which can open doors to improved quality of life and prolonged survival in patients with decompensated cirrhosis, once considered a deadlock. However, further prospective trials are necessary to understand the extent to which recompensation can be achieved. Enough literary evidence could then help us consider the modification of treatment guidelines for the early application of TIPS or as a possible first-line therapy for patients with decompensated liver cirrhosis.

FOOTNOTES

Author contributions: Anis MA and Majeed AA reviewed the literature; Anis MA and Majeed AA drafted the initial editorial; Abid S revised the editorial for important intellectual content.

Conflict-of-interest statement: The authors declare that they have nothing to disclose.

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S-Editor: Qu XL
L-Editor: Filipodia
P-Editor: Chen YX

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