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World J Gastrointest Surg 2024 February 27; 16(2): 260-634



EDITORIAL

- 260 Actuality and underlying mechanisms of systemic immune-inflammation index and geriatric nutritional risk index prognostic value in hepatocellular carcinoma
Tchilikidi KY
- 266 Prognostic impact of preoperative nutritional and immune inflammatory parameters on liver cancer
Bae SU
- 270 Don't forget emergency surgery! Lessons to learn from elective indocyanine green-guided gastrointestinal interventions
Perini D, Martellucci J
- 276 Mutational landscape of TP53 and CDH1 in gastric cancer
Cai HQ, Zhang LY, Fu LM, Xu B, Jiao Y
- 284 Overview of ectopic pancreas
Li CF, Li QR, Bai M, Lv YS, Jiao Y

ORIGINAL ARTICLE

Clinical and Translational Research

- 289 Phospholipase A2 enzymes PLA2G2A and PLA2G12B as potential diagnostic and prognostic biomarkers in cholangiocarcinoma
Qiu C, Xiang YK, Da XB, Zhang HL, Kong XY, Hou NZ, Zhang C, Tian FZ, Yang YL

Case Control Study

- 307 Classification of anatomical morphology of cystic duct and its association with gallstone
Zhu JH, Zhao SL, Kang Q, Zhu Y, Liu LX, Zou H

Retrospective Cohort Study

- 318 Will partial splenic embolization followed by splenectomy increase intraoperative bleeding?
Huang L, Li QL, Yu QS, Peng H, Zhen Z, Shen Y, Zhang Q
- 331 Influence of donor age on liver transplantation outcomes: A multivariate analysis and comparative study
Bezjak M, Stresec I, Kocman B, Jadrijević S, Filipec Kanizaj T, Antonijević M, Dalbelo Bašić B, Mikulić D
- 345 Machine learning-based radiomics score improves prognostic prediction accuracy of stage II/III gastric cancer: A multi-cohort study
Xiang YH, Mou H, Qu B, Sun HR

- 357 Risk stratification in gastric cancer lung metastasis: Utilizing an overall survival nomogram and comparing it with previous staging
Chen ZR, Yang MF, Xie ZY, Wang PA, Zhang L, Huang ZH, Luo Y
- 382 Systemic inflammatory response index is a predictor of prognosis in gastric cancer patients: Retrospective cohort and meta-analysis
Ren JY, Xu M, Niu XD, Ma SX, Jiao YJ, Wang D, Yu M, Cai H
- Retrospective Study**
- 396 Development of a clinical nomogram for prediction of response to neoadjuvant chemotherapy in patients with advanced gastric cancer
Liu B, Xu YJ, Chu FR, Sun G, Zhao GD, Wang SZ
- 409 Laparoscopic left hemihepatectomy guided by indocyanine green fluorescence: A cranial-dorsal approach
Wang XR, Li XJ, Wan DD, Zhang Q, Liu TX, Shen ZW, Tong HX, Li Y, Li JW
- 419 Hemoglobin loss method calculates blood loss during pancreaticoduodenectomy and predicts bleeding-related risk factors
Yu C, Lin YM, Xian GZ
- 429 Short- and long-term outcomes of surgical treatment in patients with intestinal Behcet's disease
Park MY, Yoon YS, Park JH, Lee JL, Yu CS
- 438 Preoperative neutrophil-to-lymphocyte ratio predicts symptomatic anastomotic leakage in elderly colon cancer patients: Multicenter propensity score-matched analysis
Wang CY, Li XL, Ma XL, Yang XF, Liu YY, Yu YJ
- 451 Preoperative blood markers and intra-abdominal infection after colorectal cancer resection
Liu CQ, Yu ZB, Gan JX, Mei TM
- 463 Immune function status of postoperative patients with colon cancer for predicting liver metastasis
Xiong L, Liu FC
- 471 Efficacy of transjugular intrahepatic portosystemic shunts in treating cirrhotic esophageal-gastric variceal bleeding
Hu XG, Dai JJ, Lu J, Li G, Wang JM, Deng Y, Feng R, Lu KP
- 481 Correlation between serum markers and transjugular intrahepatic portosystemic shunt prognosis in patients with cirrhotic ascites
Hu XG, Yang XX, Lu J, Li G, Dai JJ, Wang JM, Deng Y, Feng R
- 491 Development of a new Cox model for predicting long-term survival in hepatitis cirrhosis patients underwent transjugular intrahepatic portosystemic shunts
Lv YF, Zhu B, Meng MM, Wu YF, Dong CB, Zhang Y, Liu BW, You SL, Lv S, Yang YP, Liu FQ
- 503 "Five steps four quadrants" modularized *en bloc* dissection technique for accessing hepatic hilum lymph nodes in laparoscopic pancreaticoduodenectomy
Hu XS, Wang Y, Pan HT, Zhu C, Chen SL, Liu HC, Pang Q, Jin H

- 511** Efficacy and safety of endoscopic submucosal dissection for early gastric cancer and precancerous lesions in elderly patients

Xu WS, Zhang HY, Jin S, Zhang Q, Liu HD, Wang MT, Zhang B

- 518** Nomogram model including *LATS2* expression was constructed to predict the prognosis of advanced gastric cancer after surgery

Sun N, Tan BB, Li Y

Observational Study

- 529** To explore the pathogenesis of anterior resection syndrome by magnetic resonance imaging rectal defecography

Meng LH, Mo XW, Yang BY, Qin HQ, Song QZ, He XX, Li Q, Wang Z, Mo CL, Yang GH

- 539** Biopsy forceps are useful for measuring esophageal varices *in vitro*

Duan ZH, Zhou SY

SYSTEMATIC REVIEWS

- 546** First experience in laparoscopic surgery in low and middle income countries: A systematic review

Troller R, Bawa J, Baker O, Ashcroft J

- 554** Comparative effectiveness of several adjuvant therapies after hepatectomy for hepatocellular carcinoma patients with microvascular invasion

Pei YX, Su CG, Liao Z, Li WW, Wang ZX, Liu JL

META-ANALYSIS

- 571** Is tumor necrosis factor- α monoclonal therapy with proactive therapeutic drug monitoring optimized for inflammatory bowel disease? Network meta-analysis

Zheng FY, Yang KS, Min WC, Li XZ, Xing Y, Wang S, Zhang YS, Zhao QC

- 585** Poor oral health was associated with higher risk of gastric cancer: Evidence from 1431677 participants

Liu F, Tang SJ, Li ZW, Liu XR, Lv Q, Zhang W, Peng D

CASE REPORT

- 596** Treatment of hemolymphangioma by robotic surgery: A case report

Li TN, Liu YH, Zhao J, Mu H, Cao L

- 601** Postoperative encapsulated hemoperitoneum in a patient with gastric stromal tumor treated by exposed endoscopic full-thickness resection: A case report

Lu HF, Li JJ, Zhu DB, Mao LQ, Xu LF, Yu J, Yao LH

- 609** Early endoscopic management of an infected acute necrotic collection misdiagnosed as a pancreatic pseudocyst: A case report

Zhang HY, He CC

- 616** Percutaneous ultrasound-guided coaxial core needle biopsy for the diagnosis of multiple splenic lesions: A case report
Pu SH, Bao WYG, Jiang ZP, Yang R, Lu Q
- 622** Spilled gallstone mimicking intra-abdominal seeding of gallbladder adenocarcinoma: A case report
Huang CK, Lu RH, Chen CC, Chen PC, Hsu WC, Tsai MJ, Ting CT
- 628** Ileal collision tumor associated with gastrointestinal bleeding: A case report and review of literature
Wu YQ, Wang HY, Shao MM, Xu L, Jiang XY, Guo SJ

ABOUT COVER

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The primary aim of *World Journal of Gastrointestinal Surgery* (WJGS, *World J Gastrointest Surg*) is to provide scholars and readers from various fields of gastrointestinal surgery with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, *etc.*

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Retrospective Study

Efficacy of transjugular intrahepatic portosystemic shunts in treating cirrhotic esophageal-gastric variceal bleeding

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Abstract

BACKGROUND

Esophageal-gastric variceal bleeding (EGVB) represents a severe complication among patients with cirrhosis and often culminates in fatal outcomes. Interventional therapy, a rapidly developing treatment modality over the past few years, has found widespread application in clinical practice due to its minimally invasive characteristics. However, whether transjugular intrahepatic portosystemic shunt (TIPS) treatment has an impact on patient prognosis remains controversial.

AIM

To probing the efficacy of TIPS for treating cirrhotic EGVB and its influence on the prognosis of patients afflicted by this disease.

METHODS

A retrospective study was conducted on ninety-two patients presenting with cirrhotic EGVB who were admitted to our hospital between September 2020 and September 2022. Based on the different modes of treatment, the patients were assigned to the study group (TIPS received, $n = 50$) or the control group (percutaneous transhepatic varices embolization received, $n = 42$). Comparative analyses were performed between the two groups preoperatively and one month postoperatively for the following parameters: Varicosity status; hemodynamic parameters [portal vein flow velocity (PVV) and portal vein diameter (PVD); platelet count (PLT); red blood cell count; white blood cell count (WBC); and

hepatic function [albumin (ALB), total bilirubin (TBIL), and aspartate transaminase (AST)]. The Generic Quality of Life Inventory-74 was utilized to assess quality of life in the two groups, and the 1-year postoperative rebleeding and survival rates were compared.

RESULTS

Following surgical intervention, there was an improvement in the incidence of varicosity compared to the preoperative status in both cohorts. Notably, the study group exhibited more pronounced enhancements than did the control group ($P < 0.05$). PVV increased, and PVD decreased compared to the preoperative values, with the study cohort achieving better outcomes ($P < 0.05$). PLT and WBC counts were elevated postoperatively in the two groups, with the study cohort displaying higher PLT and WBC counts ($P < 0.05$). No differences were detected between the two groups in terms of serum ALB, TBIL, or AST levels either preoperatively or postoperatively ($P < 0.05$). Postoperative scores across all dimensions of life quality surpassed preoperative scores, with the study cohort achieving higher scores ($P < 0.05$). At 22.00%, the one-year postoperative rebleeding rate in the study cohort was significantly lower than that in the control group (42.86%; $P < 0.05$); conversely, no marked difference was observed in the 1-year postoperative survival rate between the two cohorts ($P > 0.05$).

CONCLUSION

TIPS, which has demonstrated robust efficacy in managing cirrhotic EGVB, remarkably alleviates varicosity and improves hemodynamics in patients. This intervention not only results in a safer profile but also contributes significantly to a more favorable prognosis.

Key Words: Liver cirrhosis; Esophagogastric variceal bleeding; Transjugular intrahepatic portosystemic shunt; Prognosis

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Core Tip: Esophageal-gastric variceal bleeding (EGVB) is a severe and life-threatening complication associated with cirrhosis. The implementation of transjugular intrahepatic portosystemic shunt (TIPS) has emerged as an effective strategy for both the treatment and prophylaxis of EGVB. The objective of this study was to evaluate the effectiveness of TIPS in terms of cirrhosis-triggered EGVB treatment and to probe its impact on patient prognosis. The research outcomes contribute valuable insights into the management of acute variceal bleeding and the enhancement of long-term prognostic outcomes for individuals with advanced hepatopathy. A comprehensive understanding of the benefits and potential risks associated with TIPS is pivotal for the development of personalized strategies for the treatment of variceal bleeding attributed to cirrhosis.

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INTRODUCTION

Portal hypertension constitutes a cluster of clinical syndromes stemming from elevated pressure within the portal venous system and is primarily attributed to cirrhosis triggered by diverse factors[1]. The fundamental pathophysiological features of portal hypertension include obstruction of blood flow and/or increased blood flow in the portal venous system, augmented intravascular static pressure in the portal vein and its branches, and the formation of collateral circulation. The gastroesophageal varices (GEVs) in the gastric fundus are the predominant collateral vessels. As portal hypertension intensifies, the GEV expands and ultimately ruptures, leading to esophageal-gastric variceal bleeding (EGVB). EGVB is one of the most prevalent gastrointestinal emergencies and is a primary contributor to mortality in patients with cirrhosis[2]. Cirrhotic EGVB patients typically present with symptoms such as hematemesis and melena. Approximately 30% to 50% of cirrhosis patients succumb to this condition within six weeks following their initial esophageal variceal bleeding episode[3]. These complications pose a significant burden on global public health, leading to a severely compromised quality of life for affected individuals and an increased mortality rate. Hence, proactive exploration of treatment modalities for EGVB is highly important.

Presently, therapeutic strategies for EGVB include pharmacotherapy, triple-lumen dual-balloon catheters for pressure hemostasis, endoscopic therapy, and interventional and surgical procedures. Among these modalities, interventional treatment is highly regarded by clinical practitioners due to its straightforward procedural execution, minimal trauma, and prompt hemostatic outcomes[4]. Interventional treatments primarily include partial splenic embolization (PSE), percutaneous transhepatic variceal embolization (PTVE), balloon-occluded retrograde transvenous obliteration (BRTO), and transjugular intrahepatic portosystemic shunt (TIPS). Nonetheless, given the somewhat unsatisfactory progress in domestic technology at present, certain scholars have failed to allocate adequate attention to this field and tend to favor a

one-sided emphasis on decompression. On the other hand, the lack of appropriate interventional equipment and the numerous complications correlated with BRTO, coupled with its limited indications, have hindered the development of PSE and BRTO within the country. Currently, PTVE and TIPS are the commonly employed interventional treatments for cirrhotic EGVB. PTVE involves percutaneous puncture of the intrahepatic portal vein branch under ultrasound guidance, followed by selective entry into variceal branches such as the coronary and short gastric veins, where embolization materials are injected to prevent bleeding and varices in the esophagus and stomach, facilitating the treatment and prevention of variceal hemorrhage. Nonetheless, PTVE is not without its drawbacks, as it is associated with the risk of exacerbating hypersplenism due to heightened portal venous pressure[5]. Conversely, TIPS establishes a shunt channel between the portal vein and hepatic vein within the liver parenchyma *via* the internal jugular vein, diverting blood flow from the portal venous system directly back into the systemic circulation *via* the channel, thus attenuating portal venous pressure[6]. In recent years, the clinical efficacy of TIPS has gained recognition because of the implementation of endovascular stent grafts and refined modulation of shunt diameters[7]. In summary, interventional treatments offer advantages such as minimal trauma, short preoperative preparation time, rapid hemostasis, and a broad range of indications. Nevertheless, there remains ongoing debate in the clinical realm regarding the impact of these two methods on liver function and prognosis in cirrhotic EGVB patients. Thus, this article endeavors to thoroughly investigate the efficacy of these two approaches.

MATERIALS AND METHODS

General data

A retrospective examination of the clinical data of 92 patients diagnosed with cirrhotic EGVB who were admitted to our institution between September 2020 and September 2022 was also conducted. The inclusion criteria were as follows: (1) Diagnosed with EGVB through gastroscopy; (2) Aged at least 18 years; (3) Had an unsatisfactory response to conservative treatments, including medications and endoscopy; (4) Underwent first-time TIPS or PTVE procedures; and (5) Provided complete data and the ability to read, comprehend, and provide informed consent. Exclusion criteria encompassed: (1) Clear indications of mental illness; (2) Pregnant or lactating women; (3) Contraindications for surgery; (4) Systemic infection, fever, or organic heart disease; (5) Severe hepatic encephalopathy, hepatic space-occupying lesions, or hepatic diabetes; (6) Total bilirubin (TBIL) levels exceeding three times the upper limit of normal; (7) Portal vein obstruction or stenosis; and (8) Gastrointestinal bleeding attributed to other cirrhosis-linked factors. The patients were further allocated into the study group ($n = 50$) or the control group ($n = 42$) based on distinct treatment modalities.

Methods

Within the study cohort, the TIPS procedure was performed as follows: Patients were placed in the supine position and subjected to standard aseptic draping, after which local anesthesia was administered. Under X-ray guidance, the right internal jugular vein was punctured, and a Rups-100 guidewire was inserted into the right hepatic vein approximately 1 cm distal to its confluence with the inferior vena cava. Following the measurement of right atrial pressure, a puncture needle was used to access the right branch of the portal vein from the right hepatic vein. A guidewire was then advanced into the main portal vein, and portal vein pressure was gauged. After the portal systemic collateral circulation pressure gradient was obtained, a guidewire was introduced into the splenic vein to access the angiography portal. A balloon was inflated and placed through the shunt channel. Variceal vein embolization was performed using a spring coil. A Gore stent was introduced over a guidewire, and the status of the stent and the patency of the shunt tract were reassessed through repeat angiography. Upon confirmation of favorable conditions, the postoperative portal systemic collateral circulation pressure gradient was reassessed, and the guide catheter was subsequently removed, thereby confirming the conclusion of the procedure.

Within the control cohort, PTVE was performed as follows: Patients were placed in the supine position, standard aseptic draping was applied, and local anesthesia was administered. Under the guidance of ultrasound, percutaneous liver puncture was performed to access the portal vein branch. A supersmooth guidewire was placed, followed by the use of a 4F introducer sheath. Portal vein angiography was conducted to validate portal venous pressure and evaluate the magnitude of varices. A suitable quantity of absolute ethyl alcohol was infused to induce solidification of the blood vessels. Variceal vein embolization was carried out using a spring coil. After embolization, repeat angiography was performed to verify the absence of abnormalities. Pressure was once again measured, and the catheter was removed. The puncture route was sealed using a spring coil and gelatin sponge, completing the procedure.

Evaluation of indicators

Varicosity status: Following relevant guidelines, the evaluation of variceal status in the patient cohorts was conducted both preoperatively and one month postoperatively. Variceal conditions were categorized into four classes: Absence of varices, mild varices (presenting as linear formations), moderate varices (exhibiting sinuous tortuosity and elevation), and severe varices (manifesting as bead-like, nodular, or tumorous formations).

Hemodynamics: With the assistance of Doppler ultrasonography, the hemodynamic conditions of the portal vein were examined in the two groups preoperatively and one month postoperatively. The parameters under consideration included portal vein flow velocity (PVV) and portal vein diameter (PVD).

Table 1 Comparison of general data between the two groups [*n* (%), (mean \pm SD)]

Item		Study group (<i>n</i> = 50)	Control group (<i>n</i> = 42)	Z/t/ χ^2	P value
Gender	Male	29 (58.00)	26 (61.90)	0.145	0.704
	Female	21 (42.00)	16 (38.10)		
Age (years)		54.62 \pm 7.17	55.18 \pm 6.95	0.378	0.706
Etiology of liver cirrhosis	Viral hepatitis	28 (56.00)	23 (54.76)	0.000	0.989
	Alcoholic hepatitis	15 (30.00)	14 (33.33)		
	Other	7 (14.00)	5 (11.90)		

Peripheral blood cell count: Before the surgical procedure and one month after surgery, 1 mL of fasting venous blood was drawn from both cohorts. After centrifugation at 3500 r/min, the supernatant was harvested for further analysis. The platelet count (PLT), red blood cell (RBC) count, and white blood cell count (WBC) count were ascertained with the use of a fully automatic hematology analyzer.

Liver function: Preoperatively and one month postoperatively, 3 mL of fasting venous blood was drawn from both patient cohorts. Following centrifugation at 3500 r/min, the supernatant was collected for subsequent analysis. Serum albumin (ALB), TBIL, and aspartate transaminase (AST) levels were measured *via* enzyme-linked immunosorbent assay.

Quality of life: The Generic Quality of Life Inventory-74 questionnaire was used to evaluate the overall quality of life in the two groups preoperatively and one month postoperatively. This instrument comprises four dimensions, wherein social function, psychological function, and physical function are assessed on a scale ranging from 20 to 100 points each, while material life condition is appraised on a scale ranging from 16 to 80 points. Elevated scores indicate an enhanced quality of life.

Rebleeding and survival rates: All patients underwent biweekly follow-up appointments at the designated portal hypertension outpatient clinic. The follow-up period for the two cohorts extended to one year postoperatively, with no instances of study withdrawal, resulting in a 100% follow-up rate. Throughout the one-year timeframe, the occurrence of recurrent bleeding and survival status of each patient were meticulously documented.

Statistical analysis

The data analysis was performed with the assistance of SPSS 25.0 software. The measurement data are presented as the mean \pm SD, while the enumeration data are presented as *n* (%). For normally distributed data, one-way analysis of variance and *t* tests were used, whereas for enumeration data analysis, the χ^2 test was used. The rank sum test was performed for ranked data analysis. *P* < 0.05 indicated statistical significance.

RESULTS

Comparison of general data between the two groups

The study cohort consisted of a total of 50 patients-29 males and 21 females-with an average age of 54.62 \pm 7.17 years. Within the control cohort, there were 42 individuals-26 males and 16 females-with an average age of 55.18 \pm 6.95 years. Statistical analysis revealed no significant differences between the two cohorts with respect to sex, age, or etiology of liver cirrhosis (*P* > 0.05) (Table 1).

Comparison of variceal status between the two groups

Preceding surgical intervention, the rates of absence, mild, moderate, and severe varices within the study group were 0.00% (0/50), 18.00% (9/50), 40.00% (20/50), and 42.00% (21/50), respectively. Compared to those of the control cohort, for which the incidence rates were 0.00% (0/42), 11.90% (5/42), 40.48% (17/42), and 47.62% (20/42), the differences were not significantly different (*P* > 0.05). Postsurgery, the study group exhibited rates of 38.00% (19/50), 32.00% (16/50), 18.00% (9/50), and 12.00% (6/50) for absence, mild, moderate, and severe varices, respectively. These rates were greater than those of the control group [9.52% (4/42), 50.00% (21/42), 23.81% (10/42), and 16.67% (7/42)] (*P* < 0.05) (Table 2).

Comparison of hemodynamics between the two groups

Before the surgical intervention, there were no substantial differences in the PVV or PVD between the two cohorts (*P* > 0.05). Postoperatively, the PVV increased, while the PVD decreased in the two groups, with the study cohort demonstrating superior outcomes compared to the control cohort (*P* < 0.05) (Table 3).

Comparison of serum parameters between the two groups

Preoperatively, no statistically significant differences were observed in the PLT, RBC, or WBC between the two patient

Table 2 Comparison of variceal status between the two groups [*n* (%)]

Item		Study group (<i>n</i> = 50)	Control group (<i>n</i> = 42)	Z	P value
Prior to surgery	Absence	0 (0.00)	0 (0.00)	0.533	0.465
	Mild	9 (18.00)	5 (11.90)		
	Moderate	20 (40.00)	17 (40.48)		
	Severe	21 (42.00)	20 (47.62)		
One month postoperatively	Absence	19 (38.00)	4 (9.52)	5.269	0.022
	Mild	16 (32.00)	21 (50.00)		
	Moderate	9 (18.00)	10 (23.81)		
	Severe	6 (12.00) ^a	7 (16.67) ^a		

^a*P* < 0.05 compared to preoperative values.**Table 3 Comparison of hemodynamics between the two groups (mean ± SD)**

Item		Study group (<i>n</i> = 50)	Control group (<i>n</i> = 42)	<i>t</i>	P value
PVV (cm/s)	Preoperatively	13.42 ± 3.05	13.86 ± 3.17	0.677	0.500
	Postoperatively	43.28 ± 9.61 ^a	37.81 ± 7.14 ^a	3.048	0.003
PVD (cm)	Preoperatively	1.55 ± 0.30	1.53 ± 0.31	0.314	0.755
	Postoperatively	1.21 ± 0.23 ^a	1.34 ± 0.26 ^a	2.544	0.013

^a*P* < 0.05 compared to preoperative values.

PVV: Portal vein flow velocity; PVD: Portal vein diameter.

Table 4 Comparison of serum parameters between the two groups (mean ± SD)

Item		Study group (<i>n</i> = 50)	Control group (<i>n</i> = 42)	<i>t</i>	P value
PLT (× 10 ⁹ /L)	Preoperatively	84.37 ± 16.38	85.19 ± 15.92	0.242	0.809
	Postoperatively	134.17 ± 22.35 ^a	115.64 ± 19.15 ^a	4.225	0.001
RBC (× 10 ¹² /L)	Preoperatively	3.21 ± 0.72	3.18 ± 0.73	0.198	0.844
	Postoperatively	3.31 ± 0.65	3.29 ± 0.67	0.145	0.885
WBC (× 10 ⁹ /L)	Preoperatively	4.41 ± 0.75	4.39 ± 0.76	0.127	0.900
	Postoperatively	5.54 ± 0.92 ^a	5.08 ± 0.86 ^a	2.461	0.016

^a*P* < 0.05 compared to preoperative values.

PLT: Platelet count; RBC: Red blood cell count; WBC: White blood cell count.

cohorts (*P* > 0.05). Postoperatively, the PLT and WBC counts were 134.17 ± 22.35 × 10⁹/L and 5.54 ± 0.92 × 10⁹/L, respectively, which were greater than the PLT (134.17 ± 22.35 × 10⁹/L) and WBC (5.08 ± 0.86) counts, respectively, in the control group. This difference was statistically significant (*P* < 0.05). Nevertheless, with regard to RBC, the study cohort had an RBC count of 3.31 ± 0.65 × 10¹²/L, whereas the control cohort had an RBC count of 3.29 ± 0.67 × 10¹²/L; moreover, no marked difference was detected between the two groups (*P* = 0.885) (Table 4).

Comparison of liver function between the two groups

Preoperatively, there were no discernible differences in the serum ALB, TBIL, or AST levels between the two cohorts of patients (*P* > 0.05). Postoperatively, the patients in the study group had an ALB level of 32.41 ± 4.96 g/L, a TBIL level of 34.81 ± 7.79 μmol/L, and an AST level of 75.39 ± 9.81 U/L. The control group exhibited an ALB concentration of 33.74 ± 6.62 g/L, a TBIL concentration of 33.01 ± 8.11 μmol/L, and an AST concentration of 74.47 ± 8.25 U/L. No difference was detected between the two patient cohorts (*P* > 0.05) (Table 5).

Table 5 Comparison of liver function between the two groups (mean \pm SD)

Item		Study group (n = 50)	Control group (n = 42)	t	P value
ALB (g/L)	Preoperatively	30.75 \pm 6.24	31.29 \pm 5.37	0.440	0.661
	Postoperatively	32.41 \pm 4.96 ns	33.74 \pm 6.62 ns	1.100	0.274
TBIL (μ mol/L)	Preoperatively	33.16 \pm 8.05	31.86 \pm 6.92	0.822	0.413
	Postoperatively	34.81 \pm 7.79 ns	33.01 \pm 8.11 ns	1.083	0.282
AST (U/L)	Preoperatively	76.49 \pm 7.17	77.28 \pm 7.02	0.531	0.596
	Postoperatively	75.39 \pm 9.81 ns	74.47 \pm 8.25 ns	0.481	0.632

ns: $P > 0.05$ compared to preoperative levels.

ALB: Albumin; TBIL: Total bilirubin; AST: Aspartate transaminase.

Table 6 Comparison of quality of life between the two groups (mean \pm SD)

Item		Study group (n = 50)	Control group (n = 42)	t	P value
Social function	Preoperatively	49.89 \pm 4.17	49.92 \pm 4.35	0.034	0.973
	Postoperatively	78.36 \pm 3.81 ^a	75.50 \pm 3.66 ^a	3.651	< 0.001
Psychological function	Preoperatively	48.30 \pm 5.07	48.85 \pm 4.96	0.523	0.602
	Postoperatively	70.16 \pm 5.83 ^a	65.28 \pm 5.19 ^a	4.203	< 0.001
Physical function	Preoperatively	45.69 \pm 6.58	46.41 \pm 6.75	0.517	0.607
	Postoperatively	65.25 \pm 7.39 ^a	60.67 \pm 6.98 ^a	3.037	0.003
Material life condition	Preoperatively	46.29 \pm 5.11	46.57 \pm 5.13	0.261	0.794
	Postoperatively	63.81 \pm 6.78 ^a	60.62 \pm 5.75 ^a	2.407	0.018

^a $P < 0.05$ compared to preoperative values.

Table 7 Comparison of re-bleeding and survival rates between the two groups [n (%)]

Item	Study group (n = 50)	Control group (n = 42)	χ^2	P value
Re-bleeding rate	11 (22.00)	18 (42.86)	4.600	0.032
Survival rate	31 (62.00)	22 (52.38)	0.865	0.352

Comparison of quality of life between the two groups

Preceding surgery, there were no differences in the scores on various dimensions of quality of life between the two cohorts ($P > 0.05$). Subsequent to surgery, the scores for each dimension of quality of life surpassed the preoperative values in both groups. Specifically, within the study cohort, the social function, psychological function, physical function, and material life condition scores were 78.36 \pm 3.81, 70.16 \pm 5.83, 65.25 \pm 7.39, and 63.81 \pm 6.78, respectively. These scores were all higher than those within the control cohort, which were 75.50 \pm 3.66, 65.28 \pm 5.19, 60.67 \pm 6.98, and 60.62 \pm 5.75, respectively. The differences were statistically significant ($P < 0.05$) (Table 6).

Comparison of rebleeding and survival rates between the two groups

One year after surgery, the rebleeding rate within the study group was 22.00% (11/50), which was significantly lower than the rebleeding rate observed in the control group (42.86%; 18/42) ($P < 0.05$). The one-year survival rate within the study cohort was 62.00% (31/50), and in contrast to the survival rate of 52.38% (22/42) in the control group, the difference was not statistically significant ($P > 0.05$) (Table 7).

DISCUSSION

In the context of liver cirrhosis, hepatic tissues undergo diffuse fibrosis, culminating in the impedance of portal venous drainage, augmented pressure, and the initiation of EGVB[8]. While pharmacological interventions can proficiently ma-

nage bleeding in individuals with cirrhotic EGVB, they encounter challenges in eradicating varices and are linked to extended treatment durations, thereby yielding suboptimal efficacy[9]. Endoscopic treatments fail to provide definitive resolution of recurrent bleeding among EGVB patients, and repeated interventions are often necessary, which may hinder patient acceptance[10]. Despite the efficacy of surgical procedures for managing EGVB, their application is limited by significant trauma, a heightened incidence of postoperative complications, and inapplicability to individuals with severely impaired preoperative liver function. Consequently, these factors limit the clinical utility of these methods[8]. With recent advancements in medical technology, interventional therapies have gradually been applied in the treatment of cirrhotic EGVB and have garnered significant attention from clinicians[11-13]. Consequently, the search for an effective interventional treatment modality holds substantial significance in improving patient prognosis.

TIPS placement is classified as an interventional therapy and involves the establishment of a shunt channel between the portal and hepatic veins to embolize varicose veins. This process reduces portal vein pressure and alleviates variceal severity, effectively controlling bleeding[14-16]. PTVE is also categorized as an interventional therapy that utilizes liquid embolism agents to occlude varicose veins and employs a spring coil to embolize the main trunk of the gastric coronary vein, achieving hemostasis[17-19]. In this research, the postoperative variceal conditions within the study cohort were superior to both the preoperative conditions and the control group, suggesting that TIPS may be more efficacious at ameliorating variceal conditions in patients with cirrhotic EGVB. Concerning these rationales, PTVE accomplishes hemostasis by modifying the distribution of portal vein blood flow, leading to an increase in portal vein blood flow and intensification of portal venous pressure, thereby yielding suboptimal enhancement in varicose veins. On the other hand, TIPS achieves hemostasis by establishing a shunt channel between the portal and hepatic veins, diverting a portion of blood in the portal vein into the systemic circulation. This process promotes a decrease in portal vein pressure, thereby alleviating the severity of varicose veins[20-23]. Colombato[24] reported that TIPS placement demonstrated excellent hemostatic efficacy (95%) and a low rebleeding rate (< 20%)[24]. In our work, the postoperative PVV within the study cohort was greater than both the preoperative value and the control group, whereas the PVD was lower than both the preoperative value and the control group. These findings are consistent with those of the aforementioned study, suggesting that TIPS is more effective than PTVE at improving the portal venous hemodynamics of cirrhotic EGVB patients. This may be attributed to TIPS inducing a reduction in portal venous pressure by establishing a shunt channel, consequently abating vascular resistance and augmenting blood flow velocity. The utilization of a GORE stent enables precise control over the size of the shunt channel, thereby facilitating optimal blood flow dynamics within the channel[25-27]. Studies have shown that cirrhotic EGVB patients experience splenomegaly due to elevated portal vein pressure, which leads to hypersplenism and attenuated PLT and WBC counts and other parameters[28]. In our research, the postoperative PLT and WBC counts within the study group were greater than the preoperative values and those in the control group, suggesting that TIPS, compared to PTVE, is more effective at ameliorating the splenic function and increasing the PLT and WBC counts in cirrhotic EGVB patients. This improvement can be related to the ability of TIPS to reduce portal vein pressure, thereby alleviating or preventing hypersplenism[29-32]. Cirrhotic EGVB patients inherently suffer from impaired liver function, and the stress and inflammatory response substances elicited during and subsequent to interventional treatments need to be cleared by the liver. Hence, interventional treatments might exacerbate the burden on patients' liver function[33]. Nonetheless, in our research, no differences were detected in the preoperative or postoperative levels of ALB, TBIL, or AST between the two cohorts, revealing that both TIPS and PTVE have certain safety profiles in the treatment of cirrhotic EGVB patients and do not significantly impact liver function. Here, the postoperative quality of life scores across all dimensions within the research cohort surpassed both the preoperative scores and those of the control group, suggesting the superior efficacy of TIPS over PTVE in enhancing the postoperative quality of life for cirrhotic EGVB patients. This improvement may be associated with TIPS being more effective at mitigating the severity of varices and bolstering recovery[34-36]. Furthermore, our investigation revealed a 22.00% rebleeding rate within the research cohort at the one-year mark, in contrast with the 42.86% rate observed in the control group. This finding implies that TIPS is more effective than PTVE at reducing the one-year postoperative rebleeding rate in cirrhotic EGVB patients. This effect may be related to the improvement in portal venous pressure and hemodynamics achieved by TIPS. Additionally, our study revealed no substantial difference in one-year postoperative survival rates between the two cohorts, indicating a favorable prognosis for both TIPS and PTVE in the treatment of patients afflicted by cirrhotic EGVB.

CONCLUSION

In summary, in the management of EGVB in cirrhotic patients, TIPS placement is an effective and safe therapeutic option. It dramatically mitigates the severity of varices and hemodynamics, aiding cirrhotic patients in alleviating their condition, averting the onset of complications, elevating the quality of life, and attaining superior treatment outcomes. Our study established a theoretical foundation for advocating TIPS as a primary intervention for patients afflicted with cirrhosis complicated by EGVB. However, it is essential to acknowledge the limitations inherent in our investigation. First, this study adopted a retrospective design rather than a randomized controlled trial, thereby introducing the potential for selection bias and confounding factors. Second, the absence of long-term follow-up data represents a notable limitation, as sustained observation is imperative for comprehending alterations in patient survival and quality of life in the context of TIPS treatment.

ARTICLE HIGHLIGHTS

Research background

The transjugular intrahepatic portosystemic shunt (TIPS) is an important method for treating upper gastrointestinal bleeding caused by portal hypertension in patients with liver cirrhosis. Nevertheless, additional research endeavors are needed to elucidate the precise therapeutic efficacy of TIPS for managing variceal bleeding and to discern its implications for patient prognosis.

Research motivation

The primary objective of this study was to scrutinize the efficacy of TIPS for the management of esophageal-gastric variceal bleeding (EGVB) in individuals with cirrhosis and to evaluate its consequential influence on patient prognosis. This study endeavors to meticulously assess the advantageous outcomes associated with TIPS, aiming to furnish evidence-based insights that can inform and enhance clinical decision-making processes.

Research objectives

Through in-depth research on the therapeutic effect and prognosis of TIPS placement, this paper aimed to provide additional comprehensive information for clinical doctors to better guide treatment decision-making and improve disease management.

Research methods

A retrospective study was undertaken involving 92 patients afflicted with cirrhotic EGVB who were admitted to our hospital between September 2020 and September 2022. The patient cohort was dichotomized into two groups based on distinct treatment modalities: The TIPS treatment group ($n = 50$) and the percutaneous transhepatic variceal embolization treatment group ($n = 42$). Comparative analyses were also conducted on the varicosity status, hemodynamic parameters, and quality of life of the patients in both groups, both preoperatively and postoperatively. Additionally, a comparative examination was undertaken to evaluate the 1-year rebleeding and survival rates between the two treatment groups.

Research results

Postoperative varicosity improved in both groups, with the study group showing better outcomes. Portal vein flow velocity increased and portal vein diameter decreased postoperatively, again with the study group demonstrating superior results. Postoperative platelet count and white blood cell counts were greater in both groups, and the study group had higher scores in all dimensions of life quality. Furthermore, compared with those in the control group, the one-year rebleeding rate in the study group was notably lower, although no significant difference was detected in the one-year postoperative survival rate between the two cohorts.

Research conclusions

TIPS treatment has demonstrated robust efficacy in the management of cirrhotic EGVB by significantly diminishing varicosity and enhancing hemodynamics in affected patients. This intervention not only represents a safer alternative but also contributes to a more favorable prognosis in this clinical context.

Research perspectives

Cirrhosis, as a grave and chronic ailment, profoundly influences both the quality of life and the life expectancy of afflicted individuals. Consequently, a thorough exploration of treatment modalities and prognosis pertaining to EGVB induced by cirrhosis is of paramount importance, as this review offers invaluable insights and reference points for clinicians engaged in clinical practice.

FOOTNOTES

Author contributions: Hu XG and Lu KP designed the study; Hu XG and Dai JJ wrote the manuscript; Hu XG, Lu J, Li G, Deng Y, and Wang JM performed the experiments; Hu XG, Dai JJ and Feng R analyzed the data; Lu KP revised and reviewed the manuscript; and all the authors read and approved the final manuscript.

Institutional review board statement: The study was approved by Ethics Committee of Affiliated Jinhua Hospital, Zhejiang University School of Medicine.

Informed consent statement: The data used in the study were not involved in the patients' privacy information, and all patient data obtained, recorded, and managed only used for this study, without any harm to the patient. So the informed consent was waived by the Ethics Committee of Affiliated Jinhua Hospital, Zhejiang University School of Medicine.

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REFERENCES

1. Ginès P, Krag A, Abraldes JG, Solà E, Fabrellas N, Kamath PS. Liver cirrhosis. *Lancet* 2021; **398**: 1359-1376 [PMID: 34543610 DOI: 10.1016/S0140-6736(21)01374-X]
2. Zaman A, Chalasani N. Bleeding caused by portal hypertension. *Gastroenterol Clin North Am* 2005; **34**: 623-642 [PMID: 16303574 DOI: 10.1016/j.gtc.2005.08.008]
3. McCormick PA, O'Keefe C. Improving prognosis following a first variceal haemorrhage over four decades. *Gut* 2001; **49**: 682-685 [PMID: 11600472 DOI: 10.1136/gut.49.5.682]
4. Liu B, Li G. Progress in Endoscopic and Interventional Treatment of Esophagogastric Variceal Bleeding. *Dis Markers* 2022; **2022**: 2940578 [PMID: 35571609 DOI: 10.1155/2022/2940578]
5. Chikamori F, Ito S, Sharma N. Percutaneous transhepatic obliteration for life-threatening bleeding after endoscopic variceal ligation in a patient with severe esophagogastric varices. *Radiol Case Rep* 2023; **18**: 624-630 [PMID: 36471734 DOI: 10.1016/j.radcr.2022.10.105]
6. Lv Y, Chen H, Luo B, Bai W, Li K, Wang Z, Xia D, Guo W, Wang Q, Li X, Yuan J, Cai H, Xia J, Yin Z, Fan D, Han G. Transjugular intrahepatic portosystemic shunt with or without gastro-oesophageal variceal embolisation for the prevention of variceal rebleeding: a randomised controlled trial. *Lancet Gastroenterol Hepatol* 2022; **7**: 736-746 [PMID: 35588750 DOI: 10.1016/S2468-1253(22)00087-5]
7. Parvinian A, Gaba RC. Outcomes of TIPS for Treatment of Gastroesophageal Variceal Hemorrhage. *Semin Intervent Radiol* 2014; **31**: 252-257 [PMID: 25177086 DOI: 10.1055/s-0034-1382793]
8. Lin ZP, Chen SL, Wang JY, Liu F, Tan Q, Peng QF, Zhao JB. [Comparison of the curative effect of transjugular intrahepatic portosystemic shunt with expanded polytetrafluoroethylene-covered stent and drug combined with gastroscopy as the secondary prevention of esophageal - gastric variceal bleeding in portal hypertension]. *Zhonghua Gan Zang Bing Za Zhi* 2020; **28**: 672-678 [PMID: 32911906 DOI: 10.3760/cma.j.cn501113-20190723-00266]
9. Wu CK, Yang SC, Liang CM, Li YC, Yeh WS, Tai WC, Lee CH, Yang YH, Hsu CN, Tsai TH, Chuah SK. The role of antibiotics in upper gastrointestinal bleeding among cirrhotic patients without major complications after endoscopic hemostasis. *J Gastroenterol Hepatol* 2020; **35**: 777-787 [PMID: 31674688 DOI: 10.1111/jgh.14873]
10. Kovacs TOG, Jensen DM. Varices: Esophageal, Gastric, and Rectal. *Clin Liver Dis* 2019; **23**: 625-642 [PMID: 31563215 DOI: 10.1016/j.cld.2019.07.005]
11. Vizzutti F, Schepis F, Arena U, Fanelli F, Gitto S, Aspise S, Turco L, Dragoni G, Laffi G, Marra F. Transjugular intrahepatic portosystemic shunt (TIPS): current indications and strategies to improve the outcomes. *Intern Emerg Med* 2020; **15**: 37-48 [PMID: 31919780 DOI: 10.1007/s11739-019-02252-8]
12. Tripathi D, Stanley AJ, Hayes PC, Travis S, Armstrong MJ, Tsochatzis EA, Rowe IA, Roslund N, Ireland H, Lomax M, Leithead JA, Mehrzad H, Aspinall RJ, McDonagh J, Patch D. Transjugular intrahepatic portosystemic stent-shunt in the management of portal hypertension. *Gut* 2020; **69**: 1173-1192 [PMID: 32114503 DOI: 10.1136/gutjnl-2019-320221]
13. Inchingolo R, Posa A, Mariappan M, Tibana TK, Nunes TF, Spiliopoulos S, Brountzos E. Transjugular intrahepatic portosystemic shunt for Budd-Chiari syndrome: A comprehensive review. *World J Gastroenterol* 2020; **26**: 5060-5073 [PMID: 32982109 DOI: 10.3748/wjg.v26.i34.5060]
14. Lv Y, Fan D, Han G. Transjugular intrahepatic portosystemic shunt for portal hypertension: 30 years experience from China. *Liver Int* 2023; **43**: 18-33 [PMID: 35593016 DOI: 10.1111/liv.15313]
15. Lee HL, Lee SW. The role of transjugular intrahepatic portosystemic shunt in patients with portal hypertension: Advantages and pitfalls. *Clin Mol Hepatol* 2022; **28**: 121-134 [PMID: 34571587 DOI: 10.3350/cmh.2021.0239]
16. Ahmed O, Yu Q. Transjugular Intrahepatic Portosystemic Shunt Placement: Entering the Era of Controlled Expansion. *Cardiovasc Intervent Radiol* 2023; **46**: 823-824 [PMID: 37138106 DOI: 10.1007/s00270-023-03450-w]
17. Jiang N, Wang WS, Zhu XL, Shen J. Liver failure after percutaneous transhepatic variceal embolization: A case report. *Asian J Surg* 2023; **46**: 2857-2858 [PMID: 36737331 DOI: 10.1016/j.asjsur.2023.01.096]
18. Ji K, Li X, Zhu H, Zhao S, Zhan P, Shi Y, Ye S, Xie B, Zhang Y, Yu P, Ren Z, Ding J, Han X, Li Z. A creatinine-based model for predicting recurrent bleeding after modified percutaneous transhepatic variceal embolization in patients with cirrhosis. *J Interv Med* 2022; **5**: 95-102 [PMID: 35936666 DOI: 10.1016/j.jimed.2022.03.007]
19. Zhang K, Sun X, Wang G, Zhang M, Wu Z, Tian X, Zhang C. Treatment outcomes of percutaneous transhepatic variceal embolization versus transjugular intrahepatic portosystemic shunt for gastric variceal bleeding. *Medicine (Baltimore)* 2019; **98**: e15464 [PMID: 31045824 DOI: 10.1097/MD.00000000000015464]
20. Parikh A, Leon D, Ghasemi Rad M, Wynne D, Amaresh A. Percutaneous Transhepatic Embolization of a Bleeding Colic Vein in a Cirrhotic Patient With Massive Hematochezia: A Case Report and Literature Review. *Cureus* 2022; **14**: e25736 [PMID: 35812565 DOI: 10.7759/cureus.25736]
21. Ohs Z, Jones M, Sharma N, Loveridge K. Percutaneous Transhepatic Embolization of Ectopic Varices in a Patient With Portal Hypertension

- Presenting With Hemorrhagic Shock. *Cureus* 2021; **13**: e18209 [PMID: 34589375 DOI: 10.7759/cureus.18209]
- 22 **Joseph A**, Lopera J. Transjugular Intrahepatic Portosystemic Shunt Reductions. *Semin Intervent Radiol* 2023; **40**: 44-54 [PMID: 37152796 DOI: 10.1055/s-0043-1764410]
- 23 **Brown MA**, Gueyikian S, Huffman S, Donahue L. Transjugular Intrahepatic Portosystemic Shunt Reduction Techniques. *Semin Intervent Radiol* 2023; **40**: 27-32 [PMID: 37152803 DOI: 10.1055/s-0043-1764286]
- 24 **Colombato L**. The role of transjugular intrahepatic portosystemic shunt (TIPS) in the management of portal hypertension. *J Clin Gastroenterol* 2007; **41** Suppl 3: S344-S351 [PMID: 17975487 DOI: 10.1097/MCG.0b013e318157e500]
- 25 **Trivedi S**, Lam K, Ganesh A, Hasnain Y, Hassan W, Herren J, Gaba RC. Hepatic Encephalopathy after Transjugular Intrahepatic Portosystemic Shunt Creation. *Semin Intervent Radiol* 2023; **40**: 9-14 [PMID: 37152788 DOI: 10.1055/s-0043-1764282]
- 26 **Ferral H**, Lopez-Benitez R. The History of the Transjugular Intrahepatic Portosystemic Shunt. *Semin Intervent Radiol* 2023; **40**: 19-20 [PMID: 37152791 DOI: 10.1055/s-0043-1764284]
- 27 **Deltenre P**, Zanetto A, Saltini D, Moreno C, Schepis F. The role of transjugular intrahepatic portosystemic shunt in patients with cirrhosis and ascites: Recent evolution and open questions. *Hepatology* 2023; **77**: 640-658 [PMID: 35665949 DOI: 10.1002/hep.32596]
- 28 **Bucsics T**, Lampichler K, Vierziger C, Schoder M, Wolf F, Bauer D, Simbrunner B, Hartl L, Jachs M, Scheiner B, Trauner M, Gruenberger T, Karnel F, Mandorfer M, Reiberger T. Covered Transjugular Intrahepatic Portosystemic Shunt Improves Hypersplenism-Associated Cytopenia in Cirrhosis. *Dig Dis Sci* 2022; **67**: 5693-5703 [PMID: 35301618 DOI: 10.1007/s10620-022-07443-6]
- 29 **Thornburg B**. Hepatic Encephalopathy following Transjugular Intrahepatic Portosystemic Shunt Placement. *Semin Intervent Radiol* 2023; **40**: 262-268 [PMID: 37484451 DOI: 10.1055/s-0043-1769770]
- 30 **Lopera JE**. A Comprehensive Review of Transjugular Intrahepatic Portosystemic Shunt-Related Complications. *Semin Intervent Radiol* 2023; **40**: 55-72 [PMID: 37152793 DOI: 10.1055/s-0043-1767670]
- 31 **Vizzutti F**, Celsa C, Calvaruso V, Enea M, Battaglia S, Turco L, Senzolo M, Nardelli S, Miraglia R, Roccarina D, Campani C, Saltini D, Caporali C, Indulti F, Gitto S, Zanetto A, Di Maria G, Bianchini M, Pecchini M, Aspate S, Di Bonaventura C, Citone M, Guasconi T, Di Benedetto F, Arena U, Fanelli F, Maruzzelli L, Riggio O, Burra P, Colecchia A, Villa E, Marra F, Cammà C, Schepis F. Mortality after transjugular intrahepatic portosystemic shunt in older adult patients with cirrhosis: A validated prediction model. *Hepatology* 2023; **77**: 476-488 [PMID: 35921493 DOI: 10.1002/hep.32704]
- 32 **Barth KH**. Transjugular Intrahepatic Portosystemic Shunt versus Endoscopic Variceal Ligation, an Unequal Competition. *Radiology* 2023; **308**: e231774 [PMID: 37606568 DOI: 10.1148/radiol.231774]
- 33 **Rajesh S**, George T, Philips CA, Ahamed R, Kumbar S, Mohan N, Mohanan M, Augustine P. Transjugular intrahepatic portosystemic shunt in cirrhosis: An exhaustive critical update. *World J Gastroenterol* 2020; **26**: 5561-5596 [PMID: 33088154 DOI: 10.3748/wjg.v26.i37.5561]
- 34 **Herren JL**, Shah KY, Patel M, Niemeyer MM. Intravascular Ultrasound for Transjugular Intrahepatic Portosystemic Shunt Creation: "TIPS" and Tricks. *Semin Intervent Radiol* 2023; **40**: 212-220 [PMID: 37333747 DOI: 10.1055/s-0043-1768609]
- 35 **Bhatia Kapoor P**, Benjamin J, Tripathi H, Patidar Y, Maiwall R, Kumar G, Joshi YK, Sarin SK. Post-transjugular Intrahepatic Portosystemic Shunt Hepatic Encephalopathy: Sarcopenia Adds Insult to Injury. *Turk J Gastroenterol* 2023; **34**: 406-412 [PMID: 36620928 DOI: 10.5152/tjg.2023.21964]
- 36 **Abuelazm MT**, Cheema HA, Jafar U, Awad AK, Atef M, Abdalshafy H, Alashwah M, Shahid A, Awan RU, Afifi AM, Jalal PK, Aziz H. Transjugular intrahepatic portosystemic shunt with or without variceal embolization to prevent variceal rebleeding: an updated meta-analysis. *Expert Rev Gastroenterol Hepatol* 2023; **17**: 741-751 [PMID: 37306478 DOI: 10.1080/17474124.2023.2223974]



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