

World Journal of *Clinical Cases*

World J Clin Cases 2019 January 26; 7(2): 122-259



ORIGINAL ARTICLE**Case Control Study**

- 122 Short-term efficacy of natural orifice specimen extraction surgery for low rectal cancer
Hu JH, Li XW, Wang CY, Zhang JJ, Ge Z, Li BH, Lin XH

- 130 Correlation analysis of collagen proportionate area in Budd-Chiari syndrome: A preliminary clinicopathological study
He FL, Li C, Liu FQ, Qi XS

Retrospective Cohort Study

- 137 Combination of serum gamma-glutamyltransferase and alkaline phosphatase in predicting the diagnosis of asymptomatic choledocholithiasis secondary to cholecystolithiasis
Mei Y, Chen L, Zeng PF, Peng CJ, Wang J, Li WP, Du C, Xiong K, Leng K, Feng CL, Jia JH

Retrospective Study

- 145 New metastatic lymph node classification for early gastric cancer should differ from those for advanced gastric adenocarcinoma: Results based on the SEER database
Lin JX, Lin JP, Li P, Xie JW, Wang JB, Lu J, Chen QY, Cao LL, Lin M, Tu RH, Zheng CH, Huang CM

SYSTEMATIC REVIEW

- 156 Interventions to improve sarcopenia in cirrhosis: A systematic review
Naseer M, Turse EP, Syed A, Dailey FE, Zatreh M, Tahan V
- 171 Clinical significance of exosomes as potential biomarkers in cancer
Wong CH, Chen YC

CASE REPORT

- 191 Cardiac involvement in disseminated diffuse large B-cell lymphoma, successful management with chemotherapy dose reduction guided by cardiac imaging: A case report and review of literature
Al-Mehisen R, Al-Mohaisen M, Yousef H
- 203 Two cases of variant late infantile ceroid lipofuscinosis in Jordan
Nafi O, Ramadan B, Riess O, Buchert R, Froukh T
- 209 Cecal lipoma with subclinical appendicitis: A case report
Tsai KJ, Tai YS, Hung CM, Su YC

- 215** Concomitant adenosquamous carcinoma and cystadenocarcinoma of the extrahepatic bile duct: A case report
Lu BJ, Cao XD, Yuan N, Liu NN, Azami NL, Sun MY
- 221** Metastatic low-grade endometrial stromal sarcoma with sex cord and smooth muscle differentiation: A case report
Zhu Q, Sun YQ, Di XQ, Huang B, Huang J
- 228** Successful treatment of invasive fungal rhinosinusitis caused by *Cunninghamella*: A case report and review of the literature
Liu YC, Zhou ML, Cheng KJ, Zhou SH, Wen X, Chang CD
- 236** Sarcomatoid carcinoma of the pancreas: A case report
Zhou DK, Gao BQ, Zhang W, Qian XH, Ying LX, Wang WL
- 242** Collision carcinoma of squamous cell carcinoma and small cell neuroendocrine carcinoma of the larynx: A case report and review of the literature
Yu Q, Chen YL, Zhou SH, Chen Z, Bao YY, Yang HJ, Yao HT, Ruan LX
- 253** Surgical treatment of malignant biliary papillomatosis invading adjacent organs: A case report
Xiao Y, Zhao J, Wu H, Xie KL, Wan Y, Xu XW, Zhang YG

ABOUT COVER

Associate Editor of *World Journal of Clinical Cases*, Shuhei Yoshida, MD, PhD, Assistant Professor, Division of Gastroenterology, Yachiyo Medical Center, Tokyo Women’s Medical University, Chiba 276-8542, Japan

AIMS AND SCOPE

World Journal of Clinical Cases (*World J Clin Cases*, *WJCC*, online ISSN 2307-8960, DOI: 10.12998) is a peer-reviewed open access academic journal that aims to guide clinical practice and improve diagnostic and therapeutic skills of clinicians.

The primary task of *WJCC* is to rapidly publish high-quality Autobiography, Case Report, Clinical Case Conference (Clinicopathological Conference), Clinical Management, Diagnostic Advances, Editorial, Field of Vision, Frontier, Medical Ethics, Original Articles, Clinical Practice, Meta-Analysis, Minireviews, Review, Therapeutics Advances, and Topic Highlight, in the fields of allergy, anesthesiology, cardiac medicine, clinical genetics, clinical neurology, critical care, dentistry, dermatology, emergency medicine, endocrinology, family medicine, gastroenterology and hepatology, geriatrics and gerontology, hematology, immunology, etc.

INDEXING/ABSTRACTING

World Journal of Clinical Cases (*WJCC*) is now indexed in PubMed, PubMed Central, Science Citation Index Expanded (also known as SciSearch®), and Journal Citation Reports/Science Edition. The 2018 Edition of Journal Citation Reports cites the 2017 impact factor for *WJCC* as 1.931 (5-year impact factor: N/A), ranking *WJCC* as 60 among 154 journals in Medicine, General and Internal (quartile in category Q2).

RESPONSIBLE EDITORS FOR THIS ISSUE

Responsible Electronic Editor: *Yun-Xiaojuan Wu* Proofing Editorial Office Director: *Jin-Lei Wang*

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Semimonthly

EDITORS-IN-CHIEF

Dennis A Bloomfield, Sandro Vento

EDITORIAL BOARD MEMBERS

<https://www.wjnet.com/2307-8960/editorialboard.htm>

EDITORIAL OFFICE

Jin-Lei Wang, Director

PUBLICATION DATE

January 26, 2019

COPYRIGHT

© 2019 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjnet.com/bpg/gerinfo/240>

PUBLICATION MISCONDUCT

<https://www.wjnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>

Case Control Study

Correlation analysis of collagen proportionate area in Budd-Chiari syndrome: A preliminary clinicopathological study

Fu-Liang He, Chuan Li, Fu-Quan Liu, Xing-Shun Qi

ORCID number: Fu-Liang He (0000-0003-1643-1465); Chuan Li (0000-0002-1130-9260); Fu-Quan Liu (0000-0001-7710-6135); Xing-Shun Qi (0000-0002-9448-6739).

Author contributions: He FL, Li C, and Liu FQ contributed equally as co-first authors; Liu FQ and Qi XS designed the study; He FL, Li C, and Qi XS wrote the manuscript.

Supported by the National Natural Science Foundation of China, No. 81500474; and Training Programme Foundation for Beijing Talents, No. 2016000021469G206.

Institutional review board

statement: The study was approved by the ethics committee of Beijing Shijitan Hospital of the Capital Medical University.

Informed consent statement: All patients gave informed consent.

Conflict-of-interest statement: No conflict of interest.

STROBE statement: The STROBE checklist has been confirmed.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See:

Fu-Liang He, Fu-Quan Liu, Department of Interventional Therapy, Beijing Shijitan Hospital, Capital Medical University, Beijing 100038, China

Chuan Li, Xing-Shun Qi, Liver Cirrhosis Study Group, Department of Gastroenterology, General Hospital of Shenyang Military Area, Shenyang 110016, Liaoning Province, China

Chuan Li, Section of Medical Services, General Hospital of Shenyang Military Area, Shenyang 110016, Liaoning Province, China

Corresponding author: Xing-Shun Qi, MD, Vice-Chief Physician, Liver Cirrhosis Study Group, Department of Gastroenterology, General Hospital of Shenyang Military Area, No. 83 Wenhua Road, Shenyang 110016, Liaoning Province, China. xingshunqi@126.com

Telephone: +86-24-28897606

Fax: +86-24-28851113

Abstract**BACKGROUND**

Collagen proportionate area (CPA) is an important index for assessing the severity of liver fibrosis. Budd-Chiari syndrome can frequently progress to liver fibrosis and cirrhosis. CPA might play an important role in the pathological progress of Budd-Chiari syndrome.

AIM

To explore the role of CPA in predicting the outcomes of patients with Budd-Chiari syndrome.

METHODS

Nine patients with Budd-Chiari syndrome undergoing transjugular intrahepatic portosystemic shunt (TIPS) were included. The median CPA level and correlation of CPA and prognosis of TIPS were determined.

RESULTS

Median CPA was 23.07% (range: 0%-40.20%). Pearson's χ^2 test demonstrated a significant correlation of CPA with history of gastrointestinal bleeding (Pearson's coefficient: 0.832, $P = 0.005$), alanine aminotransferase (Pearson's coefficient: -0.694, $P = 0.038$), and prothrombin time (Pearson's coefficient: 0.68, $P = 0.044$). Although CPA was not significantly correlated with shunt dysfunction or hepatic encephalopathy after TIPS, the absolute CPA was relatively larger in patients who developed shunt dysfunction or hepatic encephalopathy after TIPS.

CONCLUSION

<http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Unsolicited manuscript

Received: October 19, 2018

Peer-review started: October 19, 2018

First decision: November 15, 2018

Revised: December 1, 2018

Accepted: December 12, 2018

Article in press: December 12, 2018

Published online: January 26, 2019

This preliminary clinicopathological study found a marginal effect of CPA on the outcomes of Budd-Chiari syndrome patients treated with TIPS.

Key words: Budd-Chiari syndrome; Hepatic vein; Occlusion; Thrombosis; Fibrosis

©The Author(s) 2019. Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: In the nine patients recruited for the study, we found a marginal effect of collagen proportionate area on the outcomes of Budd-Chiari syndrome patients treated with transjugular intrahepatic portosystemic shunt.

Citation: He FL, Li C, Liu FQ, Qi XS. Correlation analysis of collagen proportionate area in Budd-Chiari syndrome: A preliminary clinicopathological study. *World J Clin Cases* 2019; 7(2): 130-136

URL: <https://www.wjgnet.com/2307-8960/full/v7/i2/130.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v7.i2.130>

INTRODUCTION

Liver histology represents a clinically important tool for assessing the severity of liver fibrosis and the presence of liver cirrhosis in chronic liver diseases^[1]. The conventional liver histological assessment systems, such as Knodell, Metavir, and Ishak scores, are semi-quantitative^[2-4]. Recently, collagen proportionate area (CPA), a novel parameter that is fully quantitative for assessing the fibrotic area in liver tissues, has been developed and widely explored. CPA refers to the ratio of the area of collagen to the area of tissue. Early studies found that CPA was significantly correlated with Ishak stage, and that CPA, but not Ishak stage, was independently associated with hepatic venous pressure gradient^[5]. Additionally, CPA can predict the risk of decompensation in liver transplant recipients with hepatitis C virus infection^[6] and compensated cirrhotic patients with hepatitis C virus infection^[7]. Evidence also suggests that CPA, rather than Laennec, Kumar, and Nagula semi-quantitative sub-classification parameters, septal thickness, and nodule size, predicts the risk of further decompensation in cirrhotic patients^[8].

Budd-Chiari syndrome refers to the obstruction of hepatic venous outflow from hepatic veins to supra-hepatic inferior vena cava^[9-11] and is classified as acute, subacute, and chronic according to the rapidity and extension of occlusion and clinical presentations^[12]. Patients with acute and subacute forms of Budd-Chiari syndrome can present with acute hepatic failure due to extensive necrosis of hepatic tissues^[10,11]. Most patients with the chronic form of Budd-Chiari syndrome progress to liver fibrosis and cirrhosis because of long-term hepatic congestion, and they often present with portal hypertension-related gastrointestinal hemorrhage as well as leg ulcers and abdominal varices^[13].

Severity of liver fibrosis and cirrhosis may reflect the disease status of Budd-Chiari syndrome. Until now, the role of CPA has not been analyzed in patients with Budd-Chiari syndrome. We conducted a preliminary clinicopathological study to analyze the correlation between CPA and clinical and laboratory variables and clinical outcomes in such patients.

MATERIALS AND METHODS

We retrospectively reviewed patients with Budd-Chiari syndrome who were admitted to the Beijing Shijitan Hospital of the Capital Medical University who underwent transjugular intrahepatic portosystemic shunt (TIPS) between August 2016 and July 2017. Budd-Chiari syndrome was diagnosed according to the current consensus and practice guideline^[10,11]. All eligible patients underwent contrast-enhanced computed tomography (CT) before TIPS and had liver biopsy specimens collected during TIPS procedures. Computer-assisted digital image analyses of picroSirius red stained liver histological sections were performed to calculate the CPA.

We collected data regarding demographic profile, history of other liver diseases,

location of the obstruction, clinical presentations and signs, CT findings, and major laboratory test results. We recorded shunt dysfunction, hepatic encephalopathy and death events, time of shunt dysfunction and hepatic encephalopathy development, and time of death during follow-up. The patients were followed until February 2018, the last visit, or death.

Continuous data are presented as means with standard deviation and median with range. The categorical data are presented as frequency with percentage. Pearson's χ^2 test was performed to explore the correlation of CPA with other variables. Pearson's coefficient with *P* value was calculated. A two-side *P* value of < 0.05 was considered statistically significant. All statistical analyses were performed using SPSS Statistics version 19.0.0 software (Armonk, NY, United States).

RESULTS

Nine patients (four males and five females) with Budd-Chiari syndrome were included. Median age was 29 years (range: 12-60 years). Patient characteristics are shown in [Table 1](#). Among them, six patients had obstruction of all major hepatic veins, two patients had obstruction of inferior vena cava, three patients had a history of gastrointestinal bleeding, and seven patients had hepatic patchy enhancement on CT. Median CPA was 23.07% (range: 0%-40.20%). Two patients developed shunt dysfunction after TIPS and had a CPA of 32.5% and 23.07%, respectively. One patient developed hepatic encephalopathy after TIPS and had the largest CPA (40.2%). No patient died during follow-up.

CPA was significantly correlated with prior history of gastrointestinal bleeding (Pearson's coefficient: 0.832, *P* = 0.005), alanine aminotransferase (Pearson's coefficient: -0.694, *P* = 0.038), and prothrombin time (Pearson's coefficient: 0.68, *P* = 0.044) ([Table 2](#)). There was, however, no significant correlation between CPA and shunt dysfunction (Pearson's coefficient: -0.168, *P* = 0.665) and hepatic encephalopathy (Pearson's coefficient: -0.453, *P* = 0.221) after TIPS.

DISCUSSION

Budd-Chiari syndrome is a rare vascular liver disease, which can progress into liver cirrhosis. Currently, TIPS is the mainstay treatment option for Budd-Chiari syndrome^[4]. Despite favorable survival of patients with Budd-Chiari syndrome^[5], a majority of patients treated with TIPS will experience adverse events, such as shunt dysfunction and/or hepatic encephalopathy. Common risk factors for the development of shunt dysfunction include type of stent and inferior vena cava obstruction. Risk factors for the development of hepatic encephalopathy include age, prior hepatic encephalopathy, and type of stent^[1]. The present study for the first time explored whether CPA can predict the outcomes of Budd-Chiari syndrome patients after TIPS. However, we did not find any significant association of CPA with shunt dysfunction or hepatic encephalopathy. This unexpected phenomenon might be mainly attributed to the fact that this disease is so rare, and only nine patients were included. Additional explanation for this phenomenon could be the small proportion of patients who developed shunt dysfunction (*n* = 2/9) and hepatic encephalopathy (*n* = 1/9) in the present study. Indeed, it should be noted that only one patient developed hepatic encephalopathy, and this patient had the largest CPA (40.2%) among the included patients. Two patients developed shunt dysfunction and had a CPA equal to or beyond the median value (32.5% and 23.07%). This preliminary result encourages us to enlarge the sample size and confirm the predictive role of CPA.

Our study also found that CPA was positively associated with prior history of gastrointestinal bleeding and prothrombin time at baseline but negatively associated with alanine aminotransferase. These findings can be explained by the following fact. First, in patients with Budd Chiari syndrome, gastrointestinal bleeding is mainly attributed to the development of portal hypertension and secondary variceal bleeding, which is closely associated with progression of liver fibrosis. Second, prothrombin time is an important component of Child-Pugh and model for end-stage liver disease (commonly known as MELD) scores for assessing the outcomes of liver cirrhosis^[16,17]. Third, a higher level of alanine aminotransferase reflects less frequent liver fibrosis but more frequent liver cell necrosis in patients with Budd Chiari syndrome^[18].

In conclusion, this preliminary clinicopathological study found a marginal effect of CPA on the outcomes of Budd-Chiari syndrome patients treated with TIPS. Further study with a larger sample size should be carried out to confirm the present findings.

Table 1 Patient characteristics

Variable	n	Frequency [n (%), or mean ± SD]	Median (range)
Age	9	30.00 ± 15.75	29.00 (12.00-60.00)
Gender (male/female)	9	4 (44.4)/5 (55.6)	
Hepatitis B virus	9	0 (0)	
Hepatitis C virus	9	0 (0)	
Alcohol abuse	9	0 (0)	
Vascular obstruction			
IVC obstruction	9	2 (22.2)	
RHV obstruction	9	8 (88.9)	
MHV obstruction	9	7 (77.8)	
LHV obstruction	9	9 (100.0)	
All HVs obstruction	9	6 (66.7)	
Portal vein thrombosis	9	0 (0)	
Clinical presentations and signs			
Hepatic encephalopathy before TIPS	9	0 (0)	
Gastrointestinal bleeding	9	3 (33.3)	
Abdominal pain	9	2 (22.2)	
Abdominal distension	9	7 (77.8)	
Abdominal varices	9	1 (11.1)	
Limb swelling	9	1 (11.1)	
Pigmentation	9	1 (11.1)	
Limb ulcer	9	1 (11.1)	
CT signs			
Hydrothorax on CT	9	3 (33.3)	
Ascites on CT	9	4 (44.4)	
Splenomegaly on CT	9	8 (88.9)	
Hepatic patchy enhancement on CT	9	7 (77.8)	
Gastroesophageal varices on CT	9	7 (77.8)	
Paraesophageal varices on CT	9	1 (11.1)	
Laboratory tests			
Hemoglobin (g/L)	9	122.67 ± 34.81	127.00 (82.00-171.00)
White blood cell (10 ⁹ /L)	9	6.86 ± 2.85	6.67 (2.99-12.48)
Platelet count (10 ⁹ /L)	9	122.22 ± 69.32	109.00 (42.00-270.00)
Alanine aminotransferase (U/L)	9	29.22 ± 17.56	23.00 (13.00-71.00)
Aspartate aminotransferase (U/L)	9	47.22 ± 20.97	39.00 (18.00-71.00)
Alkaline phosphatase (U/L)	9	178.33 ± 69.20	148.00 (96.00-288.00)
Gamma glutamyl transferase (U/L)	9	93.44 ± 42.21	84.00 (19.00-161.00)
Total bilirubin (mmol/L)	9	86.98 ± 91.81	42.80 (18.90-262.40)
Direct bilirubin (mmol/L)	9	57.71 ± 68.42	17.30 (6.20-180.00)
Albumin (g/L)	9	36.19 ± 7.08	39.60 (22.20-44.10)
Prothrombin time (s)	9	55.67 ± 15.33	56.00 (25.00-78.00)
International normalized ratio	9	1.48 ± 0.43	1.37 (1.12-2.55)
Serum creatinine (mmol/L)	9	51.00 ± 14.65	50.00 (29.00-76.00)
Blood urea nitrogen (mmol/L)	9	5.06 ± 1.51	5.15 (2.94-8.27)
Sodium (mmol/L)	9	134.78 ± 8.56	138.00 (120.00-143.00)
Potassium (mmol/L)	9	4.33 ± 0.64	4.17 (3.77-5.77)
Collagen proportionate area	9	23.44 ± 13.88	23.07 (0-40.20)
Shunt dysfunction after TIPS	9	2 (22.2)	
Hepatic encephalopathy after TIPS	9	1 (11.1)	

CT: Computer tomography; HV: Hepatic vein; IVC: Inferior vena cava; LHV: Left hepatic vein; MHV: Middle hepatic vein; RHV: Right hepatic vein; TIPS: Transjugular intrahepatic portosystemic shunt.

Table 2 Correlation analysis of collagen proportionate area

Variable	n	Pearson coefficient	P value
Age	9	0.360	0.342
Gender (male/female)	9	0.038	0.922
Hepatitis B virus	9	NA	NA
Hepatitis C virus	9	NA	NA
Alcohol abuse	9	NA	NA
Vascular obstruction			
IVC obstruction	9	-0.390	0.300
RHV obstruction	9	-0.502	0.168
MHV obstruction	9	-0.136	0.726
LHV obstruction	9	NA	NA
All HVs obstruction	9	-0.455	0.218
Portal vein thrombosis	9	NA	NA
Clinical presentations and signs			
Hepatic encephalopathy before TIPS	9	NA	NA
Gastrointestinal bleeding	9	0.832	0.005
Abdominal pain	9	-0.257	0.504
Abdominal distension	9	-0.093	0.813
Abdominal varices	9	-0.342	0.367
Limb swelling	9	-0.233	0.547
Pigmentation	9	-0.342	0.367
Limb ulcer	9	NA	NA
CT signs			
Hydrothorax on CT	9	0.142	0.716
Ascites on CT	9	-0.012	0.975
Splenomegaly on CT	9	-0.502	0.168
Hepatic patchy enhancement on CT	9	-0.037	0.924
Gastroesophageal varices on CT	9	0.219	0.572
Paraesophageal varices on CT	9	0.633	0.067
Laboratory tests			
Hemoglobin (g/L)	9	0.157	0.687
White blood cell (10 ⁹ /L)	9	-.025	0.949
Platelet count (10 ⁹ /L)	9	0.242	0.530
Alanine aminotransferase (U/L)	9	-0.694	0.038
Aspartate aminotransferase (U/L)	9	-0.642	0.062
Alkaline phosphatase (U/L)	9	-0.358	0.344
Gamma glutamyl transferase (U/L)	9	0.080	0.837
Total bilirubin (μmol/L)	9	-0.338	0.373
Direct bilirubin (μmol/L)	9	-0.415	0.267
Albumin (g/L)	9	0.348	0.358
Prothrombin time (seconds)	9	0.68	0.044
International normalized ratio	9	-0.638	0.065
Serum creatinine (μmol/L)	9	0.019	0.962
Blood urea nitrogen (mmol/L)	9	-0.411	0.272
Sodium (mmol/L)	9	0.272	0.478
Potassium (mmol/L)	9	-0.376	0.319
Shunt dysfunction after TIPS	9	-0.168	0.665
Hepatic encephalopathy after TIPS	9	-0.453	0.221

CT: Computed tomography; HV: Hepatic vein; IVC: Inferior vena cava; LHV: Left hepatic vein; MHV: Middle hepatic vein; RHV: Right hepatic vein; TIPS: Transjugular intrahepatic portosystemic shunt; NA: Not available.

ARTICLE HIGHLIGHTS

Research background

Collagen proportionate area (CPA) is an important index for assessing the severity of liver fibrosis. Budd-Chiari syndrome can frequently progress to liver fibrosis and cirrhosis.

Research motivation

Clinically, we found that CPA might play an important role in the pathological progress of Budd-Chiari syndrome. We designed the study to investigate this hypothesis.

Research objectives

We conducted a preliminary clinicopathological study to explore the role of CPA in predicting the outcomes of patients with Budd-Chiari syndrome.

Research methods

Nine patients with Budd-Chiari syndrome undergoing transjugular intrahepatic portosystemic shunt (TIPS) were included. The median CPA level, correlation of CPA and patients' history, and correlation of CPA and prognosis of TIPS were conducted.

Research results

The median CPA was 23.07% (range: 0%-40.20%). Pearson's χ^2 test demonstrated a significant correlation of CPA with a history of gastrointestinal bleeding (Pearson's coefficient: 0.832, $P = 0.005$), alanine aminotransferase (Pearson's coefficient: -0.694, $P = 0.038$), and prothrombin time (Pearson's coefficient: 0.68, $P = 0.044$). Although CPA was not significantly correlated with shunt dysfunction or hepatic encephalopathy after TIPS, the absolute CPA was relatively larger in patients who developed shunt dysfunction or hepatic encephalopathy after TIPS.

Research conclusions

This preliminary clinicopathological study found a marginal effect of CPA on the outcomes of Budd-Chiari syndrome patients treated with TIPS. This study provides a new perspective for predicting the outcome of Budd-Chiari syndrome. In the future, more patients could be recruited in the study.

Research perspectives

In the future studies of Budd-Chiari syndrome and portal hypertension, emphasis should be placed on the correlation of pathological changes and outcomes of TIPS.

REFERENCES

- 1 **Germani G**, Hytioglou P, Fotiadu A, Burroughs AK, Dhillon AP. Assessment of fibrosis and cirrhosis in liver biopsies: an update. *Semin Liver Dis* 2011; **31**: 82-90 [PMID: 21344353 DOI: 10.1055/s-0031-1272836]
- 2 **Knodel RG**, Ishak KG, Black WC, Chen TS, Craig R, Kaplowitz N, Kiernan TW, Wollman J. Formulation and application of a numerical scoring system for assessing histological activity in asymptomatic chronic active hepatitis. *Hepatology* 1981; **1**: 431-435 [PMID: 7308988 DOI: 10.1002/hep.1840010511]
- 3 **Desmet VJ**, Gerber M, Hoofnagle JH, Manns M, Scheuer PJ. Classification of chronic hepatitis: diagnosis, grading and staging. *Hepatology* 1994; **19**: 1513-1520 [PMID: 8188183]
- 4 **Ishak K**, Baptista A, Bianchi L, Callea F, De Groote J, Gudat F, Denk H, Desmet V, Korb G, MacSween RN. Histological grading and staging of chronic hepatitis. *J Hepatol* 1995; **22**: 696-699 [PMID: 7560864 DOI: 10.1016/0168-8278(95)80226-6]
- 5 **Calvaruso V**, Burroughs AK, Standish R, Manousou P, Grillo F, Leandro G, Maimone S, Pleguezuelo M, Xirouchakis I, Guerrini GP, Patch D, Yu D, O'Beirne J, Dhillon AP. Computer-assisted image analysis of liver collagen: relationship to Ishak scoring and hepatic venous pressure gradient. *Hepatology* 2009; **49**: 1236-1244 [PMID: 19133646 DOI: 10.1002/hep.22745.]
- 6 **Manousou P**, Dhillon AP, Isgro G, Calvaruso V, Luong TV, Tsochatzis E, Xirouchakis E, Kalambokis G, Cross TJ, Rolando N, O'Beirne J, Patch D, Thornburn D, Burroughs AK. Digital image analysis of liver collagen predicts clinical outcome of recurrent hepatitis C virus 1 year after liver transplantation. *Liver Transpl* 2011; **17**: 178-188 [PMID: 21280191 DOI: 10.1002/lt.22209]
- 7 **Calvaruso V**, Di Marco V, Bavetta MG, Cabibi D, Conte E, Bronte F, Simone F, Burroughs AK, Craxi A. Quantification of fibrosis by collagen proportionate area predicts hepatic decompensation in hepatitis C cirrhosis. *Aliment Pharmacol Ther* 2015; **41**: 477-486 [PMID: 25580867 DOI: 10.1111/apt.13051]
- 8 **Tsochatzis E**, Bruno S, Isgro G, Hall A, Theocharidou E, Manousou P, Dhillon AP, Burroughs AK, Luong TV. Collagen proportionate area is superior to other histological methods for sub-classifying cirrhosis and determining prognosis. *J Hepatol* 2014; **60**: 948-954 [PMID: 24412606 DOI: 10.1016/j.jhep.2013.12.023]
- 9 **Martens P**, Nevens F. Budd-Chiari syndrome. *United European Gastroenterol J* 2015; **3**: 489-500 [PMID: 26668741]
- 10 **Valla DC**. Primary Budd-Chiari syndrome. *J Hepatol* 2009; **50**: 195-203 [PMID: 19012988 DOI: 10.1016/j.jhep.2008.10.007.]
- 11 **DeLeve LD**, Valla DC, Garcia-Tsao G; American Association for the Study Liver Diseases. Vascular disorders of the liver. *Hepatology* 2009; **49**: 1729-1764 [PMID: 19399912 DOI: 10.1002/hep.22772]
- 12 **Menon KV**, Shah V, Kamath PS. The Budd-Chiari syndrome. *N Engl J Med* 2004; **350**: 578-585 [PMID: 14762185 DOI: 10.1056/NEJMra020282]
- 13 **Qi X**, Han G. Images in clinical medicine. Abdominal-wall varices in the Budd-Chiari syndrome. *N Engl J*

- Med* 2014; **370**: 1829 [PMID: 24806162 DOI: 10.1056/NEJMicm1308567]
- 14 **He F**, Zhao H, Dai S, Wu Y, Wang L, Huang H, Yue Z, Fan Z, Dong X, Liu F. Transjugular intrahepatic portosystemic shunt for Budd-Chiari syndrome with diffuse occlusion of hepatic veins. *Sci Rep* 2016; **6**: 36380 [PMID: 27805025 DOI: 10.1038/srep36380]
- 15 **Qi X**, Ren W, Wang Y, Guo X, Fan D. Survival and prognostic indicators of Budd-Chiari syndrome: a systematic review of 79 studies. *Expert Rev Gastroenterol Hepatol* 2015; **9**: 865-875 [PMID: 25754880 DOI: 10.1586/17474124.2015.1024224]
- 16 **Shin SU**, Lee JM, Yu MH, Yoon JH, Han JK, Choi BI, Glaser KJ, Ehman RL. Prediction of esophageal varices in patients with cirrhosis: usefulness of three-dimensional MR elastography with echo-planar imaging technique. *Radiology* 2014; **272**: 143-153 [PMID: 24620910 DOI: 10.1148/radiol.14130916]
- 17 **Kamath PS**, Kim WR; Advanced Liver Disease Study Group. The model for end-stage liver disease (MELD). *Hepatology* 2007; **45**: 797-805 [PMID: 17326206 DOI: 10.1002/hep.21563]
- 18 **Rautou PE**, Moucari R, Cazals-Hatem D, Escolano S, Denié C, Douarin L, Francoz C, Durand F, Ozenne V, Imbert A, Moreau R, Lebec D, Plessier A, Valla D. Levels and initial course of serum alanine aminotransferase can predict outcome of patients with Budd-Chiari syndrome. *Clin Gastroenterol Hepatol* 2009; **7**: 1230-1235 [PMID: 19560555 DOI: 10.1016/j.cgh.2009.06.011]

P- Reviewer: Goldaracena N, Park J

S- Editor: Wang JL **L- Editor:** Filipodia **E- Editor:** Wu YXJ





Published By Baishideng Publishing Group Inc
7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
Telephone: +1-925-2238242
Fax: +1-925-2238243
E-mail: bpgoffice@wjgnet.com
Help Desk: <https://www.f6publishing.com/helpdesk>
<https://www.wjgnet.com>

