Hepatology International (2021) 15:575–578
https://doi.org/10.1007/s12072-021-10192-9

EDITORIAL

A community of portal hypertension

Xiaolong Qi[1] · Yifei Huang[1] · Michael Pavlides[2] · Don C. Rockey[3]

Received: 5 March 2021 / Accepted: 15 April 2021 / Published online: 12 May 2021

Introduction

Portal hypertension is an important, if not the most important, factor affecting the clinical course of patients with cirrhosis, as it can predict the development of cirrhosis-related complications, such as variceal bleeding, ascites, and hepatic encephalopathy [1–3]. The management of portal hypertension should cover early screening and detection, primary prevention of complications, emergency care for variceal bleeding, and secondary prevention. Here, we propose a concept termed "A Community of Portal Hypertension" (Fig. 1), emphasizing multidisciplinary team (MDT)-oriented practice, innovation-oriented research, and patient-oriented care, to promote comprehensive management of portal hypertension.

MDT-oriented practice

The complexity of patients with portal hypertension is reflected in the current guidelines that span a range of disciplines, including hepatology, gastroenterology, interventional radiology, hepatobiliary surgery, laboratory medicine, radiology, pathology, and others [2, 3]. The opportunities for MDT approaches to manage portal hypertension are illustrated by available strategies to reduce portal pressure or obliterate esophageal varices that include pharmaceutical approaches, endoscopic therapies, interventional radiology procedures, and surgery; for example, pharmacologic therapy (i.e., non-selective beta-blockers in the context of primary and secondary prevention, and somatostatin, and vasopressin analogues in the treatment of active variceal bleeding, act by causing splanchnic vasoconstriction, thereby reducing portal venous inflow), endoscopic therapy (varices can also be obliterated endoscopically), or interventional approaches (i.e., endovascular eradication via balloon occluded retrograde transvenous obliteration). Partial splenic embolization is also an option for some varices, especially in patients with concurrent hypersplenism. Transjugular intrahepatic portosystemic shunting connects the hypertensive portal vein with a normotensive hepatic vein, thereby bypassing the site of increased resistance. Ultimately, liver transplantation eliminates cirrhosis and portal hypertension. The complexity of patients with cirrhosis and portal hypertension who often have significant comorbidities, and the multitude of possible treatment options, necessitate a well-rounded, pragmatic, and multidisciplinary approach.

MDT-oriented practice is a relatively new concept introduced to improve full-course management of portal hypertension. Although it requires substantial expertise and critical resources, the MDT approach allows patients to receive well-rounded and individualized care [4, 5]. Through a MDT strategy, patients referred to a dedicated MDT clinic ideally receive a recommendation for individualized management based on disease status, laboratory and imaging findings, as well as the patients' own preference. *Tseng* et al. investigated the role of MDT in the management of gastroesophageal varices secondary to portal hypertension [6]. Overall survival and variceal rebleed were compared between 58 MDT patients and 111 non-MDT patients. The rate of variceal rebleed was significantly higher in the non-MDT group than that in the MDT group (25% vs. 6%, $p < 0.001$), while no difference in overall survival was observed ($p = 0.990$). Thus, the study demonstrated that patients treated using a MDT approach had a significantly lower risk of variceal rebleeding.

In compensated cirrhosis with mild portal hypertension (defined as hepatic venous pressure gradient

Xiaolong Qi and Yifei Huang have contributed equally to this work.

✉ Xiaolong Qi
qixiaolong@vip.163.com

[1] Chinese Portal Hypertension Alliance (CHESS) Center, Institute of Portal Hypertension, The First Hospital of Lanzhou University, Lanzhou, China

[2] Oxford NIHR Biomedical Research Centre, University of Oxford, Oxford, UK

[3] Digestive Disease Research Center, Medical University South Carolina, Charleston, SC, USA

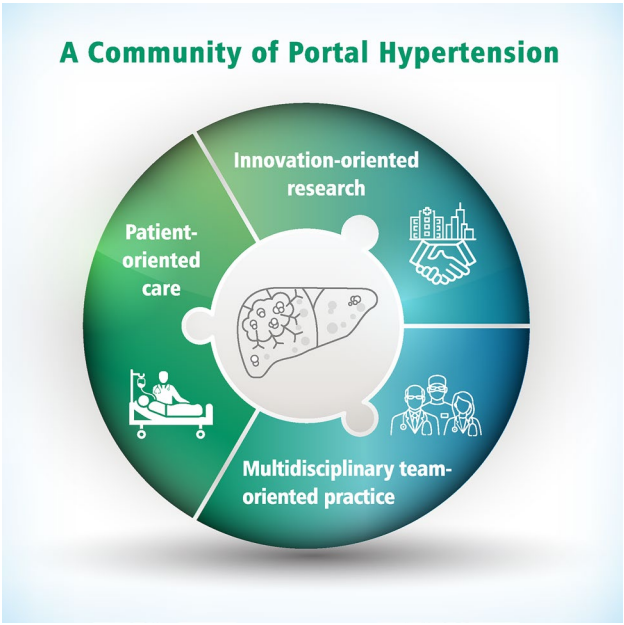

Fig. 1 A community of portal hypertension

[HVPG] > 5 mmHg but < 10 mmHg), the objective of treatment is to prevent the development of clinically significant portal hypertension (defined as HVPG > 10 mmHg) or decompensation, or to promote portal hypertension regression. In these patients, the mainstay of therapy is typically first be directed toward the underlying cause of liver disease [7]. As for patients with compensated cirrhosis and clinically significant portal hypertension but without varices, the objective of treatment should no longer to solely prevent varices, but to prevent clinical decompensation. Ideally, the management strategy for patients with decompensated cirrhosis should be to prevent disease progression (i.e., further decompensation) rather than treating complications only. The ultimate treatment for decompensation would be one that targets primarily pathological alterations within the liver, aiming to restore the integrity of liver architecture. Unfortunately, all current treatment strategies rely on measures aimed to prevent or improve the outcomes including variceal bleeding, ascites, and hepatic encephalopathy.

Recently, *Sun* et al. evaluated the efficacy and safety of endoscopy plus partial splenic embolization treatment in comparison to endoscopic treatment only for the secondary prophylaxis of variceal bleeding in decompensated cirrhosis with hypersplenism [1]. During the 2 years of follow-up, the variceal rebleeding rate was significantly reduced in the combination group compared to that in the endoscopy group (16% vs. 31%, $p < 0.001$). The combination group also showed a significantly lower variceal recurrence rate than the endoscopy group (22% vs. 67%, $p < 0.001$). Thus, this multicenter randomized-controlled trial demonstrated that the strategy of radiological intervention combined with endoscopic therapy led to increased peripheral blood cell counts and improved liver function, and Child–Pugh class [1]. This study emphasizes the important point that multimodality therapy (i.e., a MDT approach) appears to be better than single modality therapy.

Several specialties, in particular oncology, have successfully adopted MDT as routine practice for disease management [5], suggesting that a MDT is an ideal archetype in clinical practice. Of note, there are still some limitations of MDT-oriented practice. For example, in secondary prevention, timing of repeat banding is critical, and must be communicated to all care providers, including the primary doctors [8]. However, MDT-oriented practice may only be feasible in highly integrated networks, where communication is optimized. Examples include large integrated multi-specialty practices or perhaps certain tertiary centers. Additionally, care should ideally include the patient's family members, who should be included in the care model. The different necessities to develop a MDT may be difficult in areas with limited resources, and therefore, timely referral is important.

Innovation-oriented research

Emerging innovative approaches, such as artificial intelligence, machine learning, and three-dimensional modeling, have shown diagnostic and prognostic promise in the field of portal hypertension [9–13]. The reliable identification of clinically significant portal hypertension by noninvasive methods, risk stratification such that only those at high risk undergo invasive procedures like hepatic vein catheterization and endoscopy, and non-invasive monitoring of efficacy of therapy, remain unmet clinical needs that are the subject of intense investigation [14].

It is important to stress that there is a great unmet need for longitudinal studies that include well-characterized patients with different etiologies, cirrhotic stages, and therapeutic interventions. The field of portal hypertension now can plan such studies with scientifically robust designs and innovative technologies. For example, endoscopy is an important part of the diagnostic work-up for patients with portal hypertension, serving as the golden standard to diagnose high-risk varices [2, 3]. However, conventional endoscopy is invasive and poorly tolerated, with many cirrhotic patients declining an endoscopy screening if they are stable and asymptomatic. The Baveno VI consensus statement suggested that patients with liver stiffness (by transient elastography) < 20 kPa and a platelet count > 150,000 had a very low risk of having varices requiring treatment, and may avoid screening endoscopy [2]. Moreover, *Wang* et al. first evaluated an innovative magnetically controlled capsule endoscopy in assessing varices, and concluded that the novel modality was with significantly better

patient satisfaction than conventional endoscopy [15]. Therefore, such innovative technologies provide an important alternative for patients unwilling or unable to undergo endoscopy screening for varices is likely to improve patient care.

Patient-oriented care

It is also noteworthy that there are limited data in the area of patient-oriented care in the field of portal hypertension. Most studies to date have investigated the effectiveness and safety of specific interventions, and with very little research focused on the quality of life from the patient perspective. Patient satisfaction is defined as "the extent of an individual's experience compared with expectations" or "the extent to which healthcare meets general and condition-specific needs", which increasingly contributes to the assessment of quality of medical services and to the achievement of excellence in healthcare. Using endoscopy as an example, the movement to define and then measure aspects of quality for endoscopy first arose from reports of medical errors. Patient satisfaction has since become a key indicator of quality in endoscopy worldwide. The American Society for Gastrointestinal Endoscopy and the European Society for Gastrointestinal Endoscopy recommend the routine collection of quality indicators, including satisfaction, for all patients undergoing gastrointestinal endoscopy [16].

Healthcare costs are currently escalating at a nearly unstoppable pace. The field of portal hypertension is a major contributor, with an increasing number of patients with portal hypertension being treated with expensive treatments (i.e., liver transplantation, new drugs, and novel interventions adopted for management of complications of cirrhosis). Very few studies have focused on the cost-effectiveness of these advances. A limiting factor is the validity of effectiveness data generated from different countries—since financial systems are vesting different. Additionally, if the disease prevalence and incidence rates differ between countries, the cost-effectiveness ratios may be different. Furthermore, there are clearly significant differences in medical insurance and payment levels among different countries. Though *Neuberger* et al. reviewed studies of cost-effectiveness of therapies for ascites and variceal bleeding [17], more data on the cost-effectiveness of portal hypertension management are needed. The current guidelines should consider limitations in medical resources, and the notion of value is critically important in establishing priorities for management of portal hypertension.

Conclusion

"A Community of Portal Hypertension" is proposed to integrate a range of disciplines and care for patients with portal hypertension. The three key components of such a community, including MDT-oriented practice, innovation-oriented research, and patient-oriented care, should be emphasized globally in future portal hypertension research and practice.

Declarations

Conflict of interest Xiaolong Qi, Yifei Huang, Michael Pavlides and Don C. Rockey have declared no conflict of interests related to the study.

Ethical approval This article does not contain any studies with human participants or animals performed by any of authors.

References

1. Sun X, Zhang A, Zhou T, et al. Partial splenic embolization combined with endoscopic therapies and NSBB decreases the variceal rebleeding rate in cirrhosis patients with hypersplenism: a multicenter randomized controlled trial. Hepatol Int 2021. Epub ahead of print.
2. de Franchis R, Baveno VI Faculty. Expanding consensus in portal hypertension: report of the Baveno VI consensus workshop: stratifying risk and individualizing care for portal hypertension. J Hepatol. 2015;63:743–52.
3. Garcia-Tsao G, Abraldes J, Berzigotti A, Bosch J. Portal hypertensive bleeding in cirrhosis: risk stratification, diagnosis, and management: 2016 practice guidance by the American Association for the study of liver diseases. Hepatology. 2017;65:310–35.
4. Taylor C, Munro AJ, Glynne-Jones R, et al. Multidisciplinary team working in cancer: what is the evidence? BMJ. 2010;340:c951.
5. Chinai N, Bintcliffe F, Armstrong EM, et al. Does every patient need to be discussed at a multidisciplinary team meeting? Clin Radiol. 2013;68:780–4.
6. Tseng Y, Ma L, Lv M, et al. The role of a multidisciplinary team in the management of portal hypertension. BMC Gastroenterol. 2020;20:83.
7. Rockey DC, Friedman SL. Fibrosis regression after eradication of hepatitis C virus - from bench to bedside. Gastroenterology. 2021. https://doi.org/10.1053/j.gastro.2020.09.065.
8. James L, Yuanyuan Y, Raymond T, et al. Timing of endoscopy for acute upper gastrointestinal bleeding. N Engl J Med. 2020;382:1299–308.
9. Liu Y, Ning Z, Ormeci N, et al. Deep convolutional neural network-aided detection of portal hypertension in patients with cirrhosis. Clin Gastroenterol Hepatol. 2020;18:2998–3007.
10. Qi X, An W, Liu F, et al. Virtual hepatic venous pressure gradient with ct angiography (CHESS 1601): a prospective multicenter study for the noninvasive diagnosis of portal hypertension. Radiology. 2019;290:370–7.
11. Levick C, Phillips-Hughes J, Collier J, et al. Non-invasive assessment of portal hypertension by multi-parametric magnetic resonance imaging of the spleen: a proof of concept study. PLoS ONE. 2019;14:e0221066.
12. Qi X, Li Z, Huang J, et al. Virtual portal pressure gradient from anatomic CT angiography. Gut. 2015;64:1004–5.
13. Liu F, Ning Z, Liu Y, et al. Development and validation of a radiomics signature for clinically significant portal hypertension in cirrhosis (CHESS1701): a prospective multicenter study. EBioMedicine. 2018;36:151–8.

14. Qi X, Berzigotti A, Cardenas A, Sarin S. Emerging non-invasive approaches for diagnosis and monitoring of portal hypertension. Lancet Gastroenterol Hepatol. 2018;3:708–19.
15. Wang S, Huang Y, Hu W, et al. Detachable string magnetically controlled capsule endoscopy for detecting high-risk varices in compensated advanced chronic liver disease (CHESS1801): a prospective multicenter study. The Lancet. 2021;9:19–23.
16. Hayley H, Wai-Yee C, Laith A, et al. Development and validation of the gastrointestinal endoscopy satisfaction questionnaire (GESQ). Endoscopy. 2015;47:1137–43.
17. Neuberger J, Bryan S. Clinical economics review: cost-effectiveness in the therapy of liver disease. Aliment Pharmacol Ther. 1997;11:61–8.