**Name of Journal:** *World Journal of Clinical Cases*

**Manuscript NO:** 59495

**Manuscript Type:** CASE REPORT

**Gastroesophageal varices in a patient presenting with essential thrombocythemia: A case report**

Wang JB *et al*. A case report of gastroesophageal varices

Jian-Bo Wang, Yang Gao, Jun-Wei Liu, Mu-Gen Dai, Shang-Wen Yang, Bin Ye

**Jian-Bo Wang, Jun-Wei Liu, Mu-Gen Dai, Shang-Wen Yang, Bin Ye,** Department of Gastroenterology, Lishui Hospital of Zhejiang University, Lishui 323000, Zhejiang Province, China

**Yang Gao,** Department of Radiology, Lishui Hospital of Zhejiang University, Lishui 323000, Zhejiang Province, China

**Author contributions:** Wang JB and Gao Y collected and analyzed the data, wrote the manuscript; Liu JW, Dai MG and Yang SW collected and analyzed the data; Ye B designed the study and analyzed the data; all authors have read and approved the manuscript for submission.

**Corresponding author: Bin Ye, MD, Chief Doctor,** Department of Gastroenterology, Lishui Hospital of Zhejiang University, No. 289 Kuocang Road, Lishui 323000, Zhejiang Province, China. 1710469@tongji.edu.cn

**Received:** September 16, 2020

**Revised:** January 3, 2021

**Accepted:** January 28, 2021

**Published online:**

**Abstract**

BACKGROUND

Gastroesophageal varices are a rare complication of essential thrombocythemia (ET). ET is a chronic myeloproliferative neoplasm (MPN) characterized by an increased number of blood platelets.

CASE SUMMARY

A 46-year-old woman, who denied a history of liver disease, was admitted to our hospital on presentation of hematemesis. Laboratory examination revealed a hemoglobin level of 83 g/L, and a platelet count of 397 × 109/L. The appearance of gastric and esophageal varices with red colored signs as displayed by an urgent endoscopy was followed by endoscopic variceal ligation and endoscopic tissue adhesive. Abdominal computed tomography revealed cirrhosis, marked splenomegaly, portal vein thrombosis and portal hypertension. In addition, bone marrow biopsy and evidence of mutated Janus kinase 2, substantiated the onset of ET. The patient was asymptomatic with regular routine blood testing during the 6-mo follow-up period. Therefore, in this case, gastroesophageal varices were induced by ET.

CONCLUSION

MPN should be given considerable attention when performing differential diagnoses in patients with gastroesophageal varices. An integrated approach such as laboratory tests, radiological examination, and pathological biopsy, should be included to allow optimal decisions and management.

**Key Words:** Gastroesophageal varices; Essential thrombocythemia; Non-cirrhotic portal hypertension; Endoscopic variceal ligation; Endoscopic tissue adhesive; Case report

Wang JB, Gao Y, Liu JW, Dai MG, Yang SW, Ye B. Gastroesophageal varices in a patient presenting with essential thrombocythemia: A case report. *World J Clin Cases* 2021; In press

**Core Tip:**Gastroesophageal varices are a rare complication of essential thrombocythemia (ET). This report describes a 46-year-old woman who presented with ET-induced esophageal and gastric varies. ET is a chronic myeloproliferative neoplasm, which should be given considerable attention when performing differential diagnoses in patients with gastroesophageal varices, in order to allow optimal decisions and management.

**INTRODUCTION**

Gastroesophageal variceal hemorrhage is a life-threatening complication of portal hypertension, and demands effective and expedited treatment[1]. Cirrhosis is the most common underlying pathology in the progression of portal hypertension-induced gastroesophageal varices[2]. However, not all cases of hypertension are caused by cirrhosis. Obstruction or compression of the splenic vein can also cause non-cirrhotic portal hypertension, resulting in isolated gastric varices[3]. Essential thrombocythemia (ET) rarely causes extensive esophageal and gastric varices, where isolated gastric varices are predominant. In the present study, we report a patient who presented with ET-induced esophageal and gastric varices.

**CASE PRESENTATION**

***Chief complaints***

A 46-year-old woman was urgently admitted to our hospital due to presentation of hematemesis.

***History of present illness***

Hematemesis occurred without obvious inducement, was dark red in color without abdominal pain, and the patient was conscious.

***History of past illness***

The patient had a history of stroke, but did not have any history of liver disease. She had undergone prior surgery of "endoscopic variceal ligation (EVL)" at another hospital for hematemesis approximately two years ago.

***Physical examination***

Physical examination revealed the absence of palmar erythema, and spider angioma, and neither the skin nor the sclera was icteric. Abdominal examination revealed that the spleen displayed a third-degree swelling, which was accompanied by slight pain to percussion in the hepatic region.

***Laboratory examinations***

Laboratory findings were as follows: white blood cell count of 4.7 × 109/L, hemoglobin level of 83 g/L, and a platelet count of 397 × 109/L (normal reference range 125-350 × 109/L), suggesting a significantly increased platelet count. Prothrombin time and liver function tests, as well as bilirubin and albumin levels showed no abnormalities (Table 1). A hepatitis panel was also negative.

***Imaging examinations***

Abdominal computed tomography (CT) revealed cirrhosis, marked splenomegaly, portal vein thrombosis, portal hypertension, and massive collateral blood vessels in the abdominal cavity (Figure 1).

***Endoscopy***

An immediate endoscopy was performed in this patient who was rushed to our hospital on presentation of hematemesis. Endoscopy findings revealed the presence of varicose veins in the middle and lower regions of the esophagus, and the red colored sign (*i.e.*, a hematocystic spot) in the lower esophagus (Figure 2A) and gastric varices (Figure 2B). No active bleeding was found during endoscopy. Thus, EVL and endoscopic tissue adhesive with endoscopic injection of cyanoacrylate glue were performed.

**MULTIDISCIPLINARY EXPERT CONSULTATION**

We further analyzed the association between the laboratory findings, abdominal CT, and clinical outcome following endoscopy, and found both an elevated platelet count and splenomegaly which are always associated with hematological diseases.

**FINAL DIAGNOSIS**

We considered that the esophageal and gastric varices might be related to hematological diseases. Bone marrow biopsy from the ilium revealed minimal reticulin fibrosis, slightly increased granulocytes and markedly increased megakaryocyte and erythroid counts. Further genetic testing revealed a 40% mutation in Janus kinase 2 (JAK2) V617F. Collectively, these findings led to the diagnosis of ET.

**TREATMENT**

As there were no marked changes in white and red blood cell counts, we advised follow-up with a routine blood examination instead of medical intervention (*e.g.*, hydroxyurea, and anagrelide).

**OUTCOME AND FOLLOW-UP**

The patient was asymptomatic, and the platelet counts were maintained between 350 × 109/L to 450 × 109/L during the 6-mo follow-up period.

**DISCUSSION**

ET, which is a chronic myeloproliferative neoplasm (MPN) is characterized by an unexplained thrombocytosis with a tendency for thrombosis and hemorrhage[4], and has been reported to be caused by mutations in a variety of genes, and most commonly JAK2 (as observed in this patient)[5]. Varicose vein is a relatively rare phenomenon in ET, especially esophageal and gastric varices. In the present case, the patient repeatedly suffered rupture of esophageal and gastric varices, which was accompanied by marked splenomegaly, in the absence of any typical symptoms of cirrhosis. Laboratory examination suggested an increased platelet count, whereas bone marrow biopsy and genetic tests confirmed the diagnosis of ET. In summary, the patient presented with ET, which is considered a cause of portal hypertension, which subsequently resulted in esophageal and gastric varices.

There are various causes of non-cirrhotic portal hypertension, such as obstruction or compression of the splenic vein and portal vein thrombosis[3]. MPN is often accompanied by marked splenomegaly, which might increase the portal vein blood flow which ultimately provokes portal hypertension[6]. Previous reports have demonstrated that a mutation inJAK2inET displays decreased blood flow leading to prolonged interactions between the peripheral blood and sinusoidal endothelial cells with a subsequent induced risk of splanchnic venous thrombosis[7]. Furthermore, visceral or portal vein thrombosis might cause portal hypertension. In this case, abdominal CT is an ineffective diagnostic tool for cirrhosis, as the phenotypic characteristics of cirrhosis shown by abdominal CT might be secondary to portal hypertension as caused by ET. Moreover, ET might also cause portal vein thrombosis within or outside of the liver, which leads to portal hypertension[8]. Hence, liver biopsy should be carried out. Based on this case, even if imaging findings suggest cirrhosis, it is important to integrate laboratory examinations and symptoms to make a comprehensive judgment. In addition, histopathological analysis may still be useful to exclude the diagnosis of cirrhosis.

In the present case, the patient repeatedly suffered rupture of gastroesophageal varices, and a recurrence after "esophageal vein rupture repair", which suggested endoscopic treatment alone is ineffective in preventing disease recurrence, since she remained in a state of ill health. Thus, patients with portal hypertension associated with systemic blood disease need to be evaluated at the clinical level, especially in the context of their optimal therapy. As previously reported by others, splenectomy or splenic embolization, and transjugular intrahepatic portal-hepatic venous shunting might be an effective treatment for regional portal hypertension that can induce gastroesophageal varices[9]. However, splenectomy may not be a suitable option when considering the case presented in this study, as splenectomy might further increase the platelet count, which would ultimately aggravate venous thrombosis[10].

As there were no marked changes in white and red blood cell counts, we did not consider any medical intervention to include hydroxyurea and anagrelide. However, in retrospect, we remain confused about whether a more active medical intervention should be selected with the intent of reducing platelet levels, as well as the risk of thrombosis and sequentially the alleviation of portal pressure, regardless of the normal blood cell levels in patients suffering from repeated varicose rupture bleeding. These gaps in the present findings should be formally addressed and warrant further detailed exploration.

**CONCLUSION**

ET presenting with portal hypertension may cause gastroesophageal varices. We report this case with the aim of providing some useful diagnostic and treatment-associated source references for clinicians that may encounter similar situations in the clinic.

**REFERENCES**

1 **Ibrahim M**, Mostafa I, Devière J. New Developments in Managing Variceal Bleeding. *Gastroenterology* 2018; **154**: 1964-1969 [PMID: 29481777 DOI: 10.1053/j.gastro.2018.02.023]

2 **Bosch J**, Iwakiri Y. The portal hypertension syndrome: etiology, classification, relevance, and animal models. *Hepatol Int* 2018; **12**: 1-10 [PMID: 29064029 DOI: 10.1007/s12072-017-9827-9]

3 **Hernández-Gea V**, Baiges A, Turon F, Garcia-Pagán JC. Idiopathic Portal Hypertension. *Hepatology* 2018; **68**: 2413-2423 [PMID: 30066417 DOI: 10.1002/hep.30132]

4 **Nimer SD**. Essential thrombocythemia: another "heterogeneous disease" better understood? *Blood* 1999; **93**: 415-416 [PMID: 9885202 DOI: 10.1182/blood.V93.2.415]

5 **Morgan KJ**, Gilliland DG. A role for JAK2 mutations in myeloproliferative diseases. *Annu Rev Med* 2008; **59**: 213-222 [PMID: 17919086 DOI: 10.1146/annurev.med.59.061506.154159]

6 **SHALDON S**, SHERLOCK S. Portal hypertension in the myeloproliferative syndrome and the reticuloses. *Am J Med* 1962; **32**: 758-764 [PMID: 13911166 DOI: 10.1016/0002-9343(62)90165-1]

7 **Khanna R**, Sarin SK. Idiopathic portal hypertension and extrahepatic portal venous obstruction. *Hepatol Int* 2018; **12**: 148-167 [PMID: 29464506 DOI: 10.1007/s12072-018-9844-3]

8 **Blendis LM**, Banks DC, Ramboer C, Williams R. Spleen blood flow and splanchnic haemodynamics in blood dyscrasia and other splenomegalies. *Clin Sci* 1970; **38**: 73-84 [PMID: 5411484 DOI: 10.1042/cs0380073]

9 **Khanna R**, Sarin SK. Non-cirrhotic portal hypertension - diagnosis and management. *J Hepatol* 2014; **60**: 421-441 [PMID: 23978714 DOI: 10.1016/j.jhep.2013.08.013]

10 **Hatsuse M**, Taminishi Y, Maegawa-Matsui S, Fuchida SI, Inaba T, Murakami S, Shimazaki C. [Latent essential thrombocythemia becoming perceptible after splenectomy]. *Rinsho Ketsueki* 2019; **60**: 387-391 [PMID: 31168000 DOI: 10.11406/rinketsu.60.387]

**Footnotes**

**Informed consent statement:** Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

**Conflict-of-interest statement:** The authors declare that they have no conflict of interest.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (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: http://creativecommons.org/Licenses/by-nc/4.0/

**Manuscript source:** Unsolicited manuscript

**Peer-review started:** September 16, 2020

**First decision:** December 21, 2020

**Article in press:**

**Specialty type:** Medicine, research and experimental

**Country/Territory of origin:** China

**Peer-review report’s scientific quality classification**

Grade A (Excellent): 0

Grade B (Very good): B, B

Grade C (Good): C

Grade D (Fair): 0

Grade E (Poor): 0

**P-Reviewer:** Sarma MS, Swai JD **S-Editor:** Fan JR **L-Editor:** Webster JR **P-Editor:**

**Figure Legends**



**Figure 1 Spleen enlargement, and portal vein thrombosis as shown by the black arrow and a dilatation of portal hypertension on abdominal computed tomography.**



**Figure 2 Endoscopic imaging of the esophagus and gastric fundus.** A: Shows a red color sign (*i.e.*, a hematocystic spot) in the lower esophagus as indicated by the black arrow; B: Gastric fundal varices.

**Table 1** **Laboratory data**

|  |  |  |
| --- | --- | --- |
| **Complete blood count** | **Liver function tests** | **Coagulation function** |
| WBC (109/L) | 4.7 | ALT (U/L) | 25 | PT (s) | 13.5 |
| NEUT, % | 76.7 | AST (U/L) | 22 | APTT (s) | 37.4 |
| LY, % | 12.9 | ALP (U/L) | 56 |  |  |
| MONO, % | 6.1 | γ-GTP (U/L) | 36 |  |  |
| EOS, % | 4.1 | ALB (g/L) | 40.8 |  |  |
| BASO, % | 0.2 | TP (g/L) | 68.5 |  |  |
| RBC (109/L) | 4.13 | AMY (U/L) | 55 |  |  |
| Hb (g/L) | 83 | TBil (μmoL/L) | 16.9 |  |  |
| Ht | 0.276 | HBsAg | (-) |  |  |
| MCV (fl) | 66.9 | HBsAb | (-) |  |  |
| MCH (pg) | 20.1 |  |  |  |  |
| MCHC (g/L) | 301 |  |  |  |  |
| PLT (109/L) | 397 |  |  |  |  |
| PRO | (-) |  |  |  |  |

WBC: White blood cell; NEUT: neutrophil granulocyte; LY: Lymphocyte; MONO: Monocyte; EOS: Eosinocyte; BASO: Basocyte; RBC: Red blood cell; Hb: Hemoglobin; Ht: Hematocrit; MCV: Mean corpuscular volume; MCH: Mean corpuscular hemoglobin; MCHC: Mean corpuscular hemoglobin concentration; Plt: Platelet; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase; ALP: Alkaline phosphatase; γ-GTP: Gamma-glutamyl transpeptidase; Alb: Albumin; TP: Total protein; AMY: amylase; T-Bil: Total bilirubin; PT: Prothrombin time; APTT: Activated partial thromboplastin time; HBsAg: Hepatitis B surface antigen; HBsAb: Hepatitis B surface antibody.