

Hepatic Portal Venous Gas in 91-Year-Old Patient with Good Long-Term Prognosis: A Case Report

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WJ, BX and CM, were responsible for the patients' care. WJ, wrote the original manuscript; WZ, compiled the figures; CM and ZH, reviewed and made multiple revisions to the manuscript. All authors approved the report prior to submission.

1. Abstract

1.1. Introduction: Hepatic portal venous gas(HPVG) are rarely seen. Case: A 91-year-old male patient was referred to our hospital with chief complaints of severe sudden abdominal pain. Hepatic portal venous gas (HPVG) was visible in abdominal CT. Abdominal pain persisted and gradually worsened. The patient underwent laparotomy, small intestine necrosis was confirmed during operation, and bowel resection and intestinal fistulation was performed. After active postoperative support treatments, the patient was cured completely, and after 1 year follow-up, the patient had no complaints. Conclusion: HPVG is a recognized but rarely identified radiological sign, often due to subsequent bowel necrosis, is a poor prognostic indicator, active surgery combined with postoperative intensive treatment can be lifesaving even in advanced age.

2. Introduction

Hepatic portal venous gas(HPVG) is a pathological condition regarded as involving the existence of gas in the portal vein from the superior mesenteric vein and its tributaries to the intrahepatic system, which was first reported by Wolfe and Evans in 1955 in infants [1]. HPVG is not a specific disease, but merely a diagnostic clue for patients with acute abdomen. HPVG is most often seen in patients with intestinal ischemia and necrosis. It is a relatively rare condition and predicts the patient might be in a serious clinical conditions and poor prognosis with high mortality [2]. In recent

years, with the continuous improvement of attention and the development of color ultrasound, CT and other imaging technologies, more and more HPVG has been discovered. Here, we report a case of HPVG related intestinal necrosis in a elderly patient with a long good prognosis.

3. Case Presentation

A 91-year-old patient was referred to our hospital with chief complaints of severe sudden abdominal pain followed by febrile nausea and vomit. His vital signs were stable and abdominal examination showed that he had obvious tenderness, but no rebound pain. His past medical history was as follows: coronary heart disease for more than 10 years, paroxysmal atrial fibrillation for 4 years, hypertension for 7 years, and diabetes for 4 years. Laboratory data indicated a white blood cell count of $9.33 \times 10^9/L$, D-dimer of 281ug/L. Contrast-enhanced CT showed amounts of gas in hepatic portal vein branch, superior mesenteric vein and some branches of the genus, meanwhile part of the small intestine had also gas accompanied by exudation (Figure 1). At the beginning of the disease, the family members of the patient considered the risk of surgery in the elderly patients, and did not agree with the surgical treatment. As the abdominal pain worsened, the patient underwent laparotomy 24 hours later. Visible in the operation: small intestine necrosis about 40cm from the ileocecal area, and the length of necrosis is about 30cm. The diagnosis was intestinal necrosis.

Considering the patient's personal condition of severe intestinal edema, the first-time anastomosis is more likely to have anastomotic leakage, so the bowel resection and intestinal fistulation was chosen. Pathology revealed that: Small intestine was necrotic. Most of the small intestine mucosa was necrotic and lost. Edema, vasodilation, hyperplasia and congestion of submucosa and serosa were seen. Acute and chronic inflammatory cell infiltration is seen throughout the intestinal wall. The patient developed shock after surgery, mainly showing a drop of blood pressure. The cause of shock may be (1) insufficient intake, (2) postoperative infection and (3) cardiogenic shock due to surgery. After active anti-infective, supplemental volume and active supportive treatment, the patient was corrected for shock on the fourth day after surgery. The patient had still nausea and vomiting, increased after eating, during one month after surgery. Review of abdominal CT showed that the hepatic vein, superior mesenteric vein and some of the genus in the anterior segment disappeared. (Figure 2). We had taken active supportive care, such as given intravenous nutrition, gastrointestinal motility drugs, gastrointestinal physiotherapy, etc. The patient was able to eat normally when discharged 2 month after the surgery, without nausea, vomiting. After 2 year follow-up, the patient had no complaints. This case had obtained informed consent of the patient and the family and was approved by The First Hospital of Jilin University Ethics Committee.



Figure 1: Contrast-enhanced CT showed amounts of gas in hepatic portal vein branch



Figure 2: Review of abdominal CT showed that the hepatic vein, superior mesenteric vein and some of the genus in the anterior segment disappeared.

4. Discussion

This case described a super old man with chief complaints of severe sudden abdominal pain, which was quickly diagnosed HPVVG due to high use of CT. HPVVG is not an independent disease and its pathogenesis is not fully understood. Three sources of its origin have been proposed: (1) increase pressure in the bowel lumen or (2) the presence of gas-forming bacteria in the portal venous system and passage of gas into circulation or (3) failure of the mucosal defense [3]. It is usually accompanied by digestive tract diseases, and it often has a relatively short duration. Abdominal diseases other than intestinal necrosis, such as intraperitoneal abscess, gastric ulcer, inflammatory bowel disease, acute enteritis, and bowel obstruction, can also cause HPVVG [4].

Liebman et al reported the mortality of HPVVG was 75% among 64 cases of in 1978 [5]. With the improvement of diagnostic methods including computed tomography(CT) and ultrasonography and emergency surgical technique, the overall mortality of HPVVG has dropped due to earlier diagnosis and effective treatment [6,7]. A Japanese study shows that, of the 1590 HPVVG patients with mean age was 79.3 years old over 5 years, 842 (53%) patients had bowel ischemia as an underlying disease with 271 (32%) patients undergoing surgery and the overall in-hospital mortality was 27.3% [8]. A study [9] that comprised 25 patients who were diagnosed as having HPVVG and/or PI based on computed tomography (CT) findings in the Department of Emergency and Critical Care Medicine, Kansai Medical University Hospital (Osaka, Japan) between April 2013 and August 2017 indicated that the number of sites of HPVVG was associated with bowel necrosis. HPVVG in the older patient is even more suggestive of intestinal necrosis, indicating a necessity for emergency surgery. For this patient, intestinal necrosis was also confirmed during surgery. Early surgical intervention can be life-saving, it still carries high mortality [3, 10-12]. Although HPVVG reports are relatively common in recent years, reports of extremes older patient were rare. Mortality may be higher when the patient of extremes of age with extensive co-morbidities. HPVVG is not by itself a surgical indication and the treatment depends mainly on the underlying disease. The prognosis is related to the pathology itself [13]. Our case was just a super older patient with HPVVG, the difference was that the patient's had a good prognosis after surgery and postoperative support treatment. It appeared that survival in potentially lethal case is dependent on prompt and adequate treatment of the bowel necrosis. Considering the high mortality rate of HPVVG associated with bowel necrosis, the timely diagnosis in all HPVVG patients suspected bowel necrosis and active surgical treatment are necessary. Owing to the high mortality rate of AMI with HPVVG, urgent laparotomy is recommended [14]. Cases with HPVVG with abdominal symptoms leading to generalized peritonitis should undergo an urgent operation [15]. Meanwhile postoperative refinement management and supportive care were also essential, especially for the advanced age patient with more extensive

cardiovascular risk factors and other history diseases.

In conclusion, although HPVG has a high mortality rate of intestinal necrosis and a high risk of surgery in the super elderly, active surgery combined with postoperative intensive treatment can be lifesaving.

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