Journal of Medical Ultrasound (2014) 22, 106–109

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CASE REPORT

Hepatic Portal Venous Gas in a COPD Patient

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Received 29 January 2013; accepted 29 March 2013
Available online 1 May 2014

KEY WORDS
chronic obstructive pulmonary disease (COPD),
hepatic portal venous gas (HPVG)

Although hepatic portal venous gas (HPVG) is usually associated with a grave prognosis, favorable outcomes have been reported in some conditions. A rare case demonstrates the transient occurrence of HPVG in a patient with aerophagia when chronic obstructive pulmonary disease (COPD) occurred, and disappearance after symptoms resolved. The patient's recovery was uneventful and he did not suffer from any abdominal catastrophe. These findings may support the mechanical theory for the occurrence of benign HPVG.

Introduction

Hepatic portal venous gas (HPVG) was first reported in six infants with necrotizing enterocolitis in 1955 [1]. There were more than 1,000 cases in the literature, and the condition was considered to be associated with a high mortality rate (approximately 75%) [2]. Therefore, emergent surgical intervention is required in most patients with HPVG. However, HPVG has occurred during procedures such as nasogastric tube insertion, barium enema, and colofibroscopy [3–5]. We report a case of HPVG that was found during chronic obstructive pulmonary disease (COPD) exacerbation. HPVG spontaneously disappeared within 24 hours after the patient's dyspnea resolved.

Case report

A 70-year-old man who had a medical history of COPD without regular control visited our emergency department because of shortness of breath and mild abdominal distention for 1 day. There was no fever, abdominal pain, vomiting, or change in bowel habits. The patient's vital signs upon arrival to the emergency department were: body temperature 36.5°C, heart rate 106 beats/minute, respiratory rate 24 breaths/minute, and blood pressure 172/100 mmHg. The patient was dyspneic with oral breathing.

Conflicts of interest: The authors have no conflicts of interest to declare.

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0929-6441
http://dx.doi.org/10.1016/j.jmu.2013.10.002

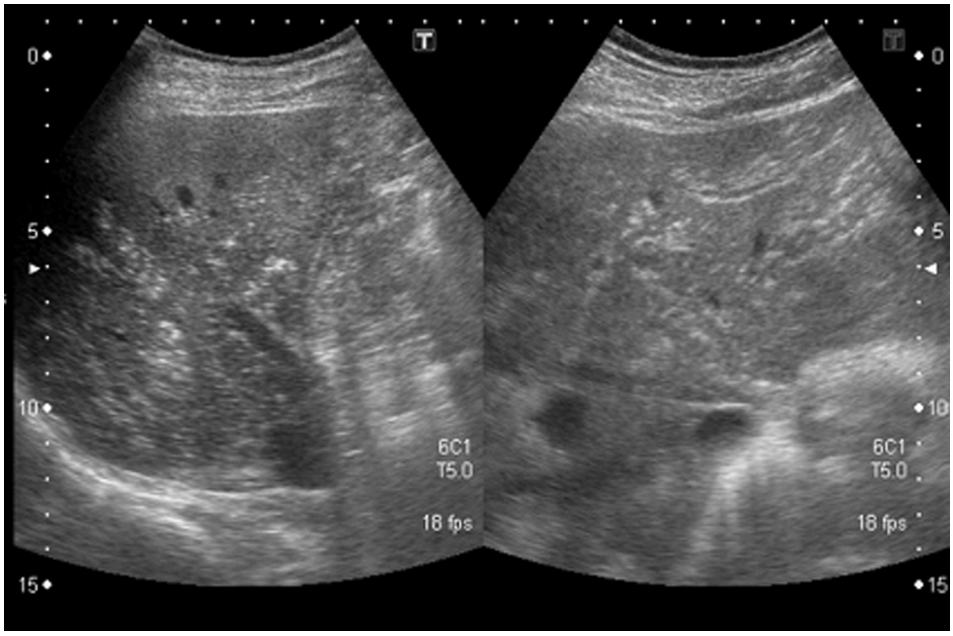

Fig. 1 Abdominal echogram reveals poorly defined, echogenic patches within the hepatic parenchyma, especially in the nondependent part, suggestive of hepatic portal venous gas.

His initial physical examination was unremarkable except for wheezing over bilateral lung fields. A chest X-ray revealed no evidence of pulmonary infiltrates. An abdominal radiograph showed an air-fluid level suggestive of ileus. Bronchodilator and steroid were given for the patient's acute exacerbation of COPD. The laboratory data disclosed no leukocytosis (8820/μl).

Abdominal echogram revealed multiple hyperechoic dots moving within the portal vein system and poorly defined, echogenic patches within the hepatic parenchyma, especially in the nondependent part, suggestive of HPVG (Fig. 1). Abdominal computed tomography (CT), performed to rule out ischemic bowel, showed marked air in the intrahepatic portal vein (Fig. 2) and the superior mesenteric vein (Fig. 3), without bowel obstruction or ischemia.

The patient's symptoms were relieved soon after treatment. Follow-up abdominal echogram within 24 hours

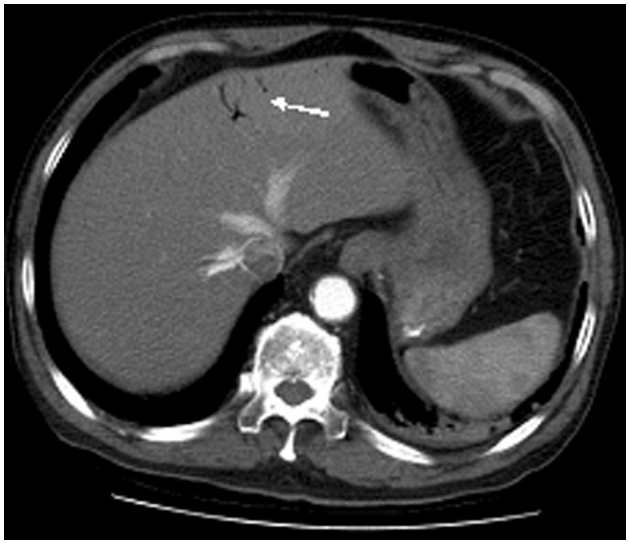

Fig. 2 Abdominal computed tomography showing air in the intrahepatic portal vein (arrow).

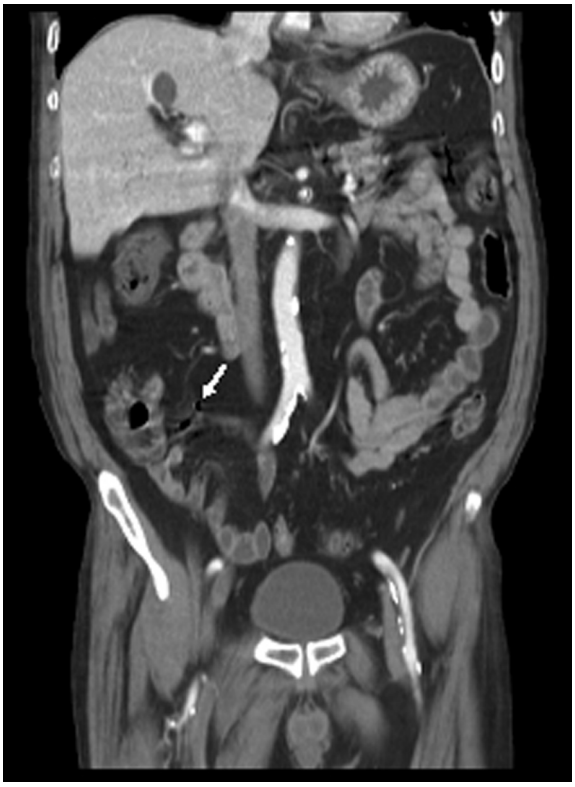

Fig. 3 Abdominal computed tomography showing air in the superior mesenteric vein (arrow).

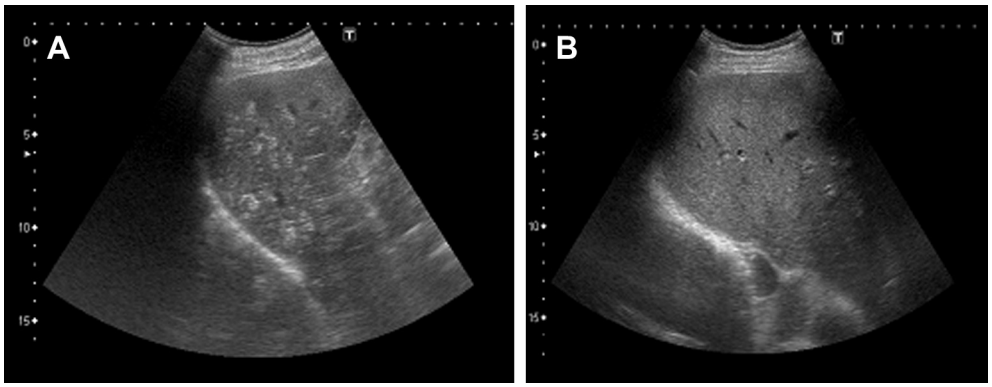

Fig. 4 (A) Abdominal echogram showing the presence of hepatic portal venous gas. (B) Follow-up echogram within 24 hours revealed disappearance of hepatic portal vein gas.

revealed the disappearance of HPVG (Fig. 4). He was discharged 3 days after arrival to the emergency department. No bacteria grew from the blood cultures.

Discussion

Although HPVG is usually considered an ominous sign, various conditions can cause HPVG, including digestive tract dilatation, gastric ulcer, ulcerative colitis, Crohn's disease, and complications of endoscopic procedures [3,6—15].

Two possible mechanisms of the occurrence of HPVG were proposed: gas transmigration through the bowel lumen due to the increased intraluminal pressure, and sepsis caused by gas-producing bacteria [2]. In the current case, no bowel ischemia was detected by imaging modalities. The absence of bacterial growth from the blood culture did not support the bacterial hypothesis in this case. The patient's shortness of breath and dyspnea (causing more gas to be ingested into the gastrointestinal tract) and bowel distention, along with mucosal tears (allowing the entry of air into the intramural part of bowel that later migrated into portal circulation), may have contributed to the development of HPVG [16].

Although HPVG may be diagnosed by conventional abdominal radiography, it is often overlooked [17]. However, with the advances of imaging modalities, the diagnosis of HPVG can be made even when the amount of accumulated gas is small [18]. The characteristic sonographic findings of HPVG are highly echogenic particles, flowing within the portal vein; or poorly defined, highly echogenic patches within the hepatic parenchyma, which are most apparent in the nondependent part [19]. HPVG is characteristically associated with peripheral gas lucencies on CT scans. Additionally, a CT scan can disclose gas in the bowel wall (pneumatosis intestinalis) and in the extrahepatic portal vein or its splanchnic vasculature [17]. In our case, HPVG was initially detected by ultrasound and confirmed by CT. In addition, no bowel ischemia was found by CT.

Although HPVG is usually considered to be related to poor prognosis, favorable outcomes were reported in some conditions [3,6—15]. The patient had an uneventful recovery and did not suffer from any abdominal catastrophe. This rare case demonstrates the occurrence of HPVG in a patient with COPD exacerbation. It may support the mechanical theory for the occurrence of HPVG.

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