Hepatic Portal Venous Gas: A Rare Dismal Condition

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Abstract

The presence of gas in the biliary tract is commonly secondary to a serious disorder, including mainly profound visceral infection or intestinal necrosis. Hepatic Portal Venous Gas (HPVG) is even rarer and has been historically associated with dismal outcome. In this brief report, we evoke this entity emphasizing its etiology, the role of Computerized Tomography (CT) in establishing the diagnosis, and treatment orientations.

Keywords: Portal; Gas; Sepsis; Surgery

Case Summary

A 66-year-old woman with chronic alcoholic pancreatitis, presented with a 2-hour history of severe abdominal pain. Upon initial physical examination, the patient was conscious, oriented, with diffuse abdominal guarding. She had tachycardia (120 beats/min) and preserved blood pressure (110/80 mmHg). Blood tests revealed a White Blood Count (WBC) of 20,700/mm$^3$, a C Reactive Protein (CRP) of 137 mg/dl, a serum Lipase of 91 UI/ml, and normal liver function tests. The IV-enhanced abdominal Computed Tomography (CT) scan showed diffuse Hepatic Portal Venous Gas (HPVG) (Figure 1). Additionally, gas was detected in both femoral veins (Figure 2). The patient was taken rapidly to the operating room. Laparotomy confirmed the diagnosis of extensive intestinal necrosis from the duodenum to the transverse colon, rendering any surgical resection useless. Supportive care measures were implemented. The patient died four hours later.

Discussion

HPVG is a rare condition secondary to numerous causes, including mainly mesenteric ischemic disease, colonic diverticulitis, inflammatory bowel disease, trauma, or iatrogenic (i.e., post endoscopic procedures) [1,2]. Historically, HPVG was first observed in neonates with necrotizing enterocolitis [1]. The most common cause of HPVG in adults is Acute Mesenteric Ischemia (AMI) which represents up to 70% of cases in the literature with a mortality rate of up to 80% [3]. Table 1 summarizes the most commonly reported etiologies of HPVG.

The intraportal gas is usually produced by microorganisms in the intestinal lumen itself or in an underlying abscess. Continuous advances in the accuracy of current imaging techniques have led to less rare diagnosis [4]. CT scan is the mainstay of the diagnostic approach to HVPG. Pre contrast phase may be sufficient to reach diagnosis. The use of lung window is recommended for its high sensitivity in detecting small amounts of gas [5-7]. Usually located in the central part of the liver, pneumobilia is the main differential diagnosis of HVPG which can reach the periphery [8,9].
Direct signs of AMI on CT scan include abrupt termination of the mesenteric vessels or even the presence of filling defects in the vessel lumen itself. They are visualized with multi-detector angiography CT scan [6]. In case of absence of IV contrast, one should look for indirect signs including bowel dilation, wall thickening or attenuation, fat standing and ascites [7].

The second most commonly reported etiology of HPVG is sigmoid diverticulitis [8]. Colonic diverticulosis, fat standing or abscess adherent to the colonic wall are commonly disclosed.

The prognosis of HPVG is related to the underlying etiology [10]. In opposition to early studies where mortality rate was nearly 75% [2], latest reports have showed an overall mortality less than 40% [7,11]. The obvious decrease in mortality is mainly due to the increased usage and sensitivity of CT scan, which facilitated earlier detection and treatment of HPVG [10].

Many authors have reported that the volume of HPVG is prognostic [12]. However, the presence of gas 3 or more hepatic segments has the poorest prognosis. Urgent surgery may be avoided when 2 or less hepatic segments are concerned. In our case, HPVG was very extensive, spreading in the entire liver. Moreover, gas reached the caval system and flooded back to both femoral veins.

To conclude, CT scan has profoundly transformed the outcome of patients with HPVG. However, it remains a serious radiologic finding that needs to be closely evaluated. In case of unclear etiology, surgical exploration may be recommended in order to rule out underlying intestinal necrosis.

References