

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Surgery Quiz – Case 56

A 77-year-old man being treated in the pulmonary ward for chronic obstructive pulmonary disease (COPD) presented with signs of an acute abdomen. The computed tomography (CT) scan showed small bowel ischemia (and air bubble in the vena porta) (figures 1, 2). The patient was led to the operating room, where Hartmann procedure was performed. The patient presented acute respiratory distress syndrome (ARDS) and 35 days later passed away.

Comment

Hepatic portal venous gas (HPVG), an ominous radiologic sign, is associated in some cases with a severe underlying abdominal disease requiring urgent operative intervention. It was first described by Wolfe and Evens in infants with necrotizing enterocolitis (NEC). Many causes have been associated ranging from benign causes to potentially lethal diseases that require prompt surgical intervention. There is no difference in male-female incidence.

The mechanism for the appearance of gas in the portal vein is not well understood. The proposed predisposing factors for the accumulation of gas in the portal venous system include the following: Escape of gas produced by gas-forming organisms in the bowel lumen or in an abscess which then circulate into the liver, or

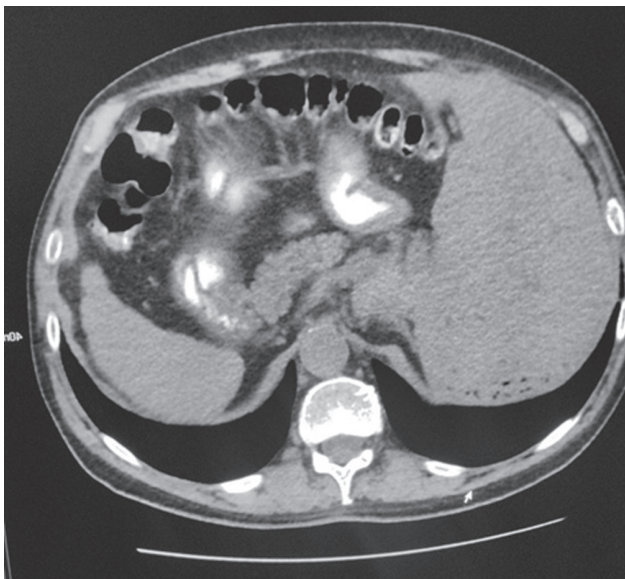


Figure 1.

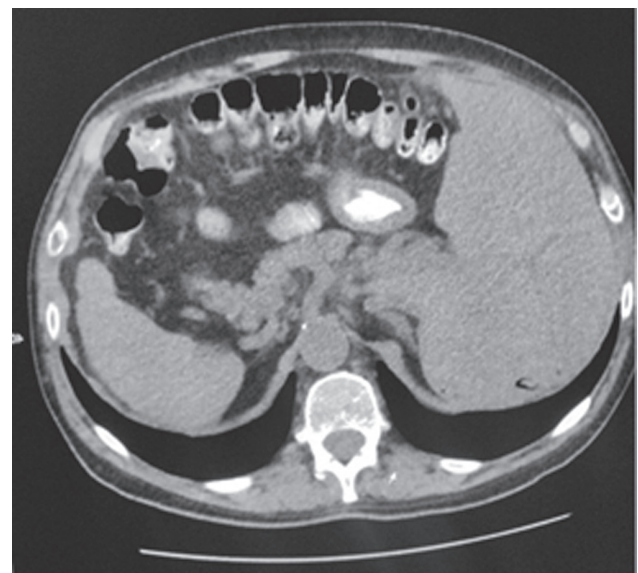


Figure 2.

the presence of gas-forming organisms in the portal venous system with passage of gas into the circulation. The characteristic finding on the CT film is a branching radiolucency extending to within 2 cm beneath the liver capsule. This is because of the centrifugal flow of portal venous blood, which carries portal venous gas peripherally, in contrast to biliary gas, which tends to collect centrally. This peripheral gas distribution is related to the direction of blood flow into the liver, and is crucial to differentiate it from pneumobilia, which is centrally located because of the biliary anatomy and the direction of bile flow.

Clinical events associated with HPVG might be important factors contributing to patient survival and prognosis. Liebman et al⁷ reported that HPVG is associated most commonly with bowel

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2025, 42(1):139–140

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necrosis (72%), followed by ulcerative colitis (8%), intra-abdominal abscess (6%), small bowel obstruction (3%) and gastric ulcer (3%) (fig. 3). This explains the high mortality rate (56–90%) reported in association with HPVG. Another factor affecting the outcome of these patients is the coexistence of a long-term chronic disease, such as chronic renal failure, COPD, diabetes mellitus or hypertension, which decreases immune functions and alters the intestinal microbial flora.

The most important cause for PVG is bowel ischemia, followed by inflammation of the gastrointestinal tract (GIT). Bowel ischemia (BI) and or infarction is a common and dangerous abdominal condition, especially in elderly patients. BI is produced by insufficient blood flow to or from the intestines. It may have an acute or chronic setting. BI in the bowel wall is divided into three stages. Stage I: the ischemic lesions are confined to the mucosa and are reversible. Stage II: it is characterized by necrosis of the mucosal and submucosal tissues, which may lead to fibrotic stricture development, and stage III: the entire wall is affected by ischemia. It is associated with a high mortality rate.

BI is the primary etiology of HPVG (70% of cases) and when associated, they are related to transmural necrosis in 91% of cases and to a high mortality rate (85% of patients). HPVG is often associated with pneumatosis intestinalis.

Ultrasonography (U/S), color Doppler flow imaging, and CT scan have been reported to be superior to abdominal X-rays in identifying HPVG. U/S is limited because of its high inter-operator variability and lack of availability at times. Color Doppler flow imaging shows hyperechogenic foci moving within the lumen of the portal vein.⁹ The CT scan has a high sensitivity for detection of HPVG and can detect the underlying pathology. CT scan can disclose gas in the bowel wall (pneumatosis intestinalis) and in the extrahepatic portal vein or its splanchnic vasculature. The CT

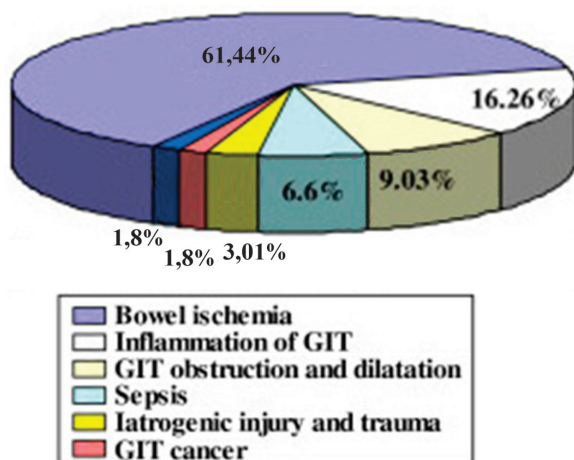


Figure 3.

scan alone cannot predict which patients are experiencing true intestinal ischemia and which simply have benign pneumatosis. CT findings should be correlated with the clinical signs and laboratory parameters to reach high sensitivity and specificity for HPVG. Increased use of CT scan and ultrasound allows early and highly sensitive detection of HPVG. Intestinal resection is performed when bowel necrosis is found on laparotomy. The prognosis of HPVG is related to the pathology itself.

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