

Hepatic Portal Venous Gas

Joris M. Franken, Eelco J. Veen

Department of Surgery, Amphia Hospital, Breda, The Netherlands

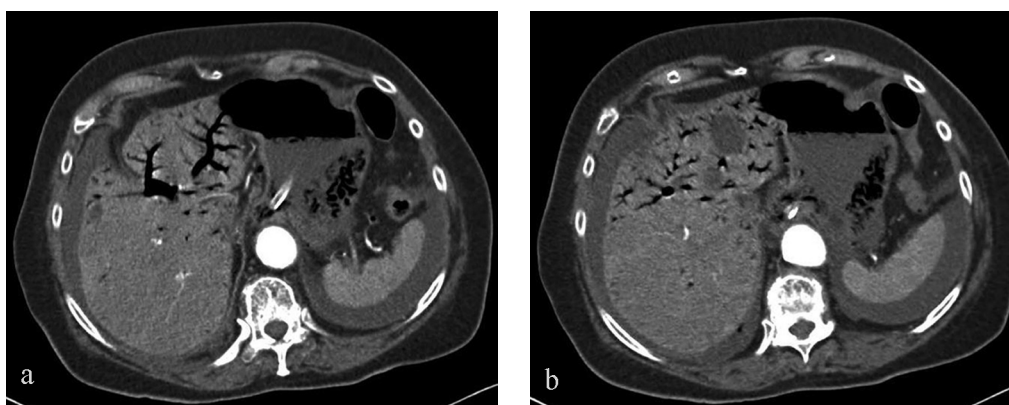


Fig 1a, b. Gas is seen in the branches of the portal vein (a) and in the liver (b).

A 64-year old patient was admitted to our hospital with acute abdominal pain. Physical examination showed tenderness in the lower right abdominal quadrant. Initial laboratory tests revealed no significant abnormalities. Abdominal CT demonstrated lucencies in the vena portae and peripheries of the liver (Fig. 1).

Laparoscopy showed a normal aspect of the intra-abdominal organs. The patient was conservatively treated with antibiotics and a postoperative colonoscopy showed an ischemic colitis of the right hemicolon. A right hemicolectomy was performed and pathological examination revealed an ulcerative aspect of the colon in accordance with ischemia. Two weeks later the patient was discharged in a good overall condition. In the outpatient setting a new colonoscopy was performed, with no pathology seen. The patient was at that moment free of complaints.

Air in the portal venous system is a relatively rare but ominous sign, usually indicating serious intra-abdominal pathology. Most cases are caused by mesenteric vascular occlusion and subsequent bowel necrosis, followed by digestive tract dilatation [1], peptic ulcer [2], inflammatory bowel disease [3] and abdominal trauma [4]. The precise pathogenesis of hepatic portal venous gas (HPVG) is unclear, but two hypotheses exist. The first states that gas is forced into the venous system by mucosal barrier disruption or by tension in a distended bowel. The second claims that the gas is formed by organisms inside the intestinal wall or venous system. HPVG can be diagnosed by lucencies in the

periphery of the liver because of the centrifugal portal venous blood flow, whereas biliary gas is formed more centrally because of the centripetal flow.

The gas itself requires no treatment, but it must act as a trigger to further assess the underlying disease. The use of modern CT has resulted in finding HPVG in more benign conditions. Together with improved surgical techniques, recent studies have reported a decreased mortality of 39% [2]. The prognosis is related to this underlying pathology and not to the HPVG itself. Early identification can permit treatment in a more controlled setting. In a stable patient a conservative approach can be followed with monitoring of the patient's clinical condition and laboratory parameters followed by colonoscopy and repeated CT. In a patient in a poor or deteriorating clinical condition an emergent explorative laparotomy should be performed [5].

References

1. Radin DR, Rosen RS, Halls JM. Acute gastric dilatation: a rare cause of portal venous gas. *AJR Am J Roentgenol* 1987;148:279-280.
2. Kinoshita H, Shinozaki M, Tanimura H, et al. Clinical features and management of hepatic portal venous gas: four case reports and cumulative review of the literature. *Arch Surg* 2001;136:1410-1414.
3. Kirsch M, Bozdech J, Gardner DA. Hepatic portal venous gas: an unusual presentation of Crohn's disease. *Am J Gastroenterol* 1990; 85:1521-1523.
4. Kalb D, Roberts S, Cumming J. Portal venous gas after blunt abdominal trauma: a case report. *J Trauma* 2003; 55:982-984.
5. Nelson AL, Millington TM, Sahani D, et al. Hepatic portal venous gas: the ABCs of management. *Arch Surg* 2009; 144:575-581.