

# Hepatic Portal Venous Gas: Findings on Ultrasound and CT

Kristin Berona, MD  
Kevin Hardiman, DO  
Thomas Mailhot, MD

Los Angeles County + University of Southern California Medical Center, Department of Emergency Medicine, Los Angeles, California

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A 76-year-old female with a history of Parkinson's, dementia, and hypertension presented to the emergency department with non-bilious, non-bloody vomiting and abdominal pain for 2 days. Her exam was significant for borderline hypotension without tachycardia, abdominal distension and a palpable ventral hernia. An emergency physician performed ultrasound showed free intraperitoneal air and gas in the liver (Video). A computed tomography showed pneumoperitoneum, pneumatosis intestinalis, and hepatic portal venous gas (HPVG) (Figure). At laparotomy, she was found to have a sigmoid colon perforation from adenocarcinoma, ischemic small bowel, and a colovesicular fistula. Post-operatively her clinical status worsened, and she was transitioned to comfort care and expired on hospital day 2.

HPVG was first reported in infants with necrotizing enterocolitis.<sup>1</sup> In adults, it is most commonly associated with mesenteric ischemia and pneumatosis intestinalis, accounting for 43% of HPGV cases<sup>2</sup> and an associated mortality of

75%.<sup>2-3</sup> It has been reported with other diseases such as diverticulitis, inflammatory bowel disease, obstructive pyelonephritis, pancreatitis, cholangitis, uterine gangrene, and severe shock.<sup>4</sup> HPVG is attributed to either bacterial gas production in bowel entering mesenteric circulation<sup>4</sup> or intraluminal air entering capillaries from impaired mucosal barrier or increased intraluminal pressure.<sup>5</sup> HPVG spreads to the periphery of the liver whereas pneumobilia collects centrally, in the direction of bile flow. Treatment is always aimed at the underlying etiology of HPVG.

**Video.** Ultrasound videos in epigastrium and right upper quadrant showing pneumoperitoneum and hepatic portal venous gas.

**Address for Correspondence:** Kristin Berona, MD, LAC+USC Medical Center, 1200 N. State St. Room 1011, Los Angeles, CA  
Email: [kberona@gmail.com](mailto:kberona@gmail.com).

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**Figure.** Computed tomography without contrast of the abdomen and pelvis showing free air (asterisks), pneumatosis intestinalis (thin arrows), and hepatic portal venous gas (large arrow).

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