

A rare occurrence of hepatic portal venous gas in emphysematous pyelonephritis

Debraj Sen, Arjun S. Sandhu¹

Departments of Radiodiagnosis, and ¹Urology, Command Hospital (Central Command), Lucknow, Uttar Pradesh, India

ABSTRACT

Hepatic portal venous gas (HPVG) is an uncommon radiological sign and often portends significant underlying abdominal disease. A number of conditions may produce this sign and identifying the underlying etiology is essential for management. The advent of ultrasonography-color Doppler imaging and computerized tomography has led to more frequent recognition of this condition. This article describes the very rare association of HPVG in a patient with emphysematous pyelonephritis.

Key words: Computerized tomography, emphysematous pyelonephritis, hepatic portal venous gas

INTRODUCTION

Hepatic portal venous gas (HPVG) is an uncommon radiological sign associated with numerous conditions and often portends significant underlying abdominal disease. It was first described by Wolfe and Evens in infants with necrotizing enterocolitis (NEC).^[1,2] This article describes the very rare association of HPVG with emphysematous pyelonephritis.

CASE REPORT

A 65-year-old hypertensive diabetic female patient developed colicky left flank pain radiating to the groin. Ultrasonography revealed an 8.0 mm mid-ureteric calculus for which she underwent ureterorenoscopic lithotripsy and double-J stenting. The stent was removed after 6 weeks. A week after stent removal, she developed continuous left flank pain, progressive abdominal distension, obstipation, and high-grade continuous

fever. A large ovoid left lumbar mass was palpable. She had anemia (hemoglobin 8 g/dL), polymorphonuclear leukocytosis (total leucocyte count 42,600/mm³) and raised blood glucose (400 mg/dL), blood urea (55 mg/dL) and serum creatinine (2.7 mg/dL) levels. Non-contrast computerized tomography (CT) revealed a grossly enlarged left kidney (15.5 cm × 12.0 cm × 19.0 cm) distended with fluid and air. Air was also noted in the peritoneal cavity, retroperitoneum, right inguinal canal and hepatic portal venous radicals [Figures 1 and 2]. Retroperitoneal and mesenteric lymphadenopathy was present. A diagnosis of emphysematous pyelonephritis, Wan type 2, was made. Emergency percutaneous nephrostomy drained 1150 ml of pus, which grew *Escherichia coli* on culture. The patient was managed successfully with central venous pressure-guided intravenous fluids, insulin and broad-spectrum antibiotics. Renal scintigraphy revealed non-functioning left kidney. The patient underwent left subcapsular nephrectomy with uneventful recovery. Histopathology of the resected kidney suggested “end-stage kidney” with chronic pyelonephritis.

For correspondence: Dr. Debraj Sen, Department of Radiodiagnosis, Command Hospital (Central Command), Lucknow - 226 002, Uttar Pradesh, India.
E-mail: sendebraj@gmail.com

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10.4103/0970-1591.124218

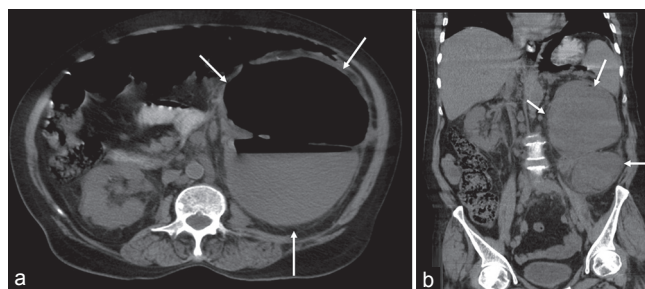


Figure 1: Computerized tomography axial section (a) and the coronal reformatted image (b) showing the obstructed left kidney (white arrows) distended with air and fluid. The parenchyma is markedly thinned out

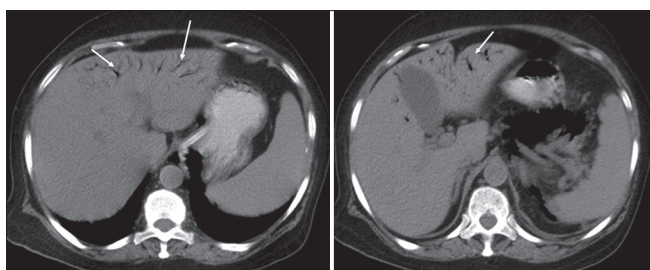


Figure 2: Computerized tomography axial sections through the abdomen (cranial to caudal) showing air within the hepatic portal venous radicles (white arrows)

DISCUSSION

HPVG is an uncommon radiological sign and often portends significant underlying abdominal disease. Though first described in infants with NEC, it may be seen in inflammatory, infective, obstructive and neoplastic abdominal conditions; post-chemotherapy; gastrointestinal investigations and interventions; post-liver transplantation; hemodialysis; cardiopulmonary resuscitation; severe hyperglycemic shock; superior mesenteric artery syndrome; cystic fibrosis; intra-aortic balloon pulsation and bronchopneumonia.^[1,2] It is most commonly seen in intestinal ischemia.^[1,2]

The mechanisms of porto-venous gas accumulation are: (1) Passage of intestinal intraluminal or extraluminal peritoneal gas through capillaries and mesenteric venous tributaries, (2) Passage of extra-peritoneal (or retroperitoneal) gas through the portosystemic collaterals, and (3) Presence of gas-forming organisms.^[2]

Emphysematous pyelonephritis (EPN) is a grave, acute gas-forming necrotizing renal and perinephric infection, commonly seen in adult diabetic females and immunocompromised patients with obstructive uropathy. *E. coli* is the commonest offending organism followed by *Proteus*, *Klebsiella*, anaerobic *Streptococci* and *Candida*.^[3] Wan *et al.* classified EPN as type I (“dry”) and type 2 (“wet”) with intraparenchymal or perinephric fluid, the former associated with a higher mortality.^[4] Huang and Tseng classified EPN based on CT appearance as: (i) Class 1: Gas in the collecting system, (ii) Class 2: Gas in the renal parenchyma without extrarenal extension, (iii) Class 3A: Perinephric extension of gas or abscess, Class 3B: Pararenal extension of gas or abscess, (iv) Class 4: Bilateral EPN or solitary kidney with EPN.^[5] Synergistic medical and surgical management including drainage or nephrectomy are essential.^[6,7]

Only four reports mention the association of HPVG in EPN.^[8-11] In our patient, this association probably

occurred due to the passage of gas through retroperitoneal porto-systemic collaterals. However, the possibility of low-grade bowel infection in this immunocompromised state leading to HPVG exists.

CONCLUSION

The presence of HPVG in emphysematous pyelonephritis is a very rare association. This may be attributed to the passage of gas from renal and perinephric tissues through portosystemic collaterals and possibly through mesenteric veins due to concomitant low-grade bowel infection in susceptible immunocompromised patients.

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How to cite this article: Sen D, Sandhu AS. A rare occurrence of hepatic portal venous gas in emphysematous pyelonephritis. *Indian J Urol* 2014;30:108-9.

Source of Support: Nil, **Conflict of Interest:** None declared.