A 38-year-old woman with insulin-dependent diabetes reported four days of flank pain, dysuria, polyuria and urinary urgency. Vital signs included blood pressure 113/70mmHg, heart rate 135/min, respiratory rate 24/min, and temperature 102.5°F. Exam revealed right cerebral vascular accident and suprapubic tenderness without guarding or rebound. Significant laboratory evaluations included a leukocyte count of 19.5x10^3/microlitre with 46% bands and toxic granulations. Hematocrit measured 30.9g/dL and platelets were 92x10^3/microlitre. Serum chemistries were significant for blood urea nitrogen 103mg/dL, creatinine 3.9mg/dL and lactate 7.8mmol/L. Urinalysis was nitrite positive, leukocyte esterase moderate, 8-12 leukocytes/hpf, and moderate bacteria. Urine and blood cultures were positive for pan-sensitive Escherichia coli. A non-contrast computed tomography (CT) abdomen image is depicted (Figure 1 and 2). The patient was treated with IV crystalloid, piperacillin/tazobactam and gentamycin, underwent percutaneous drainage, and was admitted to the intensive care unit where she suffered a prolonged course but survived to hospital discharge.

The patient has emphysematous pyelonephritis (EPN) with pneumo-vena cava. EPN is a life-threatening, necrotizing infection of the renal parenchyma, collecting system, or perinephric tissue by gas-forming uropathogens (eg. E. coli, Klebsiella, Proteus). Risk factors include diabetes (>90% of patients), female gender, immunosuppression, renal disease or genitourinary obstruction. Symptoms include fever, flank/back pain, dysuria, nausea/vomiting, renal failure or hyperglycemia. Disturbed consciousness, thrombocytopenia and sepsis are associated with increased mortality. CT is the preferred imaging modality. Class I contains gas within the collecting system. Class II contains intraparenchymal gas. In class IIIa, gas or abscess extends into the perinephric space, and in IIIb into the pararenal space. Class IV signifies bilateral or solitary kidney involvement. Treat EPN with aggressive fluid resuscitation, broad-spectrum antibiotics targeting gram-negative bacteria, glycemic control and electrolyte maintenance. Additionally, treat class I or II disease with percutaneous drainage and class III and IV disease with percutaneous catheter placement. Nephrectomy is reserved for severe or refractory cases.

**Figure 1.** Abdomen computed tomography image without intravenous contrast showing right-sided emphysematous pyelonephritis with an air-fluid level in the inferior vena cava (IVC).

**Figure 2.** Additional non-contrast computed tomography image highlighting extensive emphysematous pyelonephritis with pneumo-vena cava. IVC signifies inferior vena cava.
REFERENCES
