Emphysematous Pyelonephritis and Pneumo-Vena Cava

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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).[1] Risk factors include diabetes (>90% of patients), female gender, immunosuppression, renal disease or genitourinary obstruction.[1] Symptoms include fever, flank/back pain, dysuria, nausea/vomiting, renal failure or hyperglycemia. Disturbed consciousness, thrombocytopenia and sepsis are associated with increased mortality.[1,2] CT is the preferred imaging modality. Class I contains gas within the collecting system.[1,2] Class II contains intraparechymal gas.[1,2] 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.[1,2] 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.[1]

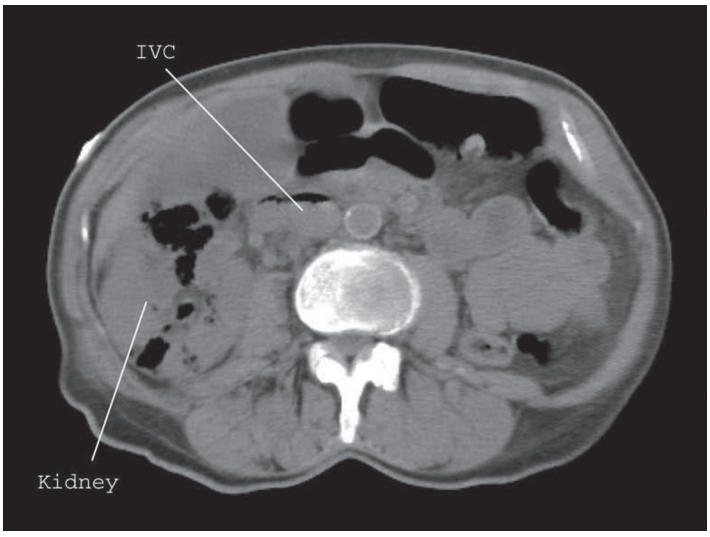

Figure 1. Abdomen computed tomography image without intravenous contrast showing right-sided emphysematous pyelonephritis with an air-fluid level in the inferior vena cava (IVC).

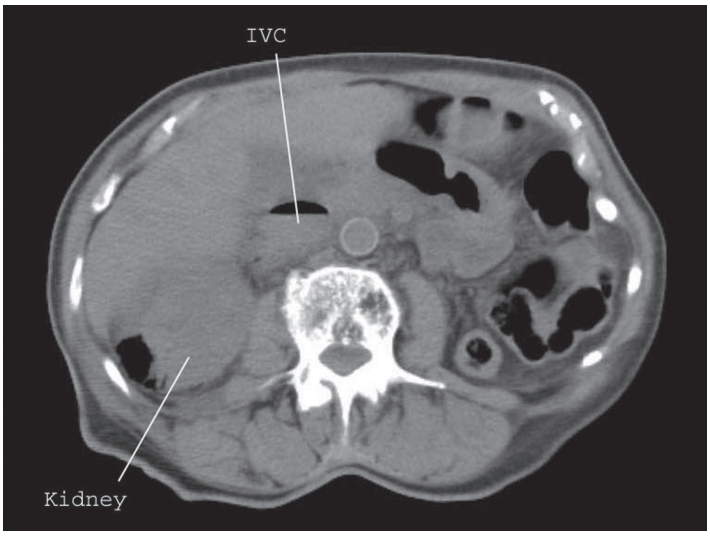

Figure 2. Additional non-contrast computed tomography image highlighting extensive emphysematous pyelonephritis with pneumo-vena cava. IVC signifies inferior vena cava.

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