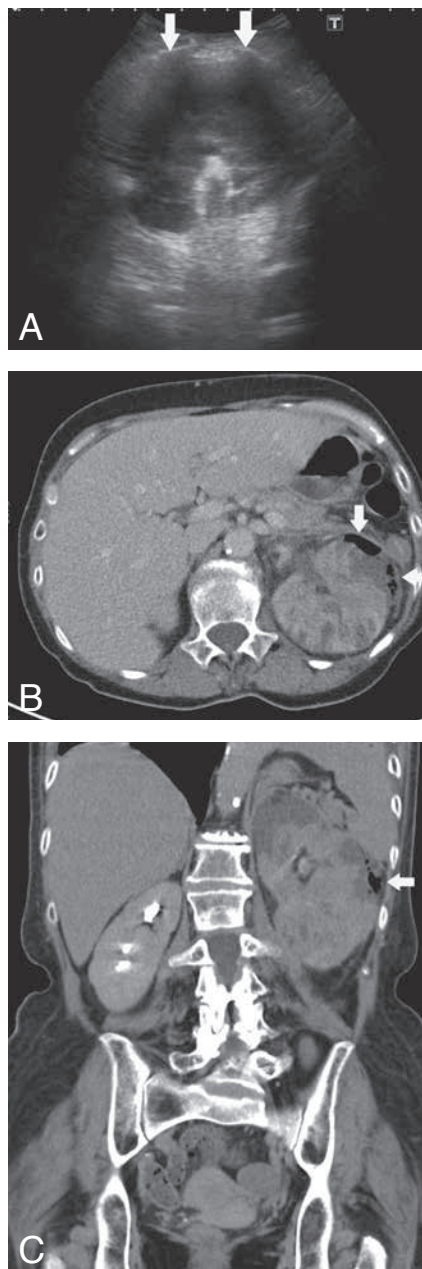


## IMAGES IN CLINICAL RADIOLOGY



### *Dirty shadowing in emphysematous pyelonephritis*

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A 62-year-old female presented with progressive pain at the left loin region, chills and fever for 1 week.

Laboratory results showed an elevation of CRP and raise of white blood cell count. Creatinine and urea were normal. Midstream urine sample showed an elevation of white blood cells, as well as detection of bacteria. The patient had no prior medical history of diabetes mellitus or urinary obstruction. Glycemia was within normal range.

On ultrasound, visualization of the left kidney was largely impaired due to dirty shadowing caused by subcapsular air (Fig. A, arrows). CT scan of the abdomen showed an enlarged left kidney, with multiple subcapsular air bubbles (Fig. B and C, arrows). There was inhomogeneous enhancement of the left kidney with formation of subcapsular fluid collections at the upper and middle pole.

Based on the combination of characteristic clinical and imaging findings, the diagnosis of an emphysematous pyelonephritis was made.

The patient was treated with intravenous antibiotics and left nephrostomy. Clinical evolution was favorable, although the left kidney showed a shrunken appearance on follow-up studies.

#### *Comment*

Emphysematous pyelonephritis is an acute necrotizing infection of the renal parenchyma and its surrounding tissues. Mortality due to emphysematous pyelonephritis is most commonly associated with septic complications. Mortality rate is approximately 20%. In 95% of the cases, there is an underlying undiagnosed diabetic mellitus. Other risk factor are urinary tract obstruction, immunosuppression, polycystic kidneys and end stage renal disease. Our patient had none of these predisposing factors. *Escherichia coli* is the causative pathogen in most cases (70%). It produces gas via fermentation of glucose and lactate.

The clinical presentation of emphysematous pyelonephritis is similar to non-complicated pyelonephritis. Signs and symptoms that may be present are: fever, dysuria, nausea and flank pain. Loin tenderness is frequently noticed on clinical examination. Sometimes crepitus around the renal region or in the scrotum can be felt. Because of its nonspecific clinical presentation, emphysematous pyelonephritis is a radiological diagnosis.

Signs of emphysematous pyelonephritis on ultrasonography (US) are an enlarged kidney, with hyperechogenic foci within the parenchyma and dirty shadowing, corresponding to gas. Impaired visualization of the kidney may result in underestimation of the disease. CT is the preferred imaging technique to allow a specific diagnosis and evaluation of the extent of infection. The presence of bubbly and/or linear gas bubbles within the renal parenchyma, combined with renal enlargement and heterogeneous enhancement with wedge-shaped hypodense areas and abscess formation, are the signature of emphysematous pyelonephritis. It is important to distinguish emphysematous

pyelonephritis from emphysematous pyelitis, because emphysematous pyelitis has a far better prognosis, and can be treated with mere antibiotics. Emphysematous pyelitis can be recognized by gas formation that is limited to the renal collecting system.

The most successful treatment strategy for emphysematous pyelonephritis is a combination of antibiotics with percutaneous or surgical nephrostomy.

In conclusion, emphysematous pyelonephritis is a potentially life threatening condition. It is an imaging diagnosis, with CT as the first choice imaging technique.

#### *Reference*

1. Ubee S.S., McGlynn L., Fordham M.: Emphysematous pyelonephritis. *BJU Int*, 2011, 107: 1474-1478.

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