

Emphysematous Pyelonephritis

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Section: Uroradiology & genital male imaging

Area of Interest: Kidney

Procedure: Diagnostic procedure

Imaging Technique: CT

Special Focus: Infection Case Type: Clinical Cases

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Patient: 71 years, male

Clinical History:

A 71-year-old man who underwent a radical cystectomy with construction of Bricker bladder 10 days before presents with diffuse abdominal pain refractory to analgesic therapy. Furthermore, a developing abdominal distension was noted. Physical examination revealed tympany. Urine was tinged with blood and unusually strong or foul-smelling. No fever was recorded.

Imaging Findings:

CT showed collections of air within the central collecting system with the gas clearly outlining the dilated calyces. Moderate perirenal fat stranding was also present. Postoperative changes were noted with the ureters distal end exteriorized in the right lower quadrant.

Discussion:

Emphysematous pyelonephritis represents a life-threatening necrotizing infection of the kidneys characterized by gas formation. Up to 90% of the affected patients have poorly controlled diabetes. *E.coli*, *Klebsiella pneumonia* and *Proteus mirabilis* are the most commonly identified bacteria [1]. Prompt therapeutic intervention is of utmost importance, as the condition can rapidly progress to fulminant sepsis and therefore carries a high mortality rate.

Conventional radiography demonstrates abnormal collections of gas in about 70% of the cases. Findings consist in either mottled gas within the renal fossa or crecentic collections of gas within the Gerota fascia. US will show an enlarged kidney with nondependent echoes within the renal parenchyma or collecting system. The echogenic foci distal shadowing will display reverberations and low-level echoes that are nicknamed "dirty shadowing".

CT is the modality of choice and capable of distinguishing which type of emphysematous pyelonephritis is present [2]. Findings include enlargement of the renal parenchyma and its destruction, presence of gas, fluid collections, gas-fluid levels, focal tissue necrosis and eventually abscess formation [3].

According to the gas distribution pattern, two types of emphysematous pyelonephritis with different prognosis can be distinguished. Type 1 has an aggressive clinical course and is characterized by renal parenchymal destruction that manifests with either streaky or mottled areas of gas; intra or extrarenal fluid collections are absent. On the other hand, type 2 is characterized by renal or perirenal fluid collections that are associated with bubbly or loculated gas or by gas within the urinary collecting system [4].

Recent literature advocates aggressive medical treatment combined with percutaneous drainage and partial or

complete nephrectomy.

Differential Diagnosis List: Emphysematous Pyelonephritis, Acute pyelonephritis, Emphysematous pyelitis, Xanthogranulomatous pyelonephritis

Final Diagnosis: Emphysematous Pyelonephritis

References:

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WanYL, Lee TY, Bullard MJ, Tsai CC (1996) Acute gas-producing bacterial renal infection: correlation between imaging findings and clinical outcome. Radiology 198: 433–438 (PMID: [8596845](#))

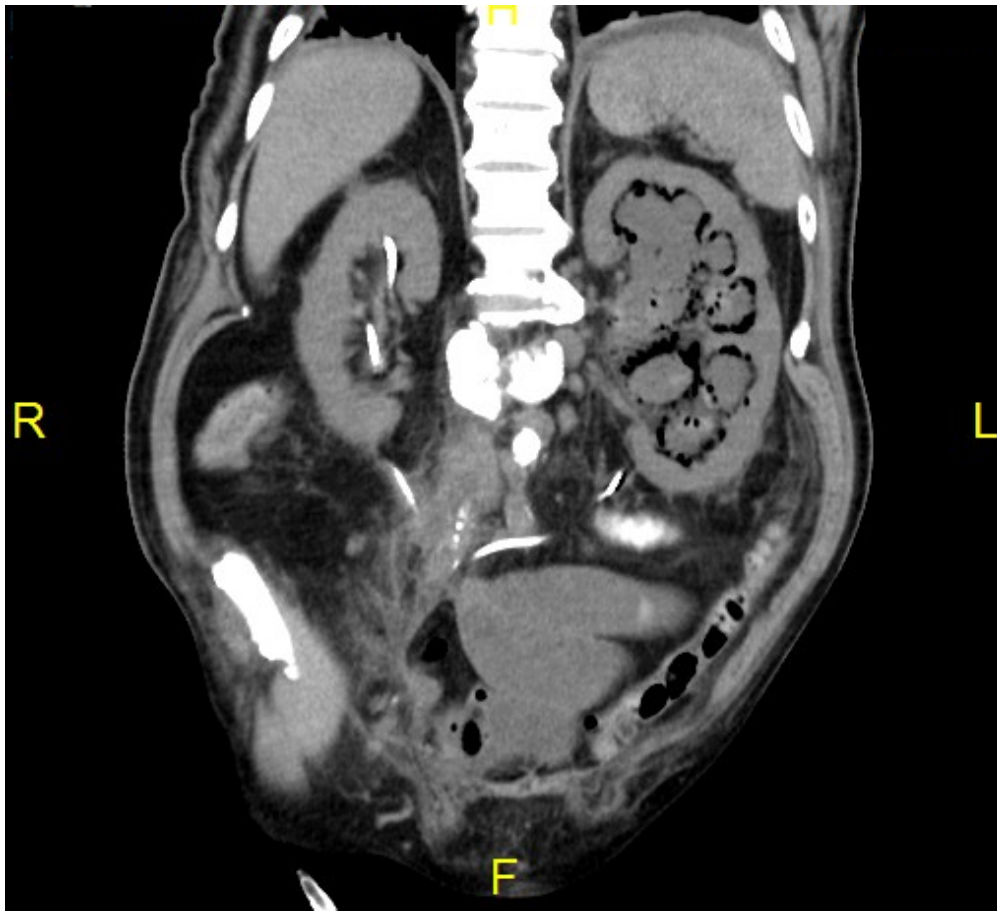
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Pyelonephritis: Radiologic-Pathologic Review. Radiographics - AFIP Archives Volume 28, Issue 1 (PMID: [18203942](#))

Figure 1

a



Description: Coronal

CT showed collections of air within the central collecting system with the gas clearly outlining the dilated calyces **Origin:** Radiology Department, Hospital del Mar, Barcelona

b



Description: Sagittal

CT showed collections of air within the central collecting system with the gas clearly outlining the dilated calyces **Origin:** Radiology Department, Hospital del Mar, Barcelona

c



Description: Axial

CT showed collections of air within the central collecting system with the gas clearly outlining the dilated calyces **Origin:** Radiology Department, Hospital del Mar, Barcelona