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Emphysematous Pyelonephritis: A Case Report

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Abstract | **Case Report**

Emphysematous pyelonephritis (EPN) is a severe, necrotizing renal infection characterized by gas formation within the renal parenchyma, collecting system, or peri-renal spaces. It is most frequently seen in diabetic or immunocompromised patients and can be life-threatening. We report a case of a 45-year-old male with known prostate cancer and a prior left nephrostomy for moderate hydronephrosis, presenting with febrile abdominal pain. CT confirmed right-sided EPN. This case highlights the importance of early diagnosis and tailored management in high-risk patients.

Keywords: Emphysematous pyelonephritis, CT scan, Diabetes, Prostate cancer, Hydronephrosis, Urinary tract infection.

INTRODUCTION

Emphysematous pyelonephritis (EPN) is an uncommon but severe form of acute pyelonephritis, predominantly affecting diabetic and immunocompromised patients [1,2]. The infection is typically caused by gas-producing bacteria such as *Escherichia coli* [3]. Pre-existing urinary tract obstruction, including hydronephrosis from malignancy, is a recognized predisposing factor [4]. CT scan is the gold standard for diagnosis, enabling classification and guiding management [5].

OBSERVATION

We report the case of a 45-year-old male with a history of poorly controlled type 2 diabetes and prostate cancer, under urological follow-up, had previously undergone a left nephrostomy for moderate hydronephrosis. He presented to the emergency department with diffuse abdominal pain, fever (39.1 °C), and malaise for 5 days.

Physical examination revealed left flank tenderness and mild abdominal distension.

Laboratory findings showed hyperglycemia (5.2 g/L), elevated C-reactive protein (176 mg/L), leukocytosis (21,500/mm³), and elevated creatinine (19 mg/L). Urinalysis revealed pyuria and urine culture grew Escherichia coli sensitive to third-generation cephalosporins and aminoglycosides [3].

Renal ultrasound demonstrated hyperechoic areas with reverberation artifacts in the left kidney. Contrast-enhanced abdominal CT scan confirmed the presence of multiple intraparenchymal and pelvic gas collections in the right kidney, with extension to the peri-renal space, consistent with stage 3A EPN according to Huang and Tseng's classification [5].

Imaging Findings Below are the CT scan images illustrating the emphysematous pyelonephritis in our patient.

Figure 1: Axial CT scan showing multiple gas bubbles within the right renal parenchyma

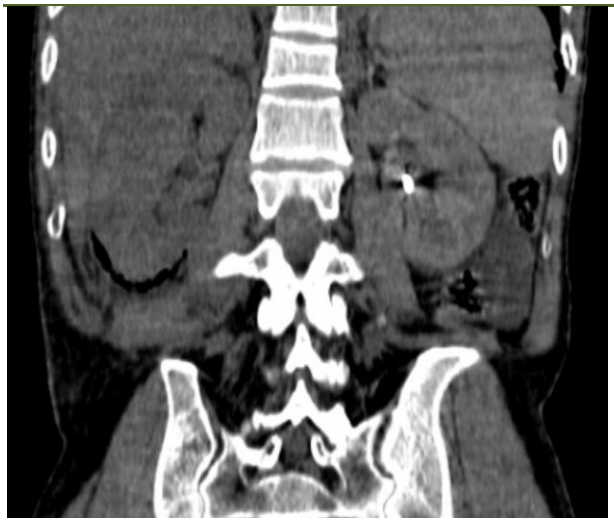

Figure 2: Coronal CT scan reconstruction demonstrating peri-renal gas extension beyond the Gerota fascia

DISCUSSION

EPN is a rare but potentially fatal renal infection, with mortality rates reaching up to 20% in bilateral cases [7]. Diabetes mellitus is the most significant risk factor, followed by urinary tract obstruction [8]. Gas formation results from bacterial fermentation of glucose [9]. CT is the gold standard for diagnosis, enabling precise staging and guiding management decisions [4,5].

Huang and Tseng's classification includes [5]:

- Stage 1: Gas confined to the collecting system
- Stage 2: Gas in the parenchyma without extrarenal extension
- Stage 3A: Extension to the peri-renal space
- Stage 3B: Extension beyond the Gerota fascia
- Stage 4: Bilateral EPN or EPN in a solitary kidney

Our patient presented with stage 3A disease, successfully treated conservatively with antibiotics and percutaneous drainage, avoiding nephrectomy [6].

CONCLUSION

EPN is a urological and infectious emergency requiring rapid diagnosis and multidisciplinary management. CT scanning is essential for confirmation and disease staging. Conservative treatment combining antibiotics and drainage can be effective in selected patients, potentially avoiding nephrectomy and improving prognosis.

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