



A case of emphysematous cystitis complicated by unilateral hydronephrosis and septicemia: nephrology picture

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A 65-year-old woman with poorly controlled type 2 diabetes was admitted to the hospital due to mild COVID-19 pneumonia. On the 11th day of admission she developed high-grade fever and gross hematuria. Physical examination revealed mild tenderness in the suprapubic area. Laboratory investigations revealed severe acute kidney injury (AKI). Urinalysis showed a high number of leukocytes with positive nitrites, in a context of macroscopic hematuria. An ultrasound of Kidneys-Ureters-Bladder was performed, showing mild right hydronephrosis. Urgent computed tomography (CT) scan with intravenous contrast was subsequently carried out due to clinical septicemia. Air content in the urinary bladder, which was compatible with emphysematous cystitis, and a moderate degree of right hydronephrosis were observed (Fig. 1, Supplementary Fig. 1). She was started on empirical antibiotic therapy with piperacillin/tazobactam injection, and de-escalated to ceftriaxone injection after blood and urine cultures showed growth of *Klebsiella pneumoniae* sensitive to ceftriaxone.

Despite a 1-week course of the appropriate antimicrobial agent, she continued having high-grade fever and persistent bacteriuria. Blood and urine cultures were evaluated again. About 72 h later, a second micro-organism (*Enterococcus faecium*) was isolated in both cultures. Fosfomicin and amikacin were prescribed according to the culture and sensitivity

report. Cystoscopy and cystogram were performed 3 weeks after the initial presentation, revealing severe necrotizing mucosal inflammation of the bladder wall with evidence of submucosal emphysema. Neither vagino-vesical nor enterovesical fistulas were detected. The cause of right hydronephrosis was suspected from severe mucosal inflammation of the right ureter due to severe ascending infection. Thus, treatment decision was conservative medical therapy. After completing a 21-day course of intravenous antibiotics, a follow-up CT scan showed resolution of emphysematous cystitis and right hydronephrosis (Supplementary Fig. 2). Renal function recovered despite exposure to nephrotoxic agents.

This case of emphysematous cystitis complicated by right hydronephrosis and multiple-organism septicemia reminds us that emphysematous cystitis is an uncommon but potentially life-threatening form of complicated urinary tract infection (UTI) [1]. Besides the highly variable clinical presentation [2], severe clinical manifestations, including severe AKI and septicemia, supported, in our case, a differential diagnosis from the classic UTI. To date, radiographic imaging remains the gold standard diagnostic tool [3]. Our case also demonstrates that appropriate antibiotic management after radiographically-confirmed emphysematous cystitis can achieve a favorable outcome without the need for surgical intervention.

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Fig. 1 Coronal view of CT KUB scan with delayed post-contrast venous phase demonstrating moderate degree of right hydronephrosis (red arrow) and air bubble in the bladder (white arrow)

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Declarations

Conflict of interest The authors declare no conflict of interest.

Ethical statement The present work is original and has not been published elsewhere in any form or language. The patient provided written consent for the publication of her clinical information.

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