

Kidney-pancreas transplant recipient with dysuria and hematuria

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A 57 year-old male with combined kidney-pancreas transplant 10 years ago presented with suprapubic pain, dysuria, and hematuria that started 3 days prior to presentation. His pancreas is enteric-drained and the last C-peptide level was 2 ng/mL (normal: 0.9–4.3 ng/mL). His maintenance immunosuppressive medications included tacrolimus 6 mg twice a day, mycophenolate 750 mg twice a day and prednisone 10 mg daily. On examination, he was in apparent discomfort, afebrile, blood pressure 150/80 mmHg, pulse 88 bpm, otherwise unremarkable heart and lung findings, right lower quadrant allograft site was non-tender but the suprapubic area was distended and tender to palpation. Laboratory findings: white blood cell count was 9200 cells/mm³ with 72.2 % neutrophils, hemoglobin 11.5 g/dL, and serum creatinine was 1.2 mg/dL, blood glucose 98 mg/dL. Urinalysis showed 8–10 red blood cells/hpf, 20–25 white blood cells/hpf. Abdominal CT scan showed distended urinary bladder with abnormal urothelial enhancement and multiple foci of air in the bladder wall suggestive of Emphysematous Cystitis (Fig. 1a, b). The renal allograft was unremarkable, and the native kidneys were atrophic. Cystoscopy was performed which showed diffuse submucosal emphysematous lesions confirming the diagnosis of Emphysematous Cystitis

(Fig. 1c, d). Urine culture revealed >100,000 CFU/mL of *Klebsiella pneumoniae*. Patient was treated with intravenous antibiotic therapy and recovered.

Emphysematous cystitis is a rare form of complicated urinary tract infection, whose characteristic feature is presence of gas within the bladder wall and lumen. Various gas-forming microbes including fungi have been implicated in emphysematous cystitis with *Escherichia coli* (60 %) and *Klebsiella pneumoniae* (10–20 %) being the two most common isolates [1]. The most common symptoms of emphysematous cystitis are abdominal pain and hematuria, occurring in about 80 % of patients [2]. Though fever is more suggestive of pyelonephritis, it may be observed in approximately 30–50 % of patients [1]. Pneumaturia (passage of gas in the urine) is a highly specific symptom, but is a rare patient complaint.

Diabetes mellitus, neurogenic bladder, bladder outlet obstruction, organ transplant and recurrent urinary tract infection are the major risk factors for this condition [3]. Among these risk factors, diabetes mellitus appears to be the strongest, and it is reported that almost 70 % of patients with emphysematous cystitis are diabetics [1].

Computed tomography (CT scan) is the best imaging modality for the diagnosis and approximately 90 % of the

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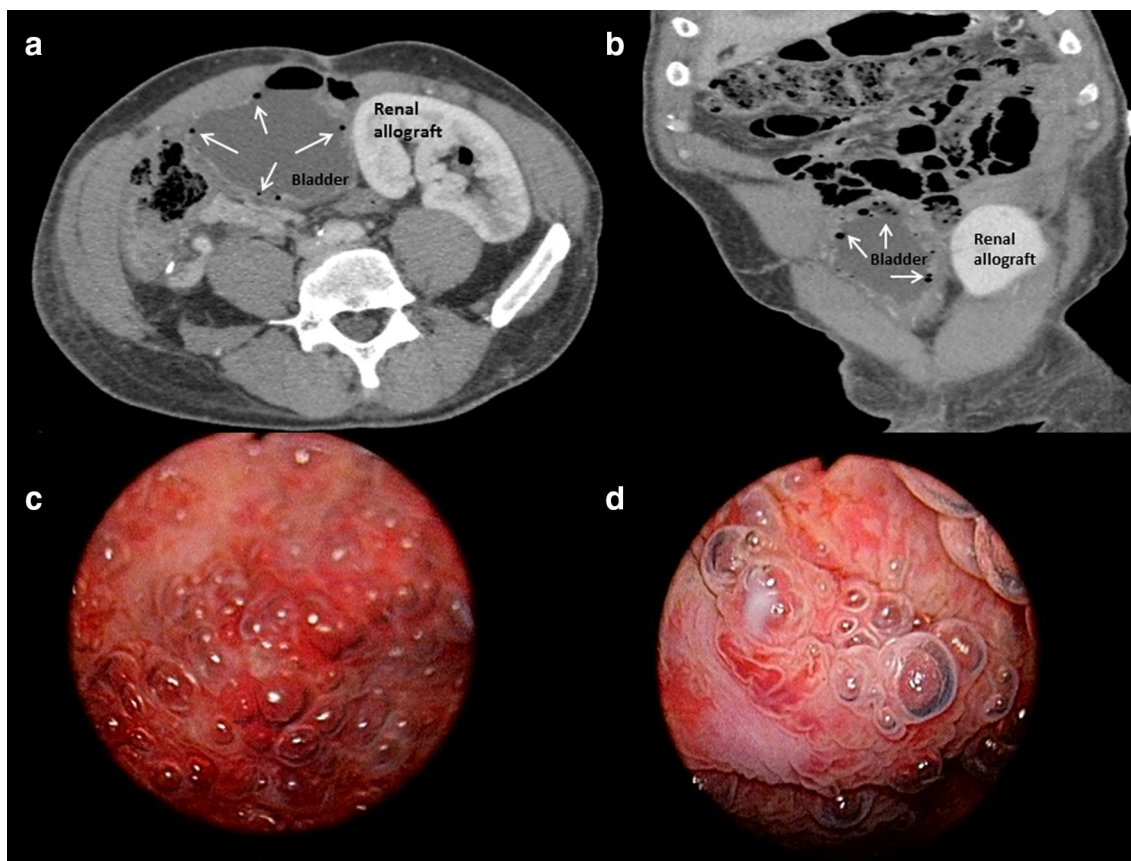


Fig. 1 **a, b** CT scan of the abdomen showing distended urinary bladder with abnormal urothelial enhancement and multiple foci of air in the bladder wall (*arrows*). **c, d** Cystoscopy images showing diffuse submucosal emphysematous lesions with erythematous bladder mucosa

cases are treated with medical therapy alone, while about 10 % require combined surgical and medical intervention [4]. A delay in diagnosis or inappropriate treatment can result in bladder rupture, sepsis and death.

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Compliance with ethical standards

Conflict of interest The Authors declare that they have no conflict of interest.

Statement of human and animal rights All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2013. No animals were used during the study.

Informed consent Informed consent was obtained from all individual participants included in the study.

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