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Nephrocolic Fistula in a Compromised Urinary Tract : A Case Identified via Radioisotope Mercaotiacetyltriglycine (MAG3) Diuretic Renography

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Introduction. Nephrocolic fistula is an abnormal communication between the kidney and colon. It is rare and the presentation may be atypical. Diagnosis is usually made using retrograde pyelograde, CT scan or barium enema.
Case. We present the case of a nephrocolic fistula detected on a radioisotope renography (MAG3) scan in a 74-year-old woman, who has a poorly controlled diabetes mellitus with a dysfunctional urinary tract due to recurrent emphysematous pyelonephritis (EPN) of the left kidney, complicated by a left ureteric stricture, pyonephrosis and neurogenic bladder secondary to diabetic cystopathy. She underwent multiple ureteric stentings, drainage procedures, and prolonged antimicrobial treatments for multidrug-resistant and fungal urosepsis. A renal MAG3 scan later revealed abnormal tracer accumulation in the descending colon, suggestive of a nephrocolic fistula. This case underscores the diagnostic challenges of nephrocolic fistula in individuals with a compromised urinary tract.
Conclusion. Urologists should maintain a high index of suspicion for nephrocolic fistula particularly in individuals with a compromised urinary tract. Alternative diagnostic imaging may be utilized to establish the diagnosis.

Keywords: emphysematous pyelonephritis, MAG3, nephrocolic fistula

Introduction

Nephrocolic fistula is a rare, abnormal communication between the kidney and colon. Ascending and descending colons are located anterolateral to the kidney, in 20% of the population retrorenal [1]. Despite the close proximity of both organs, nephrocolic fistula is still rare due to the anatomical separation by the Gerota's fascia and the thick wall of colon and kidney. Most cases are secondary to chronic infection, calculi, iatrogenic injury, or malignancy [2]. Presentation of nephrocolic fistula may be atypical, reportedly being haematochezia, altered bowel habit, recurrent UTI [2-4]. The diagnosis is usually made using a retrograde pyelogram, excretory urography, or barium enema [5]. This is the first reported case diagnosed on MAG3 scan and illustrates the real-world complexity of diagnosing nephrocolic fistula.

Case Report

A 74-year-old woman with type 2 diabetes mellitus (HbA1c 14.6%), hypertension, and subclinical hypothyroidism presented in July 2023 with left loin-to-groin pain, fever, dysuria and no bowel output. Initial labs showed elevated inflammatory markers and acute kidney injury.

CT abdomen revealed emphysematous pyelonephritis (EPN) of the left kidney with gas tracking into the ureter, left ureteritis, suspicion of mid-ureteric rupture, and moderate hydronephrosis (Figure 1). The descending colon wall was found to be thickened. She underwent cystoscopy and left retrograde pyelography (RPG) which showed small bladder capacity with thickened wall, and extravasation of contrast at the proximal left ureter. Pus was aspirated from the left kidney and cultured Klebsiella pneumoniae. The findings suggestive of a left nephronia and neurogenic bladder, the left ureter was stented, IV augmentin/clavulanate were commenced for 6 weeks and she was on long term continuous bladder drainage. Follow-up imaging showed resolving nephronia and hydronephrosis, hence the stent was subsequently removed in February 2024. Colonoscopy revealed no significant findings.

However, in March 2024, the patient was admitted again due to pyuria and seizure secondary to left pyelonephritis and pyonephrosis with

moderate left hydronephrosis. Left RPG stenting done, narrowing of left upper ureter seen. Urine culture and sensitivity yielded MRO Pseudomonas aeruginosa and Candida glabrata. She was put on another course of IV ceftazidime for 5 weeks.

As the latest RPG suggestive of possible malignancy, a left diagnostic ureteroscopy was done in October 2024. Thick stricture noted at L2/L3 level and RPG shows no contrast flow beyond. A guide wire was successfully negotiated through, pus was aspirated, moderate hydronephrosis was seen over the left kidney. Biopsy from the stricture tissue yields no malignant cells. Subsequent ultrasound in January 2025 showed resolved infection with persistent hydronephrosis.

Considering that the patient had recurrent episodes of pyelonephritis, a renal function assessment was arranged prior to discussion of nephrectomy. A MAG 3 scintigraphy incidentally revealed a left nephrocolic fistula with moderately reduced kidney function (Figure 2 & 3). However, the patient eventually succumbed due to severe diabetic ketoacidosis before further management can be offered.

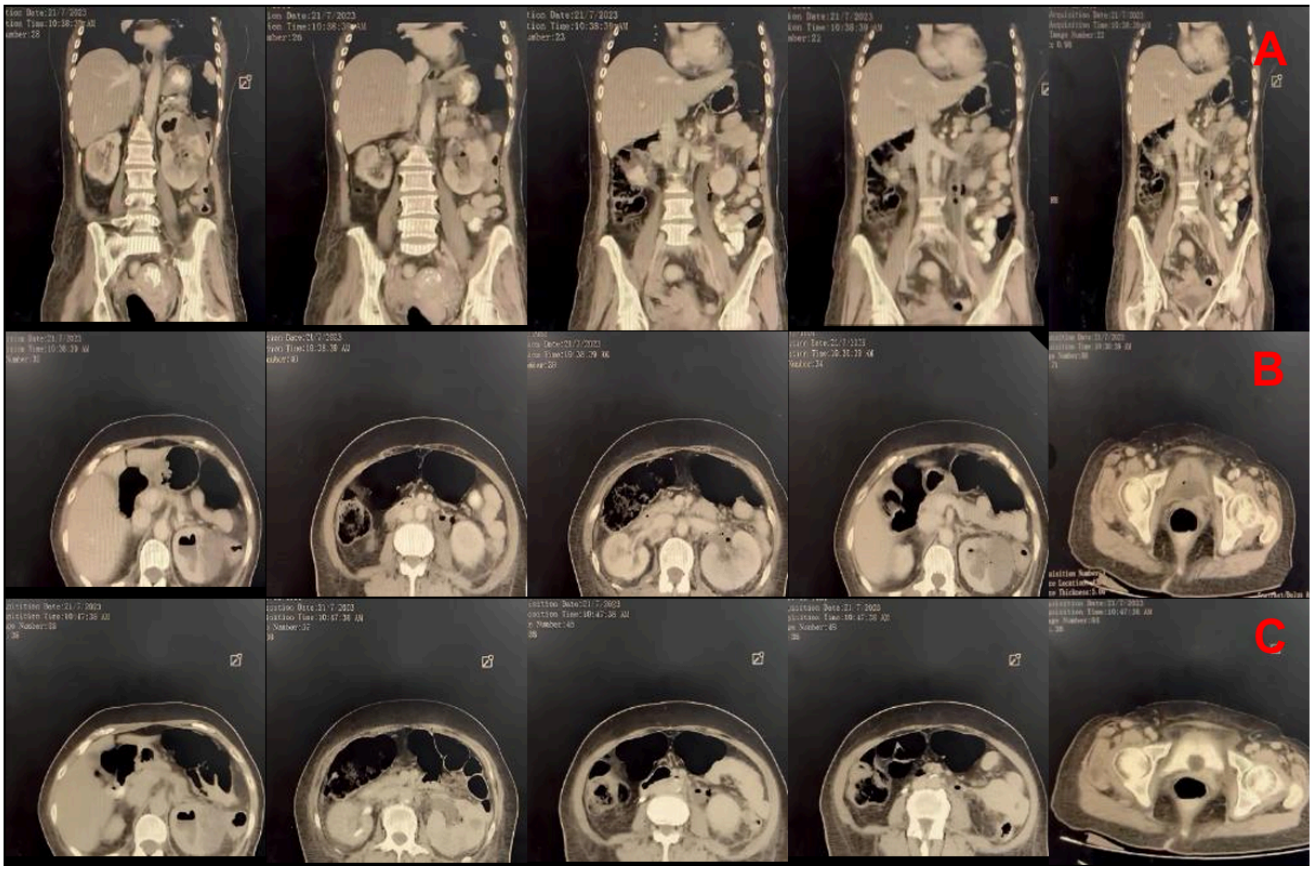

Figure 1. (A&B) Portal venous phase shows bilateral moderate hydronephrosis and free air in the left collecting system extending from the upper pole of the kidney to the proximal ureter. Bilateral perinephric fat streakiness suggestive of bilateral pyelonephritis. The bladder wall is generally thickened. No stone in the collecting system. The wall of the descending colon adjacent to the left kidney is thickened. (C) The delayed phase shows no contrast extravasation in the ureter.

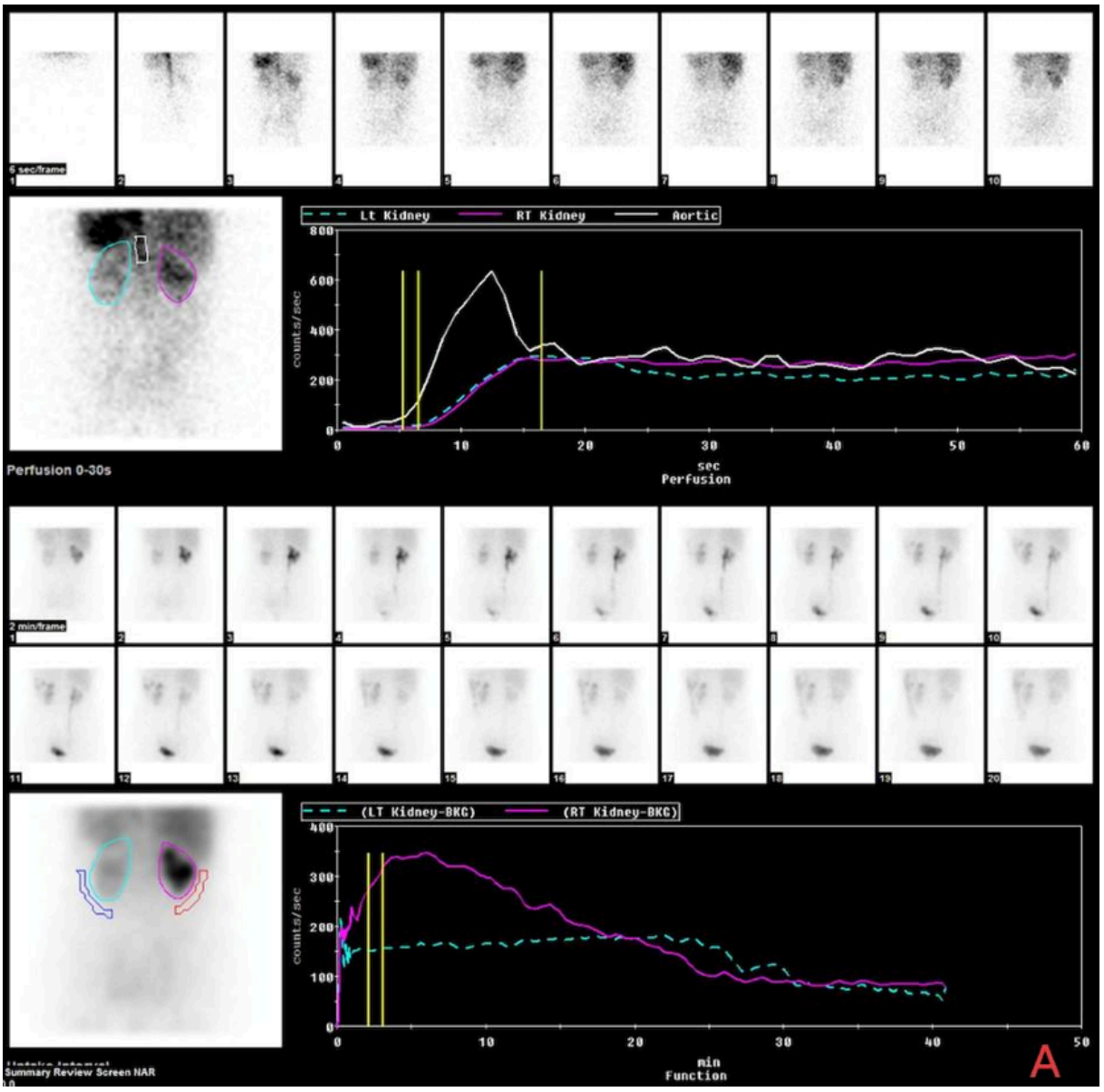

Figure 2. (A) Renal scintigraphy with Tc-99m MAG3 shows impaired perfusion and tubular function of the kidneys, particularly in the left kidney, characterized by a delayed perfusion phase compared to the aortic curve, decreased uptake, and slowed excretion. This pattern is consistent with an inflammatory renal process (pyelonephritis). No significant urinary tract obstruction is observed. (B) An accumulation of radio-pharmaceutical appears in the left upper quadarant abdomen from the intermediate phases of the examination with progressive increment in intensity. The findings suggest a suspicion of a fistula between the urinary system and other organ in the left hemi-abdomen

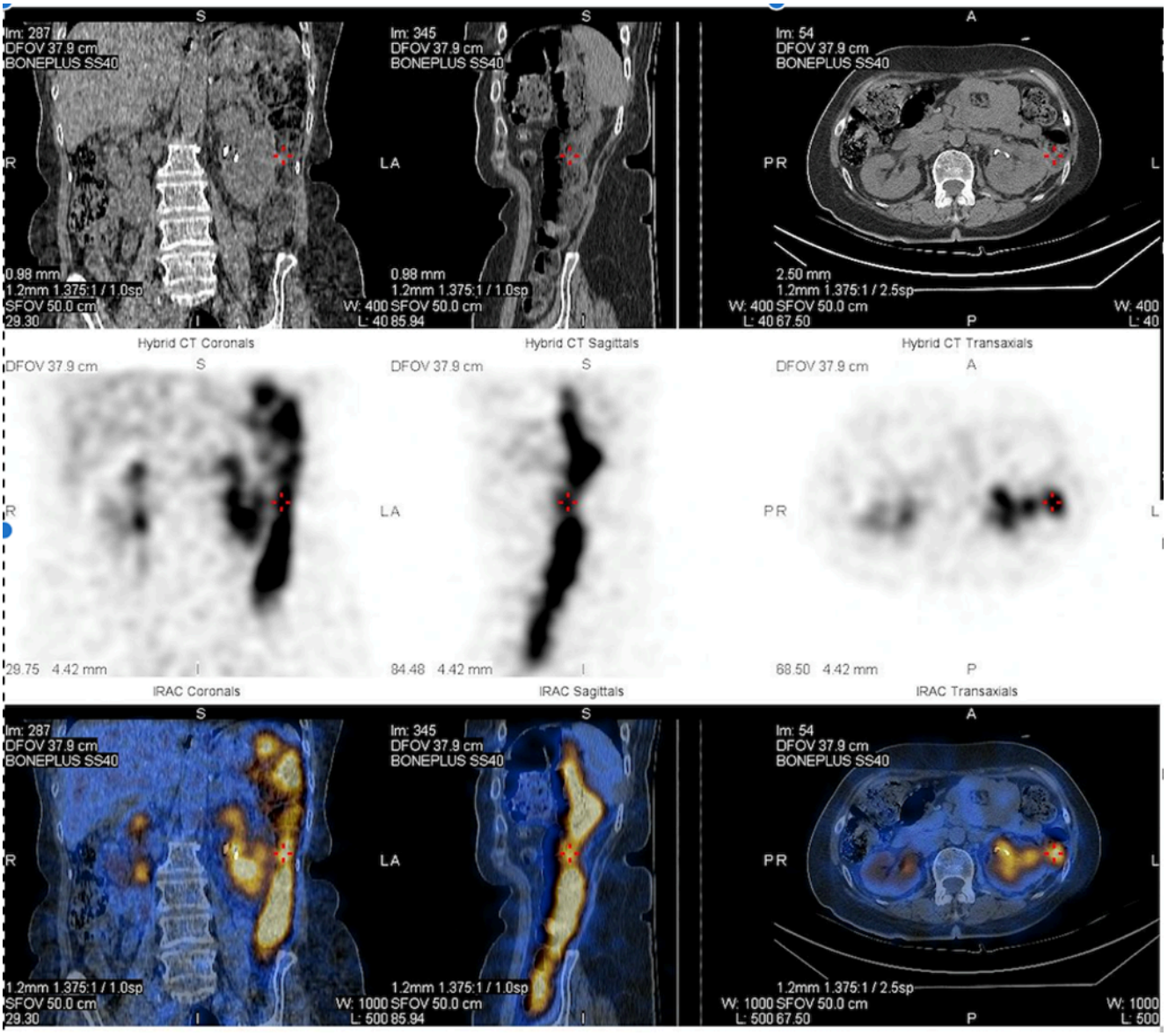

Figure 3. SPECT-CT abdomen reveals tracer accumulation along the left abdomen corresponds to uptake within the descending colon.

Discussion

This case highlights the diagnostic challenges of nephrocolic fistula in a compromised urinary tract. Nephrocolic fistulas are rare. Reported etiologies of nephrocolic fistula are interventional procedures (cryoablation, PCNL), obstructing urolithiasis, and inflammatory conditions (EPN, xanthogranulomatous pyelonephritis, inflammatory bowel disease, extrapulmonary tuberculosis, diverticulitis) [3-4] Fistula formation seemingly occurs in the context of high intrarenal pressure and chronic infection. In this patient, poorly controlled diabetes resulted in an immunocompromised state and autonomic bladder dysfunction. Diabetic cystopathy and ureteric obstruction by stricture increase intrapelvic pressure may facilitate the formation of abnormal fistulous tract.

Diagnosing nephrocolic fistula is inherently challenging due to its rarity, vague presenting symptoms, and frequent overlap with recurrent urinary tract infections or gastrointestinal complaints. CT urography remained the initial imaging of choice followed by antegrade or retrograde pyelography [6]. Few cases described the diagnosis based on suspicious colonoscopy findings and barium enema [2,4]. In this case, the fistula was not suspected clinically but was incidentally suggested on MAG3 scintigraphy based on abnormal tracer accumulation in the descending colon. MAG 3 is a type of dynamic renal scintigraphy which serves primarily to evaluate kidney function, meanwhile addition of late images has the ability of detect urinary leak.

This imaging modality is non-invasive, however it generates only planar images. Addition of SPECT-CT allows generation of three dimensional image for better localisation of the fistula with no extra radioactive tracer needed if done in the same session as MAG [11-12].

Surgery remains the mainstay treatment of nephrocolic fistula. The primary objective is to excise the fistula and repair associated organs [2-3,5,7]. Few factors should have come into consideration upon deciding the treatment modalities such as the patient's clinical status, functional status of the affected kidney and the etiology of nephrocolic fistula. Some studies advocate non-operative management with stenting and antibiotics for iatrogenic nephrofistula formation [8-10]. However, there is no clear guideline on the management of nephrocolic fistula due to its rarity.

Conclusion

Nephrocolic fistula may have an atypical presentation and it is important to maintain vigilance for this rare but serious complication especially in the immunocompromised population with a defective urinary tract. Clinicians should maintain a high index of suspicion in patients with recurrent infections, unexplained gastrointestinal symptoms, or functional renal decline. Alternative diagnostic strategies can be adapted if the conventional pathways are not feasible.

Conflict of Interest

The authors define no conflict of interest.

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