

AMSER Case of the Month

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74-year-old female with left flank pain



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Patient Presentation

- 74-year-old female presents to the ED with acute left flank pain beginning earlier that day.
- Associated hematuria and nausea; denies fever or dysuria.
- PMH: recurrent nephrolithiasis with recent ultrasound demonstrating multiple renal calculi, hyperlipidemia, uterine cancer, ductal carcinoma in situ, hyperparathyroid adenoma, and MEN1.
- PSH: breast lumpectomy, hysterectomy, and parathyroidectomy.
- BP 169/88 mmHg; BMP within normal limits.
- CBC: WBC $13.5 \times 10^3/\mu\text{L}$; neutrophils 87% (ANC 11.79).
- UA: turbid; leukocyte esterase 500; 2+ blood; too numerous to count RBCs; 51–181 WBCs; moderate bacteria.

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant: 2 Acute onset flank pain in patient with known current stone disease, diagnosed on recent imaging. Recurrent symptoms of stone disease. Follow-up imaging.

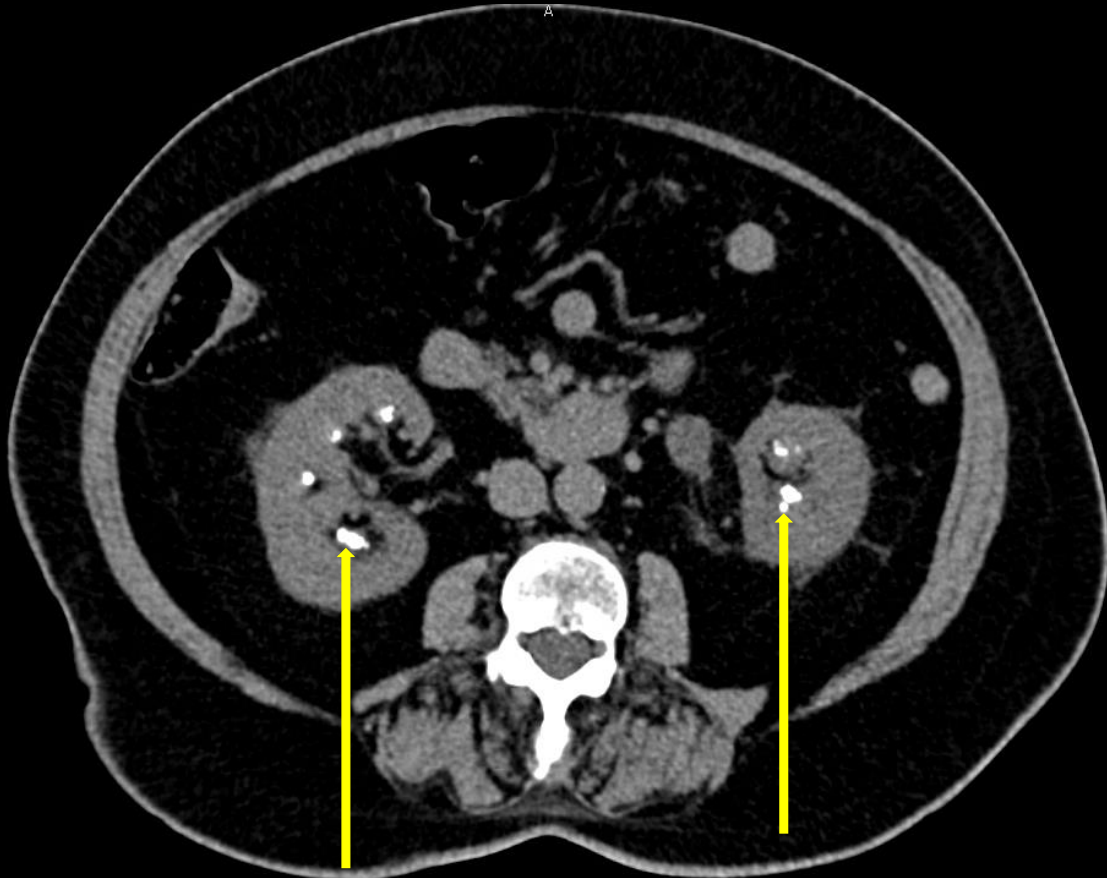
Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis without IV contrast	Usually Appropriate	☼☼☼
US color Doppler kidneys and bladder retroperitoneal	May Be Appropriate (Disagreement)	○
US kidneys and bladder retroperitoneal	May Be Appropriate	○
Radiography abdomen and pelvis	May Be Appropriate	☼☼☼
CT abdomen and pelvis with IV contrast	May Be Appropriate	☼☼☼
Radiography intravenous urography	Usually Not Appropriate	☼☼☼
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	○
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	○
MRU without and with IV contrast	Usually Not Appropriate	○
MRU without IV contrast	Usually Not Appropriate	○
CT abdomen and pelvis without and with IV contrast	Usually Not Appropriate	☼☼☼☼
CTU without and with IV contrast	Usually Not Appropriate	☼☼☼☼

This imaging modality was ordered by the ER physician

CT Abdomen/Pelvis Without Contrast (unlabeled)



CT Abdomen/Pelvis Without Contrast (labeled)

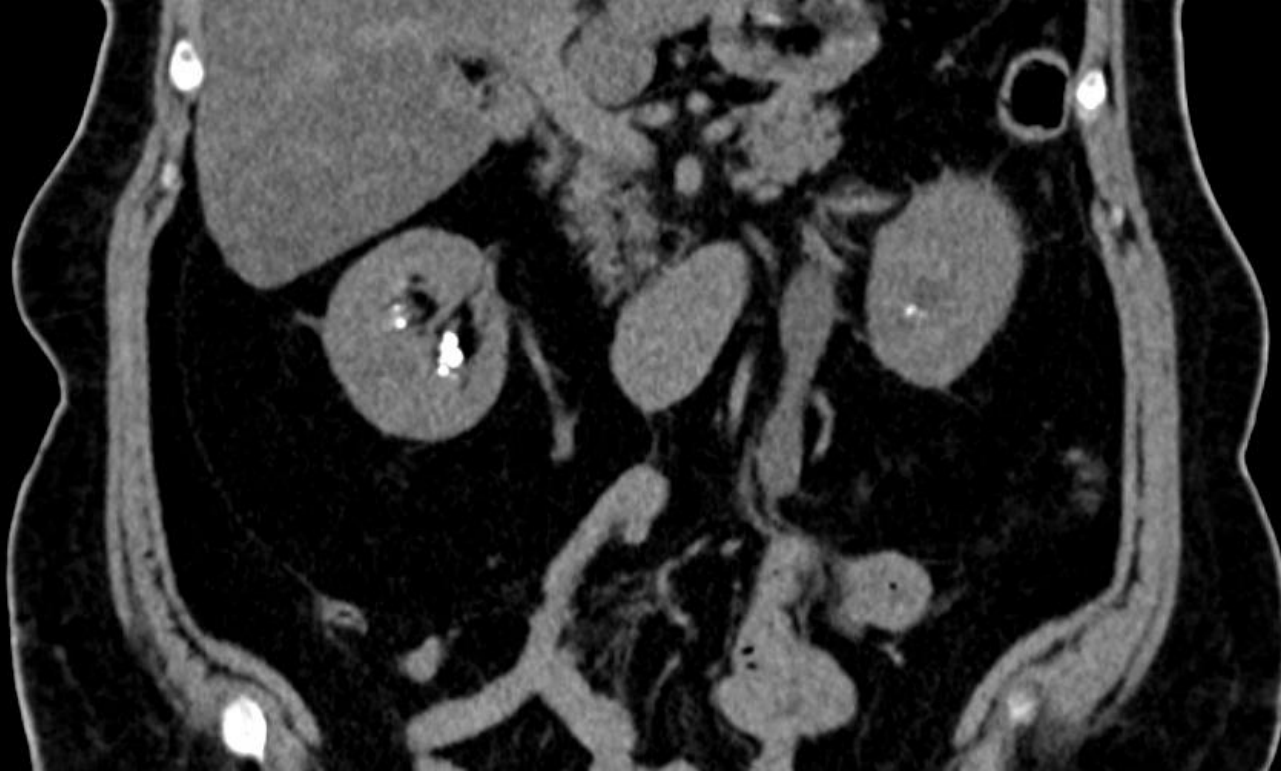


Bilateral renal calculi predominantly centered within the renal medullary pyramids



6 mm obstructing distal left ureteral calculus

CT Abdomen/Pelvis Without Contrast (unlabeled)

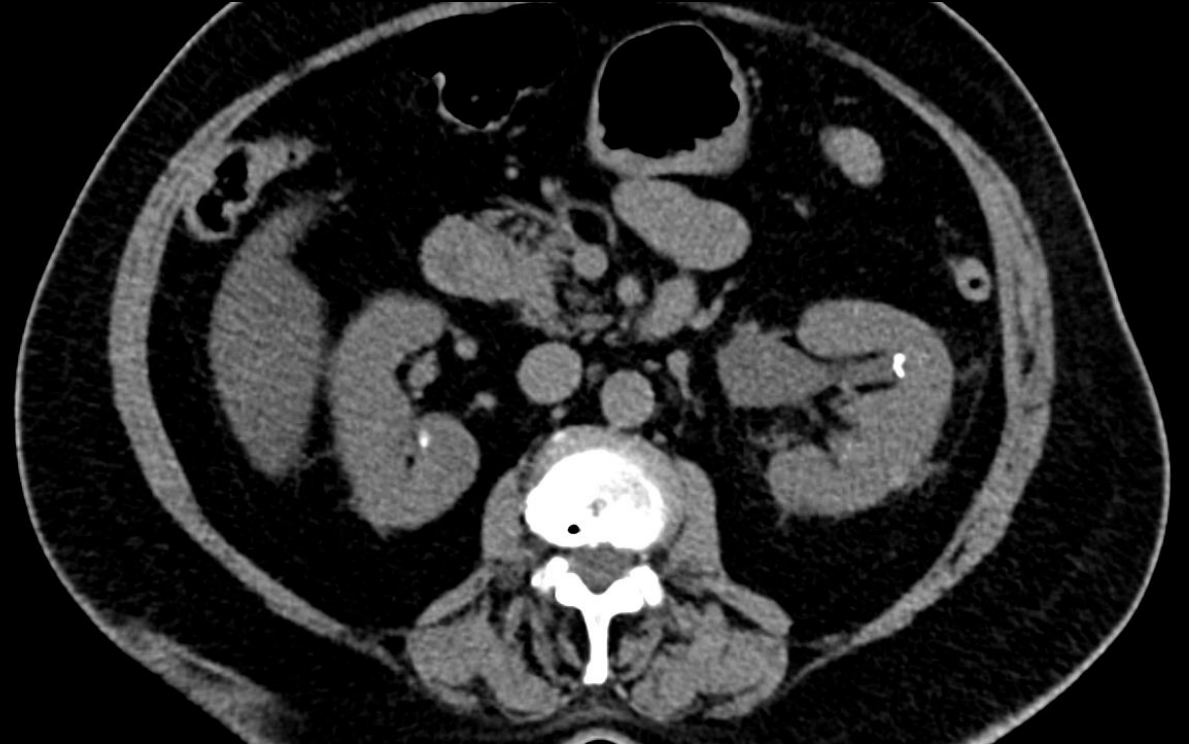


CT Abdomen/Pelvis Without Contrast (labeled)

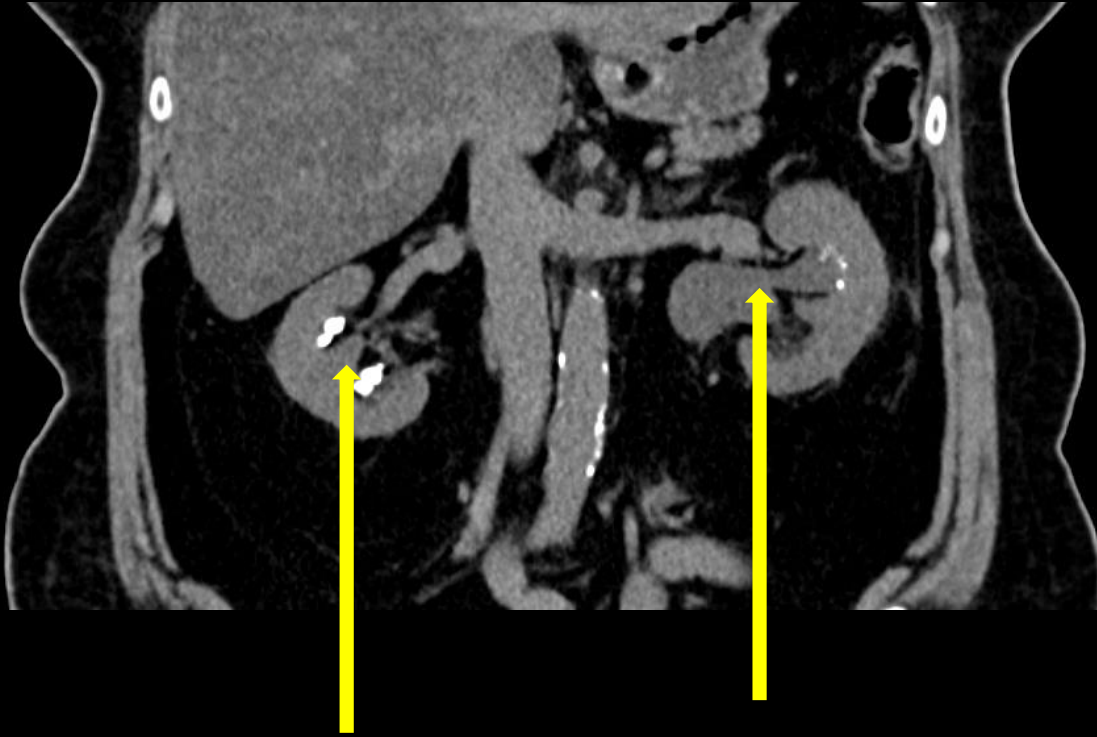


Proximal left ureter / hydroureter

CT Abdomen/Pelvis Without Contrast (unlabeled)

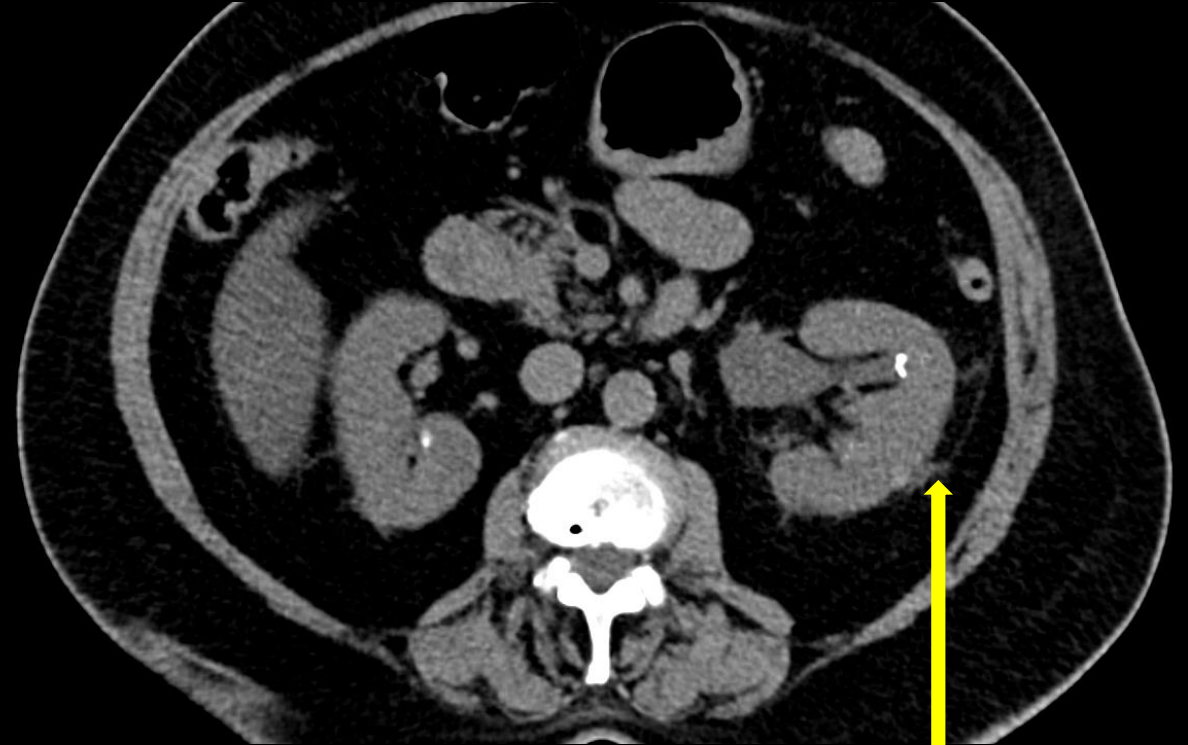


CT Abdomen/Pelvis Without Contrast (additional labeled findings)



Normal right collecting system

**Mild left hydronephrosis
(dilated renal pelvis)**



**Subtle left
perinephric stranding**

Final Dx:

Obstructing Left Distal Ureteral Calculus

Case Discussion

- Urolithiasis develops when urine becomes supersaturated with stone-forming solutes, allowing crystal nucleation, growth, and aggregation.¹
- Calcium-containing stones are the most common type of kidney stone.¹
- Hypercalciuria is a major risk factor for calcium stone formation; systemic causes include primary hyperparathyroidism.²
- Primary hyperparathyroidism can increase filtered calcium load and urinary calcium, contributing to nephrolithiasis.²
- This patient has recurrent nephrolithiasis with a history of hyperparathyroid adenoma/MEN1 and prior parathyroidectomy.
- Her CT demonstrated bilateral renal calcifications predominantly centered within the medullary pyramids, consistent with medullary nephrocalcinosis.
- Stone composition was not available; hyperparathyroidism is a relevant risk factor, not a proven cause of these specific stones.

Case Discussion

- Ureteral stones commonly present with acute flank pain, hematuria, nausea, and vomiting.³
- Noncontrast CT is the imaging study of choice for acute flank pain with suspected stone disease.⁴
- CT reliably characterizes stone size and location, detects complications, and can identify alternative causes of pain.⁴
- Secondary signs of obstruction include hydroureteronephrosis and perinephric/periureteric inflammatory change.
- In this case: 6 mm obstructing distal left ureteral calculus with mild-to-moderate hydroureteronephrosis and subtle left perinephric/periureteric stranding.
- Additional findings: innumerable bilateral renal calculi.

Case Discussion

- Management depends on stone size/location, symptoms, degree of obstruction, renal function, and evidence of infection.⁵
- Observation is reasonable for selected patients without complications; reconsider if infection, refractory pain, or renal deterioration develops.⁵
- α -blockers may be offered as medical expulsive therapy for distal ureteral stones 5–10 mm; benefit is greatest for distal stones >5 mm.⁵
- Sepsis with an obstructing stone requires urgent collecting-system decompression by ureteral stent or percutaneous nephrostomy plus antibiotics.⁵
- Active removal is considered for low likelihood of passage, persistent pain, persistent obstruction, or renal insufficiency.⁵
- Patient course: discharged with tamsulosin 0.4 mg, cephalexin 500 mg, hydrocodone/acetaminophen 5-325mg, ondansetron 4mg, and outpatient urology follow-up.

References

- 1. National Institute of Diabetes and Digestive and Kidney Diseases. Definition & Facts for Kidney Stones. U.S. Department of Health and Human Services.
- 2. Bilezikian JP, et al. Primary Hyperparathyroidism; Maalouf NM. Nephrolithiasis. Endotext Internet. NCBI Bookshelf.
- 3. National Institute of Diabetes and Digestive and Kidney Diseases. Symptoms & Causes of Kidney Stones.
- 4. Expert Panel on Urological Imaging. ACR Appropriateness Criteria® Acute Onset Flank Pain–Suspicion of Stone Disease (Urolithiasis). J Am Coll Radiol. 2023;20(11S):S315-S328.
- 5. European Association of Urology. EAU Guidelines on Urolithiasis. 2026.