AMSER Case of the Month January 2021

Radiographic Investigation of an Ileal Conduit

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AMSER

Patient Presentation: a 66 y/o male with…

Pertinent PMHx

- Urothelial cell bladder carcinoma
  - TURBT, multiple tumors. 70% of bladder and prostatic urethra. HG T-1
- Prostatic adenocarcinoma
- COPD, HTN, HLD, Spinal Stenosis

- SurgHx
  - Cystoprostatectomy, 2016
    - Pelvic lymph node dissection
    - Ileal conduit c/b SBO and urine leak of proximal conduit
  - Incisional Hernia Repair, Parastomal 2016

- SocialHx
  - 45 pack-years; last 2018

Hospital Admission; OSH Transfer

- P/w Intermittent, "intense" b/l flank pain
  - +ve: Nausea/ Vomiting
  - -ve: Fever, changes in vision, angina, dyspnea, falls
- From OSH transfer notes
  - Hypotensive
  - Leukocytosis 22.5
  - AKI Cr 2.8
  - UTI
  - CT showing concern for obstruction at left ureteroenteric anastomosis

Pertinent Labs

- Cr 2.48 mg/dL
- WBC 22.5
- UA
  - +3 LE, +3 Blood, +1 Protein
- Urine Microanalysis
  - >180 WBC/hpf
  - 38 RBC/hpf

What Imaging Should We Order?

- s/p radical cystectomy
- CT from OSH showed hydroureteronephrosis
- Concern for stricture or obstructing calculus

→Retrograde flow imaging (loopogram), ideal modality to identify possible anastomotic stricture s/p urinary diversion

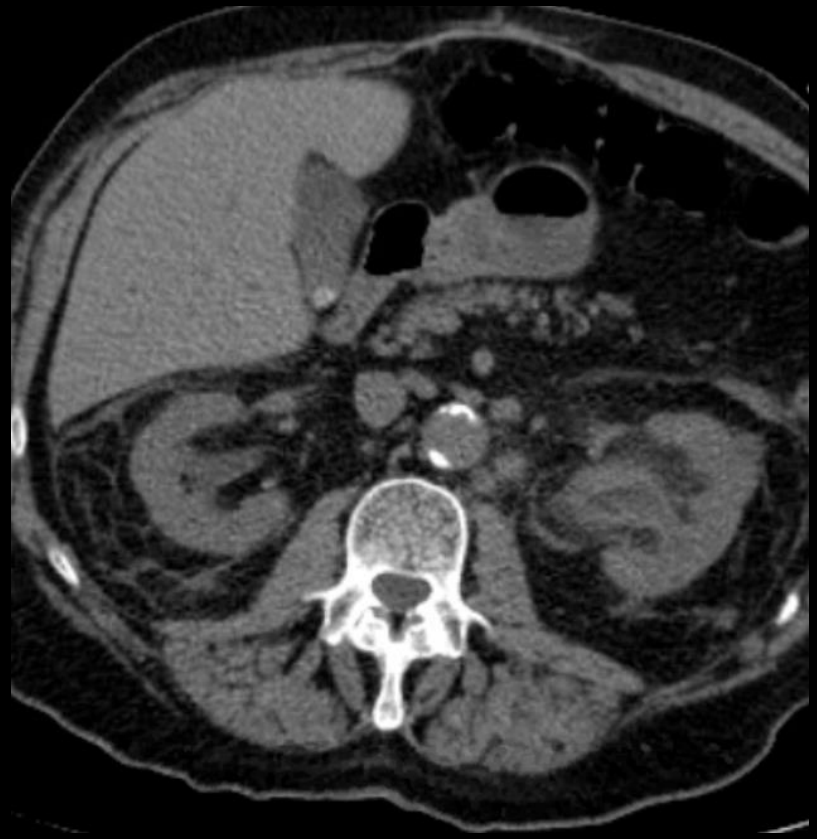
ACR Appropriateness Criteria

Variant 3: **Muscle-invasive bladder cancer with or without cystectomy. Post-treatment surveillance.**

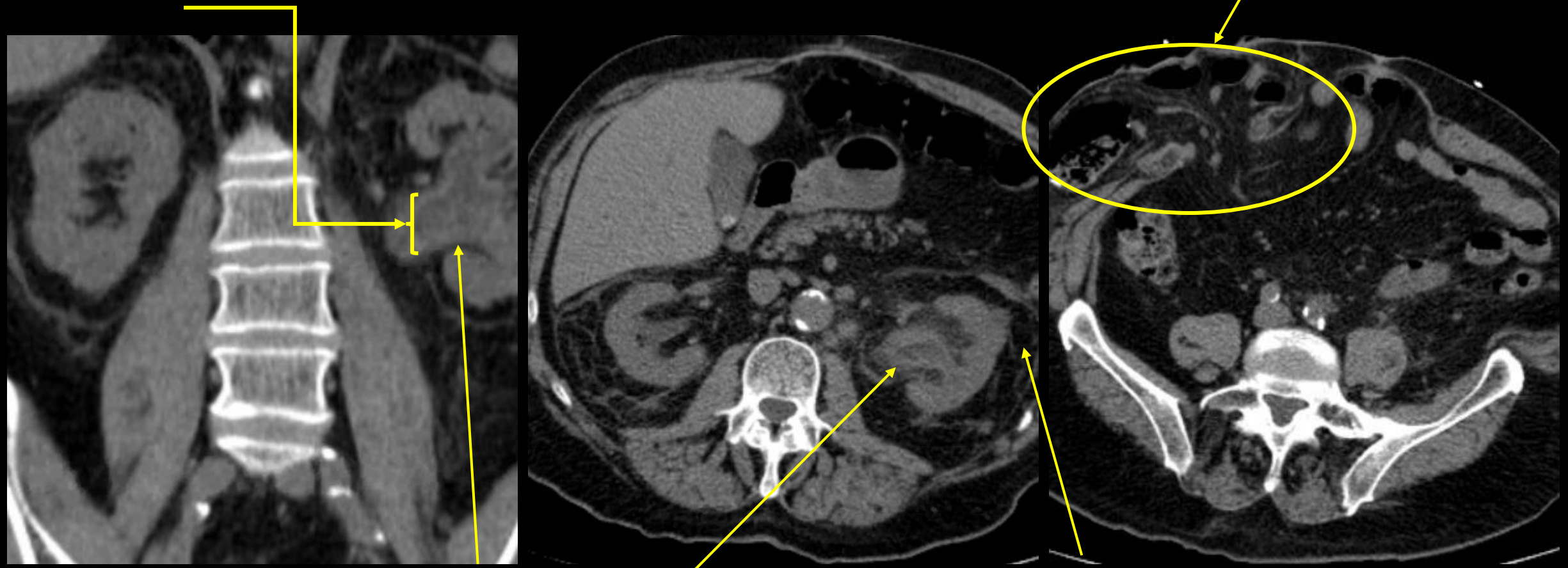
Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☢
Fluoroscopy abdomen loopogram	Usually Appropriate	☢☢☢
MRI abdomen and pelvis without and with IV contrast	Usually Appropriate	O
MRU without and with IV contrast	Usually Appropriate	O
CT abdomen and pelvis with IV contrast	Usually Appropriate	☢☢☢
CTU without and with IV contrast	Usually Appropriate	☢☢☢☢
MRI abdomen and pelvis without IV contrast	May Be Appropriate (Disagreement)	O
CT chest with IV contrast	May Be Appropriate	☢☢☢
CT chest without IV contrast	May Be Appropriate	☢☢☢
CT abdomen and pelvis without and with IV contrast	May Be Appropriate (Disagreement)	☢☢☢☢
FDG-PET/CT skull base to mid-thigh	May Be Appropriate	☢☢☢☢
US pelvis (bladder)	Usually Not Appropriate	O
Radiography intravenous urography	Usually Not Appropriate	☢☢☢
CT abdomen and pelvis without IV contrast	Usually Not Appropriate	☢☢☢
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢

This imaging modality was ordered by attending urologist

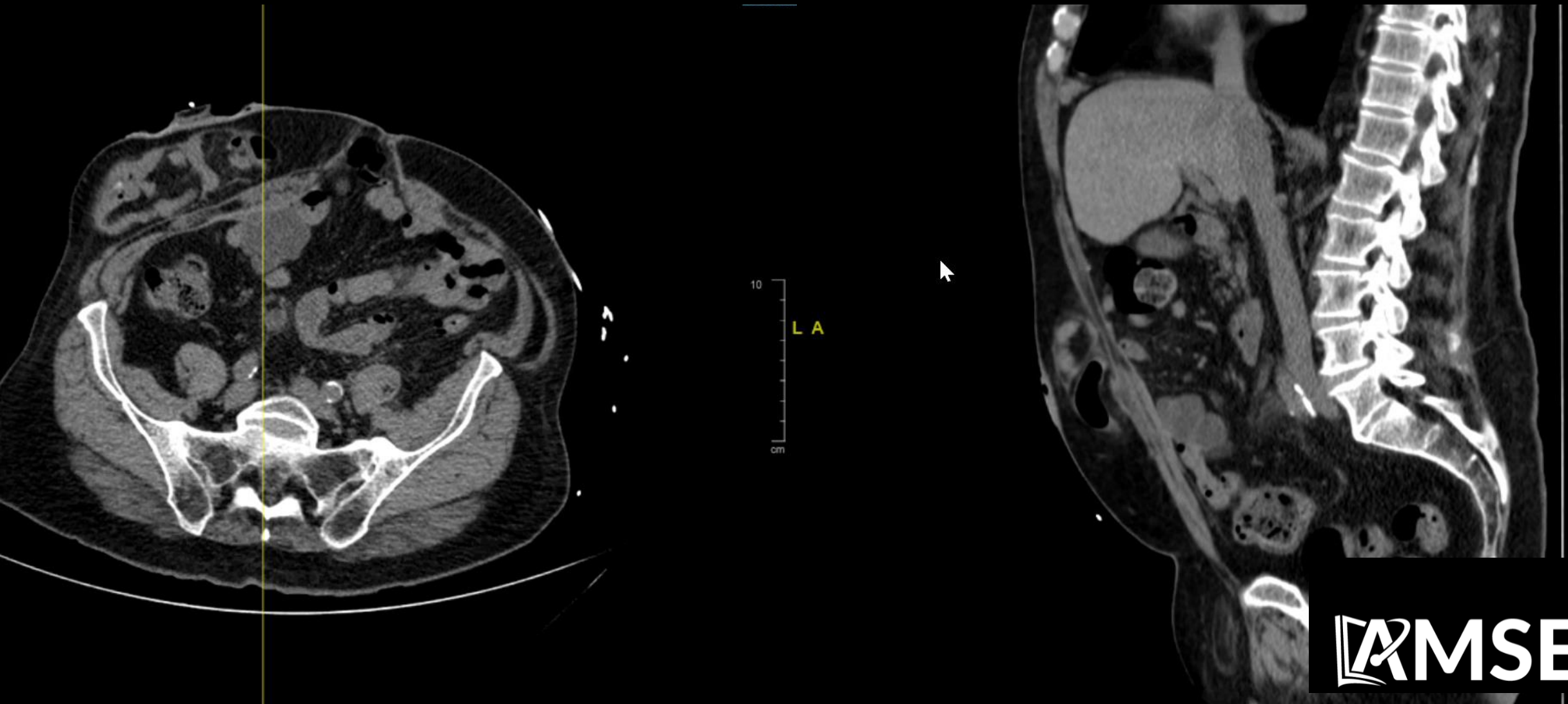
Prior CT Findings (unlabeled)



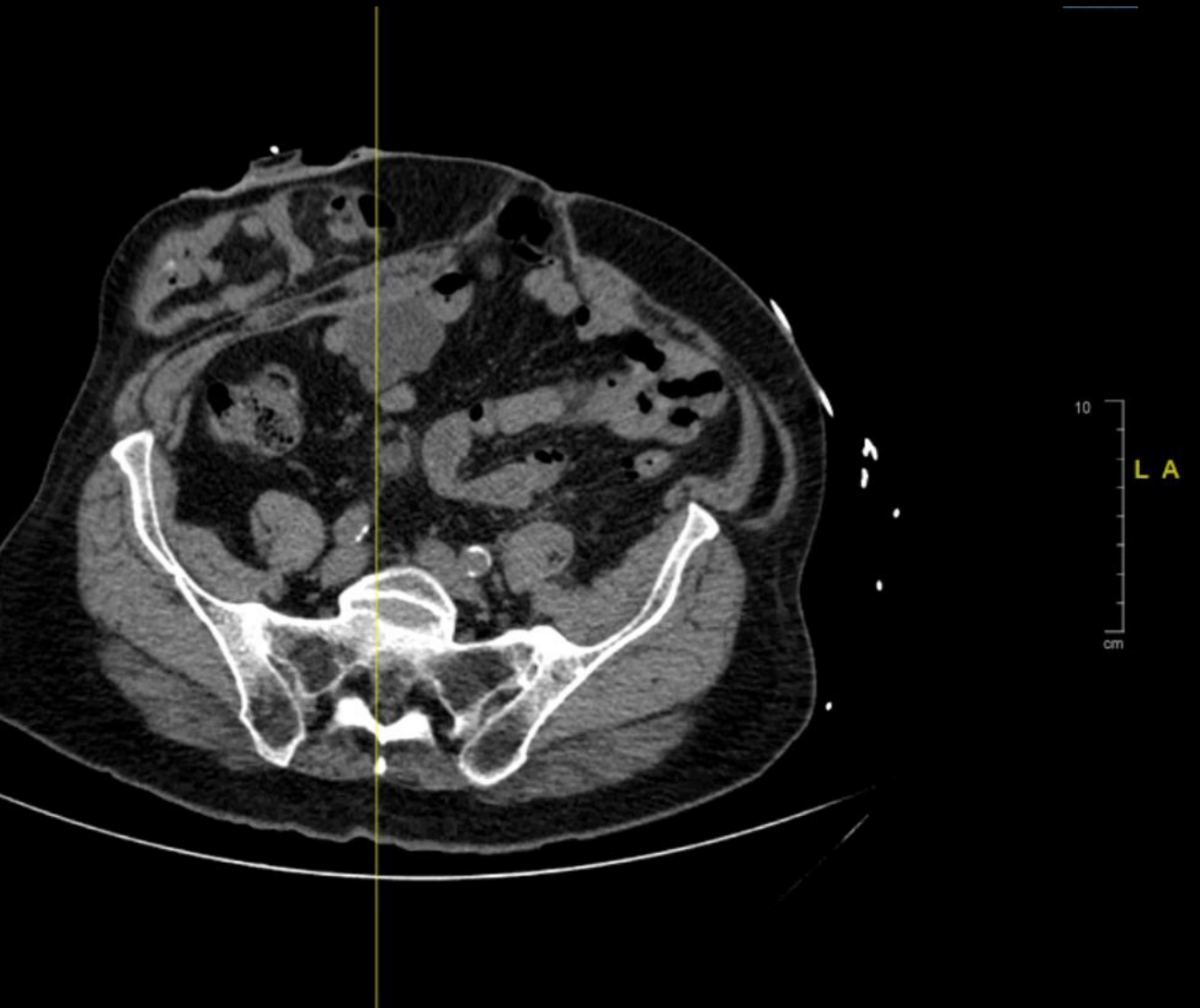
Findings: (labeled)

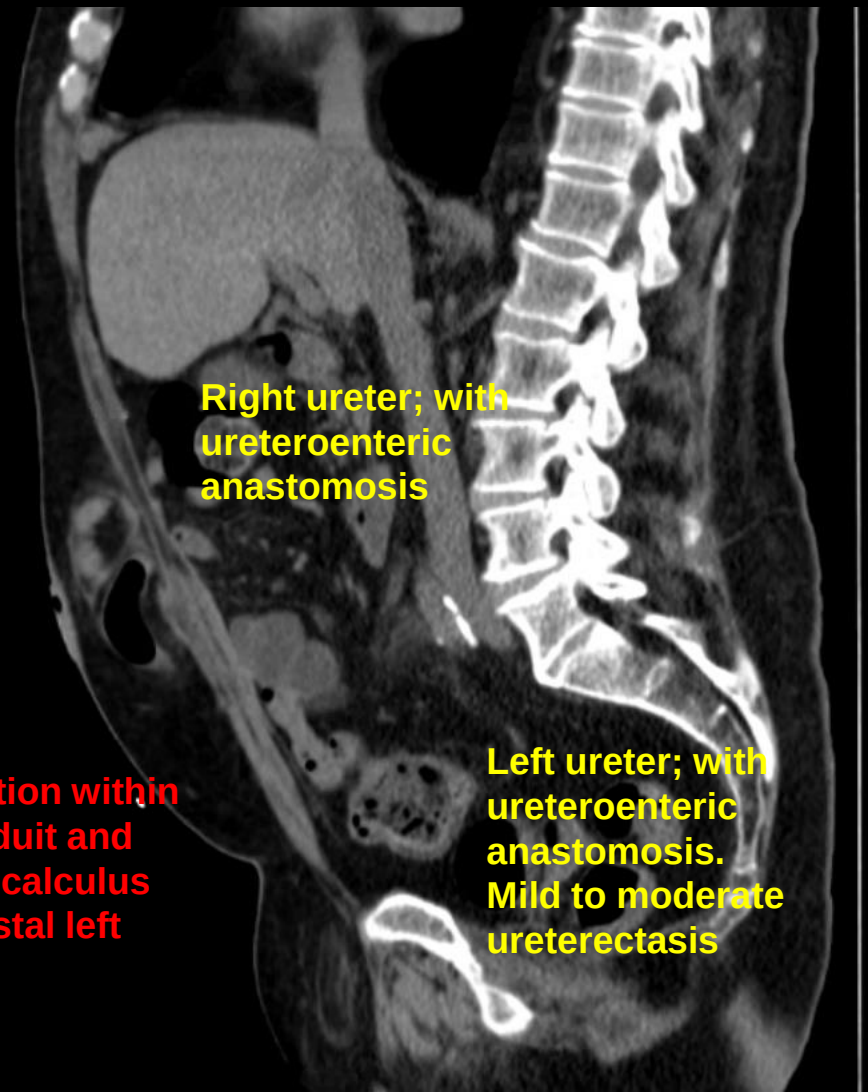


Prior CT Findings continued (unlabeled)



Findings continued (labeled)





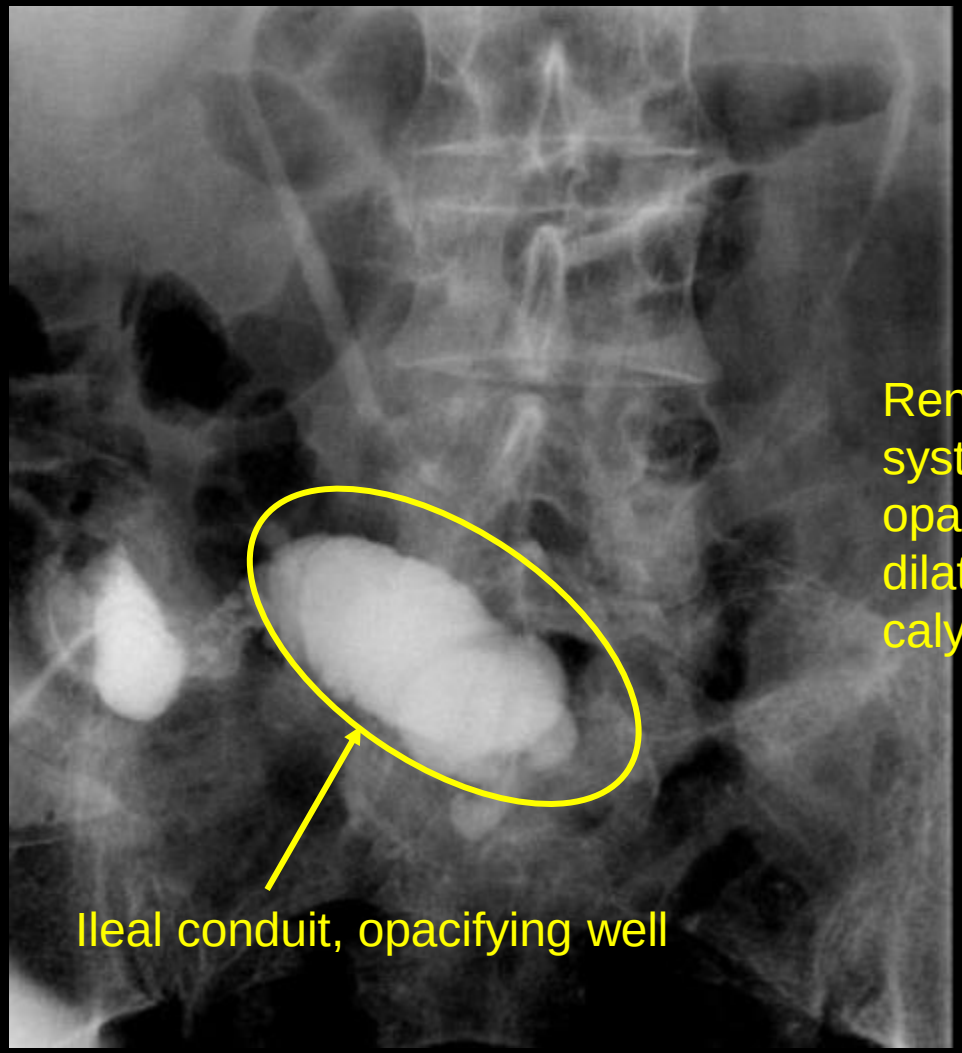
Calcification within ileal conduit and possible calculus within distal left ureter

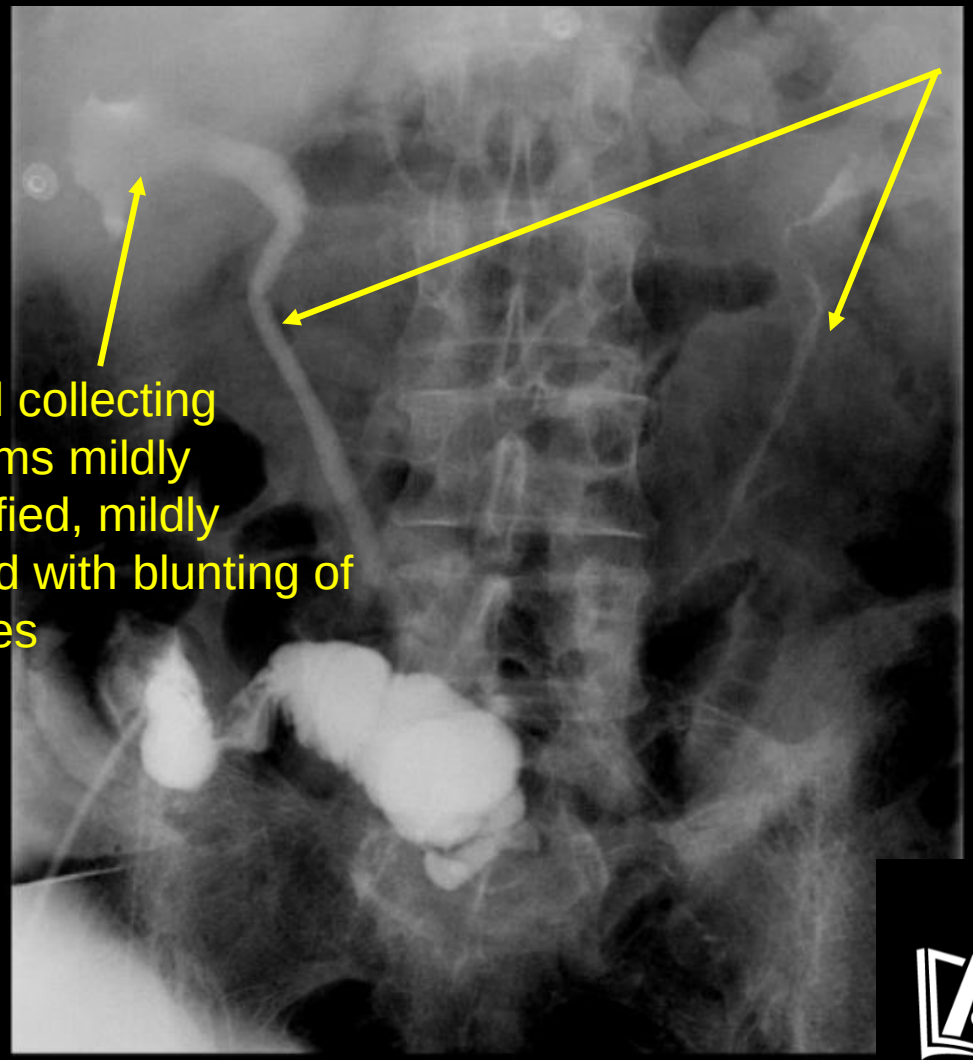
The previous CT findings were from an OSH; concerning for stricture at the anastomosis

Loopography was performed to assess for stricture/outflow obstruction

Loopography Findings continued (unlabeled)

Loopogram Findings continued (labeled)





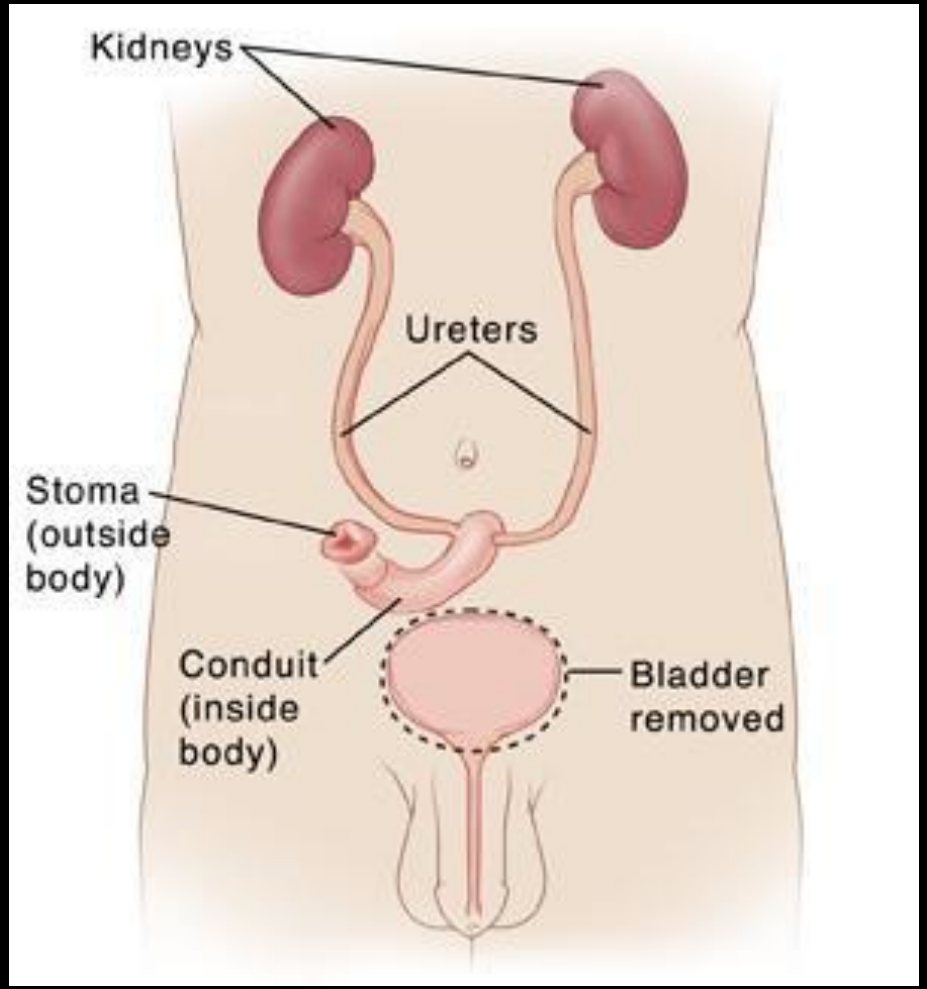
Final Diagnosis:

- Retrograde flow from conduit to renal collecting systems excludes stricture at ureteroenteric anastomosis
- Non-obstructing calcifications within ileal conduit, likely post-operative calcific changes
- Small calcification at left distal ureter, likely dystrophic calcification versus non-obstructive calculus, unchanged from previous study
- Urothelial thickening in the renal pelvicalyceal system, nonspecific for inflammatory process
- AKI etiology is likely not post-renal or obstructive

Ileal Conduits

For the purpose of urinary diversion

- Indications
  - s/p cystectomy
  - Neurogenic bladder with threatening renal impairment
  - Radiation injury to bladder
  - Intractable incontinence
- Many short- and long-term complications
  - Bowel leak/obstruction most common (60%)
  - Renal impairment/AKI (20%)



CT Urogram vs. Loopogram

CT Urogram enhanced and unenhanced images

- Scout images & split bolus IV contrast
  - Split bolus protocol to reduce radiation exposure
- Capture of nephrographic and urographic phases in a single image acquisition
- Excretory phase visualizes renal collecting system and ureters
- Identification of **pathology** or **disease recurrence**

Fluoroscopic Loopogram

- Visualization of collecting systems and ureters (renal-independent study)
- Used to identify **post-operative leaks** and exclude **stricture** at the ureteroileal anastomosis

Complications of Ileal Conduits

Complication	Total (%)	Median time to occurrence, years (range)	Probability of experiencing complication			
			5 years	10 years	15 years	20 years
Any complication	**643 (60.8%)**	**1.1 (0.1-25.7)**	**58.9%**	**69.6%**	**75.8%**	**79.9%**
Bowel	**215 (20.3)**	**1.5 (0.1-17.3)**	**18.0%**	**23.2%**	**29.3%**	**31.0%**
→ Bowel Obstruction	169 (16.0)	1.7 (0.1-17.3)	14.3%	18.5%	24.0%	25.7%
Abscess	38 (3.6)	0.9 (0.1-21.6)	3.3%	4.2%	4.9%	4.9%
Fistula	29 (2.7)	1.9 (0.1-21.1)	2.5%	2.9%	4.1%	4.9%
Renal	**213 (20.2)**	**2.2 (0.1-29.6)**	**17.9%**	**24.1%**	**29.6%**	**34.4%**
→ Renal failure (Cr>2.0 mg/dL)*	201 (19.0)	2.3 (0.1-29.6)	16.7%	22.8%	28.1%	33.0%
Loss of functional renal unit	22 (2.1)	2.4 (0.2-23.5)	1.8%	2.9%	3.6%	3.6%
Dialysis-dependence	26 (2.5)	8.4 (0.9-23.5)	1.5%	3.1%	4.8%	6.8%
Infectious	**174 (16.5)**	**1.8 (0.1-25.7)**	**15.2%**	**20.3%**	**24.0%**	**27.0%**
→ Pyelonephritis	127 (12.0)	2.3 (0.1-25.7)	10.3%	14.4%	17.8%	20.7%
→ Recurrent urinary tract infections	73 (6.9)	2.1 (0.1-21.6)	6.7%	9.2%	10.4%	11.8%
Stomal	**163 (15.4)**	**2.3 (0.2-23.4)**	**14.9%**	**20.7%**	**23.8%**	**25.0%**
→ Peristomal hernia	147 (13.9)	2.4 (0.2-18.3)	13.8%	19.2%	22.3%	23.6%
Stomal stenosis	22 (2.1)	9.2 (0.2-23.4)	1.1%	1.5%	3.4%	3.4%
Urolithiasis	**162 (15.3)**	**2.5 (0.1-24.9)**	**14.6%**	**19.9%**	**23.3%**	**27.4%**
Upper tract urolithiasis	141 (13.3)	2.5 (0.1-24.9)	12.2%	16.6%	20.2%	24.3%
→ Conduit stones	48 (4.5)	3.0 (0.2-22.9)	4.8%	6.4%	7.5%	7.5%
Metabolic	**135 (12.8)**	**1.9 (0.1-25.9)**	**11.0%**	**14.9%**	**17.8%**	**22.0%**
Metabolic acidosis	108 (10.2)	1.0 (0.1-24.2)	9.8%	12.1%	14.1%	16.1%
Vitamin B12 Deficiency	32 (3.0)	9.1 (0.4-25.8)	1.3%	3.2%	4.8%	8.0%
Structural	**122 (11.5)**	**1.5 (0.1-25.0)**	**10.6%**	**13.0%**	**16.7%**	**18.6%**
★ Anastomotic stricture	106 (10.0)	1.1 (0.1-25.0)	10.1%	11.5%	13.5%	14.8%
Conduit stricture	25 (2.4)	9.4 (0.2-24.1)	0.9%	2.1%	4.7%	5.9%

RULE OUT

Loopogram

- Foley catheter inserted into the stoma
  - Balloon is inflated with 5 to 8 mL of contrast material
- Instill contrast through catheter via hand injection
- Under fluoroscopy, observe for retrograde flow
- Contrast opacificatiom of ureters and pelvicalyceal system

- Mild ureterectasis, pelvicaliectasis, with mild hydronephrosis may be normal in a patient with urinary diversion. This dilation occurs because there is no surgical construct to prevent reflux at the time the conduit is created.

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