

# AMSER Case of the Month

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Chronic pyelonephritis

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# Patient Presentation

**HPI:** 64 y/o F with increasing and constant Rt flank for past 2 days.

**PMH:** Recurrent UTIs, xanthogranulomatous pyelonephritis, nephrolithiasis, PAD, morbid obesity, HLD, RA, ovarian mass

**PSHx:** cystoscopy w/ laser lithotripsy, ureteral stents, toe amputation, hysterectomy, colostomy,

**Meds:** ASA, atorvastatin, hydroxychloroquine, omeprazole

**Substance Use Hx:** current smoker (63 pack yrs)

# Pertinent Labs

CMP/CBC: WBC 17k with 85% Polys, Hgb 9.7, ALP 292, Cr 0.53

U/A: +3 LE, WBC too numerous to count, cloudy

Urine Cx: 30,000 CFU/mL mixed gram +

Gram stain: gram + cocci in pairs, chains and clusters. Rare gram -

What Imaging Should We Order?

# Select the applicable ACR Appropriateness Criteria

## Variant 2:

**Acute pyelonephritis. Complicated patient (eg, diabetes or immunocompromised or history of stones or prior renal surgery or not responding to therapy). Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	⊗ ⊗ ⊗
CT abdomen and pelvis without and with IV contrast	Usually Appropriate	⊗ ⊗ ⊗ ⊗
MRI abdomen without and with IV contrast	May Be Appropriate	0
CT abdomen and pelvis without IV contrast	May Be Appropriate	⊗ ⊗ ⊗
MRI abdomen and pelvis without and with IV contrast	May Be Appropriate (Disagreement)	0
MRI abdomen and pelvis without IV contrast	May Be Appropriate	0
MRI abdomen without IV contrast	May Be Appropriate	0
US color Doppler kidneys and bladder retroperitoneal	May Be Appropriate	0
Tc-99m DMSA scan kidney	May Be Appropriate	⊗ ⊗ ⊗
Fluoroscopy voiding cystourethrography	Usually Not Appropriate	⊗ ⊗
Radiography abdomen and pelvis (KUB)	Usually Not Appropriate	⊗ ⊗
Fluoroscopy antegrade pyelography	Usually Not Appropriate	⊗ ⊗ ⊗
Radiography intravenous urography	Usually Not Appropriate	⊗ ⊗ ⊗

This imaging modality was ordered by the ER physician



# Findings (unlabeled)



# Findings (unlabeled)



# Findings (unlabeled)



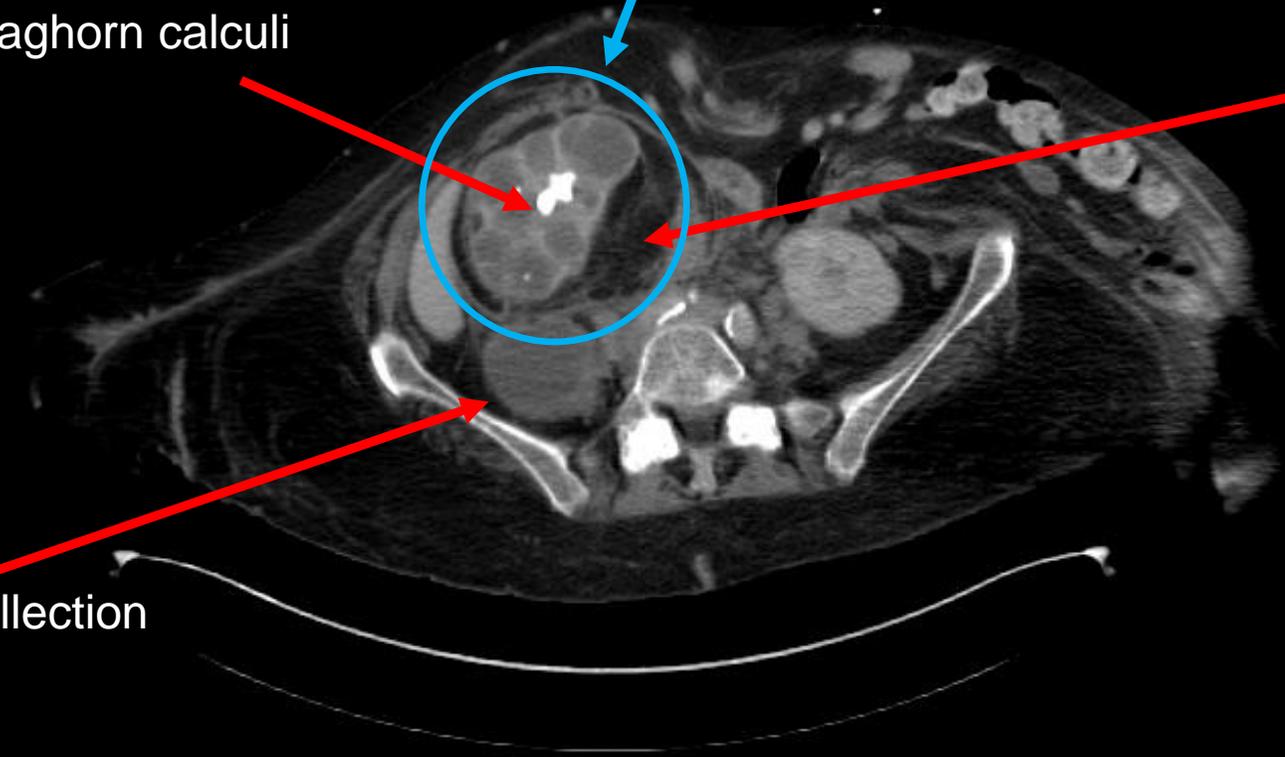
# Findings (labeled)

Dilated calyces with multiloculated appearance surrounded by granulomatous infiltration ("Bear Paw" Print)

Staghorn calculi

Fat proliferation & stranding

Pararenal fluid collection



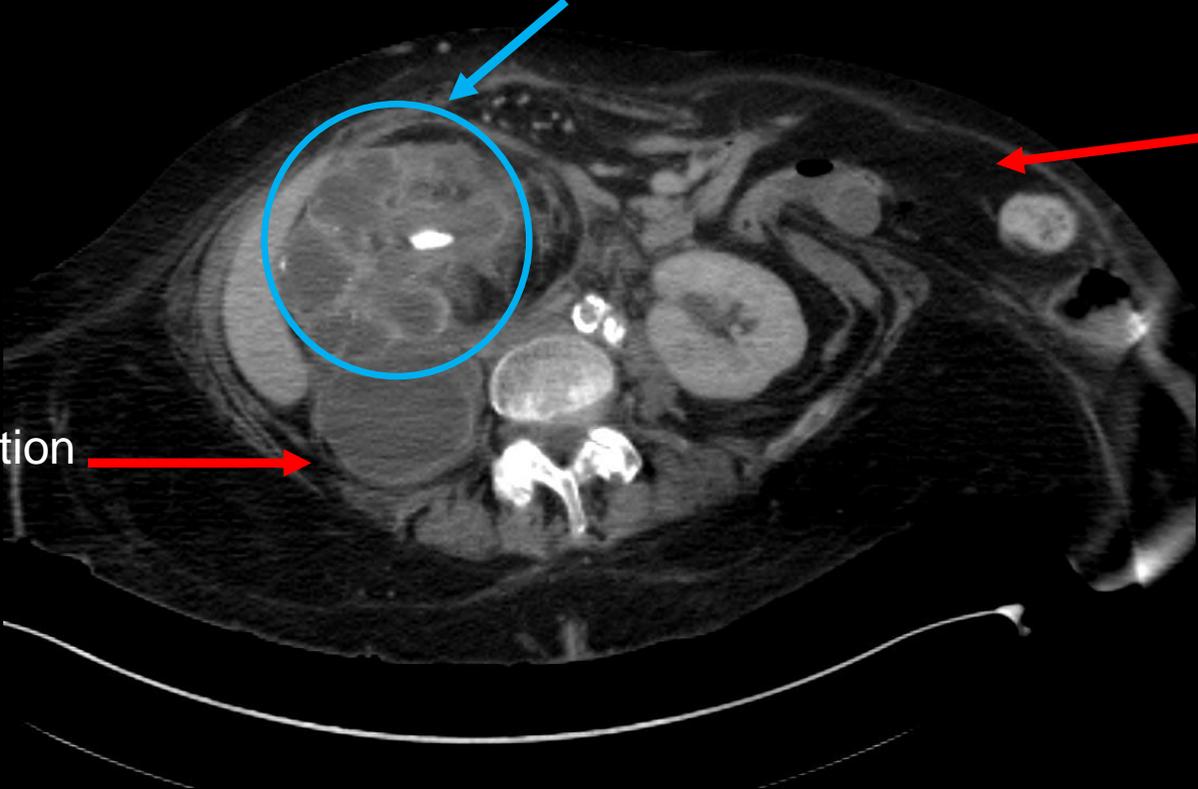
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# Findings (labeled)

Dilated calyces with multiloculated appearance surrounded by granulomatous infiltration ("Bear Paw" Print)

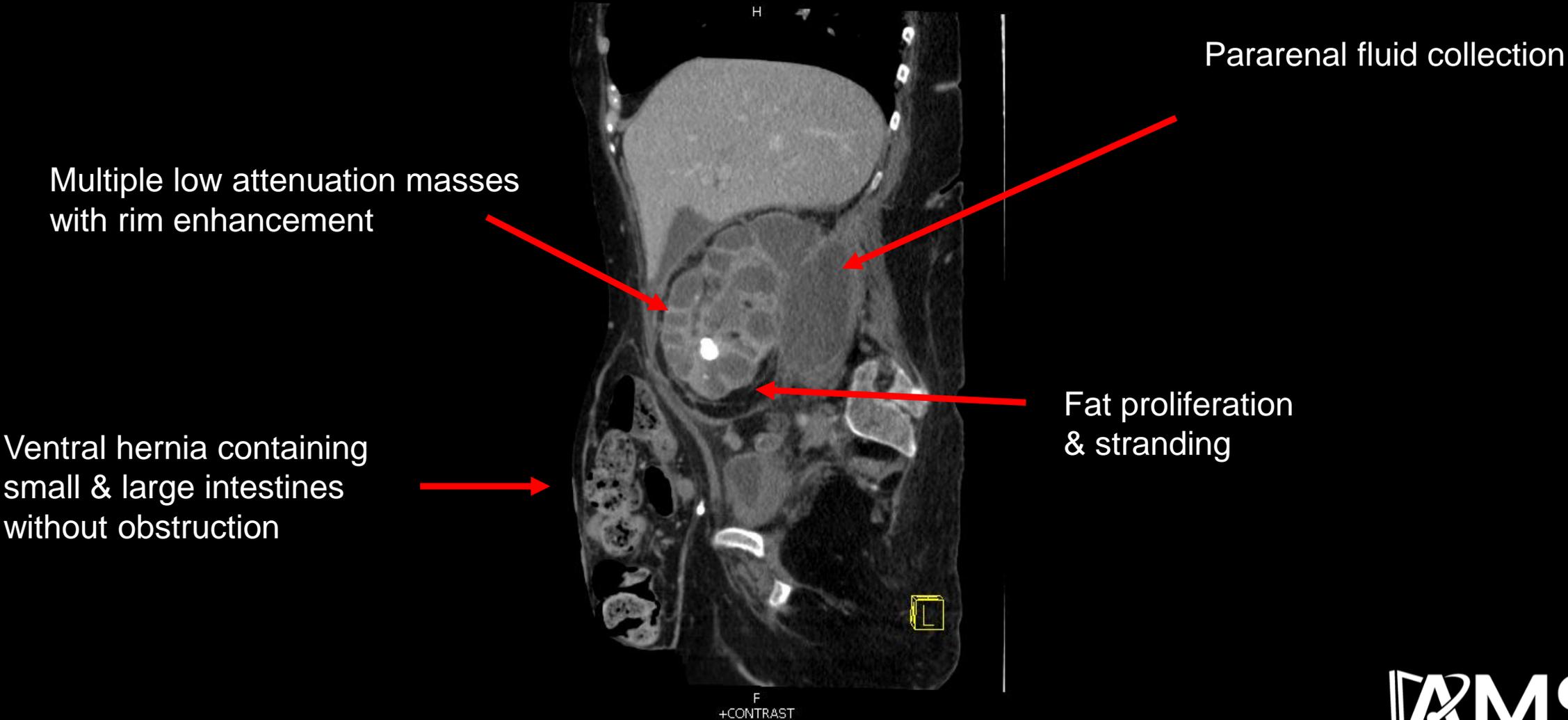
Ventral hernia containing bowel with no obstruction

Pararenal fluid collection



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# Findings (labeled)



Final Dx:

Xanthogranulomatous pyelonephritis (Stage III)

# Xanthogranulomatous pyelonephritis

Epidemiology: usually middle-aged to elderly female (2:1 female predilection). Increased incidence of UTIs w/ struvite stones and diabetes mellitus

Signs/Symptoms: malaise, weight loss, low-grade fever, flank pain, hematuria, pyuria, and positive Urine Cx. Often absent UTI symptoms.

Pathophysiology: chronic granulomatous inflammation 2/2 chronic infection with incomplete macrophage (lipid-laden) processing of bacteria (*E. coli* & *proteus*). Renal parenchyma replaced with reactive mass that can extend into adjacent tissues. Incomplete understanding of lipid & cholesterol accumulation. 90% caused by struvite stones.

# Radiographic Findings & Staging

CT: Enlarged kidney. Loss of normal renal outline with paradoxical contracted renal pelvis. Multiple low attenuation renal masses with rim enhancement. Dilated calyces with multiloculated appearance surrounded by granulomatous infiltration (**bear's paw sign**). Can have perinephric extension with thickening of Gerota's fascia. Calcification. Struvite stone.

US: centrally-located calculus, enlarged & distorted renal architecture

Forms: diffuse (90%) & focal/tumefactive (10%)

Staging: based off disease involvement of adjacent tissues

I= renal parenchyma

II= extension into perirenal fat

III= extend into perirenal & pararenal spaces or diffuse retroperitoneum

# Differential Diagnosis & Treatment

If typical features and entire kidney affected: XGPN vs renal tuberculosis

If focal disease or no staghorn calculi: Renal tuberculosis, Renal abscess, Renal cell carcinoma, angiomyolipoma

Treatment: Surgery (nephrectomy) and consider adjacent tissues/organs affected by XPGN extension

# References:

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<http://freeimagesonline.blogspot.com/2011/08/grizzly-bear-paw-print.html>