AUA 2026
Washington, DC
MAY 15-18

006IC - Disasters in Endourology and How to Avoid Them (continued)

Friday, May 15

Faculty

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PART 3

DISASTERS IN ENDOUROLOGY & HOW TO AVOID THEM

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POSTOPERATIVE COMPLICATIONS

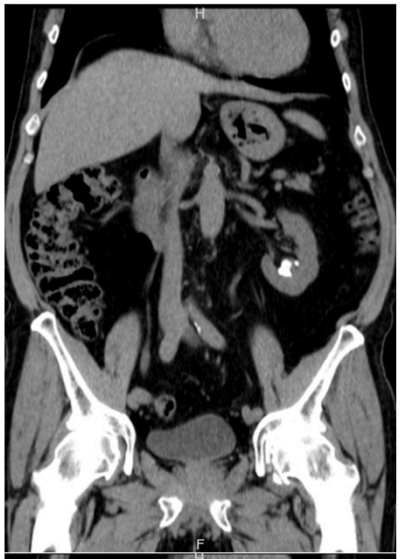
: “MAYHEM AND MANAGEMENT”

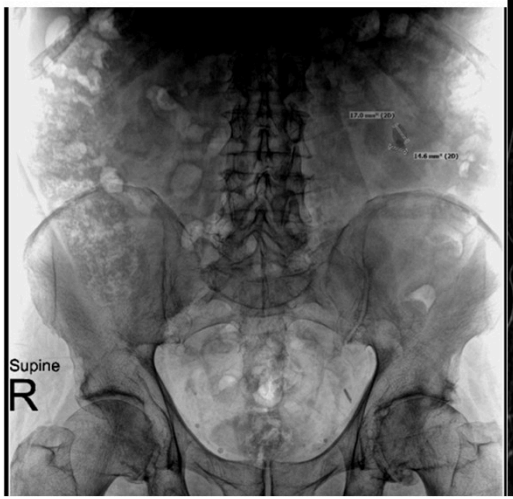
Retroperitoneal Hematoma

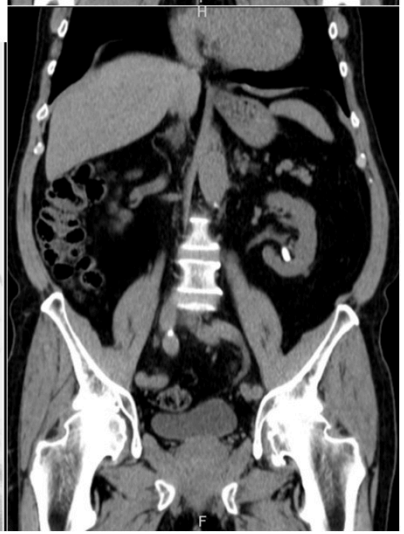
Dec

- 66y/o man
- Large Left lower pole stone

- Left stent placed, then
- **LEFT SWL on aspirin**





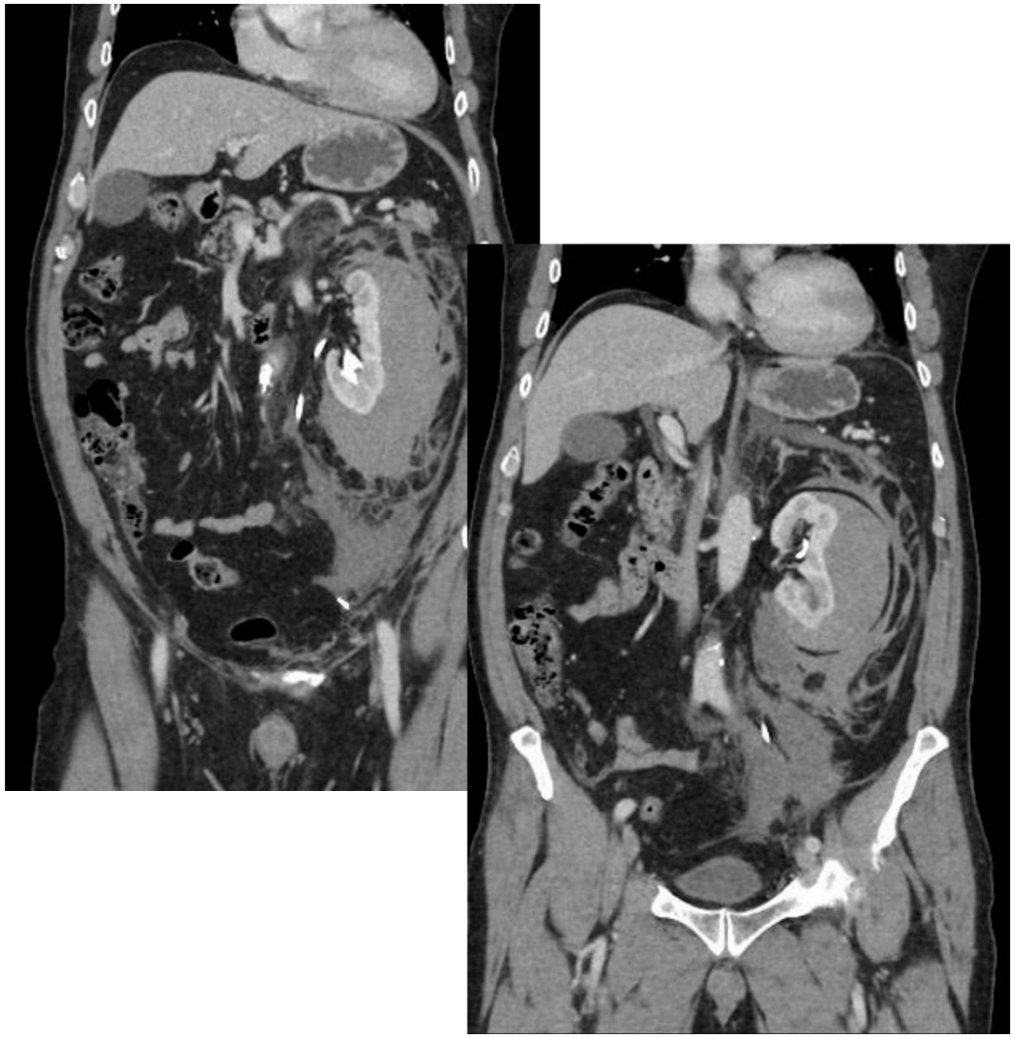


RPH
December

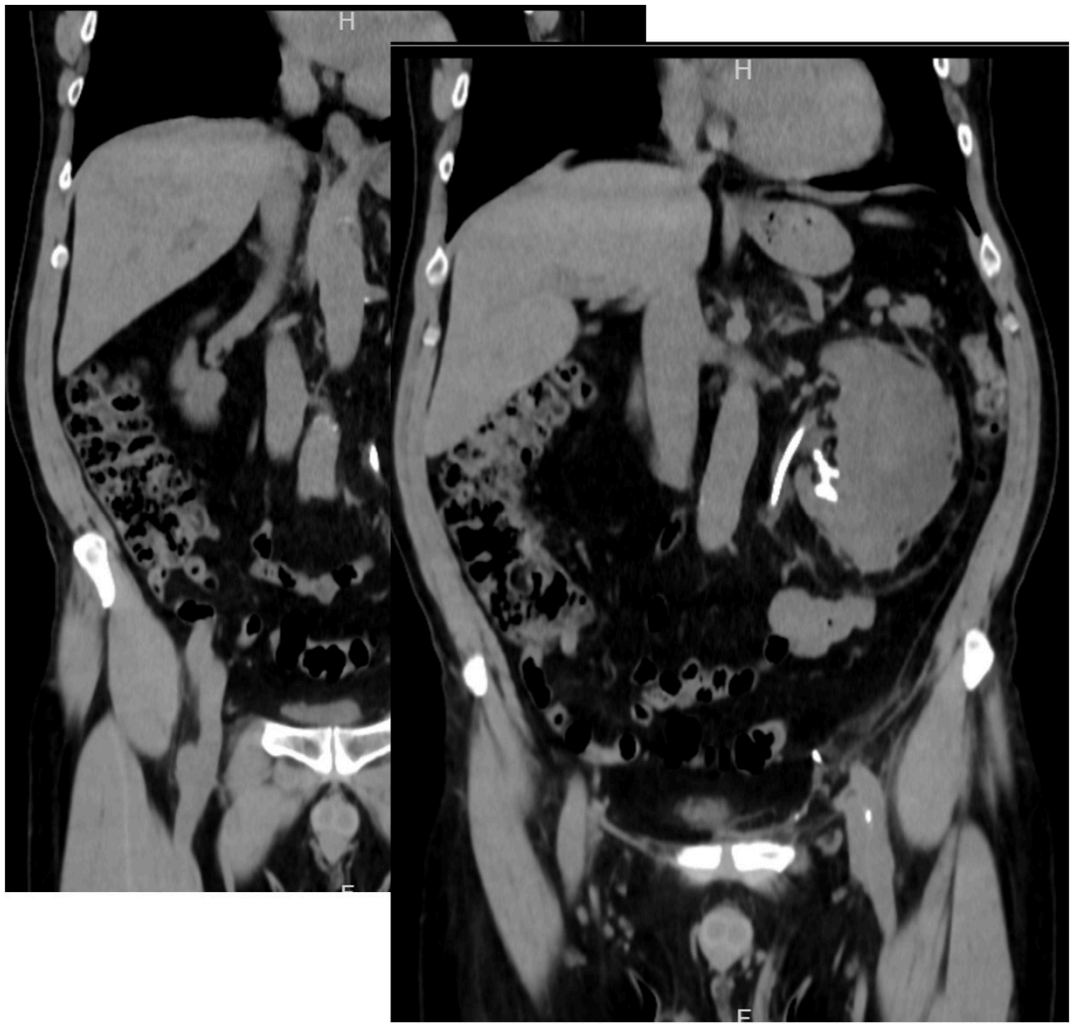
- Severe flank pain post op
- Diaphoretic
- Hg/HCT drop

- What next…..

RPH
December



RPH
January



RPH
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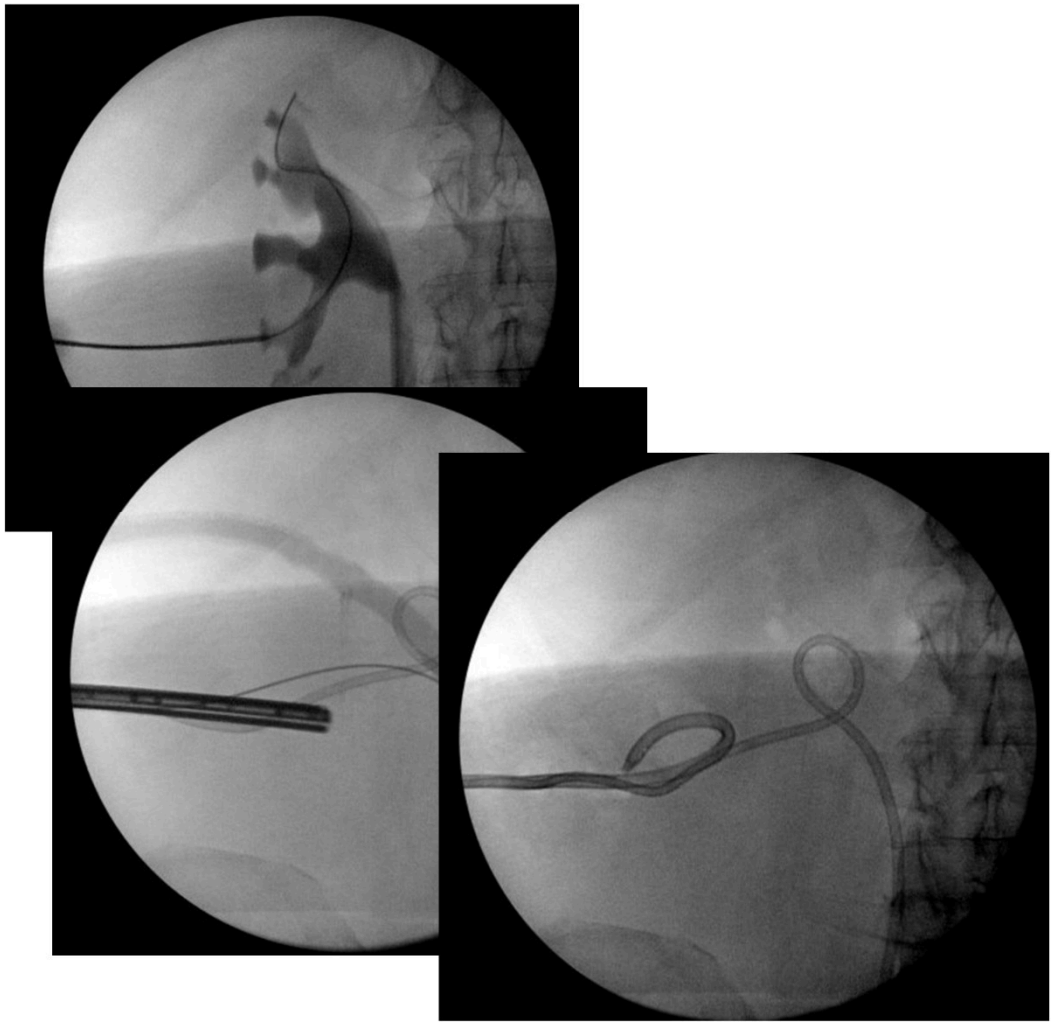
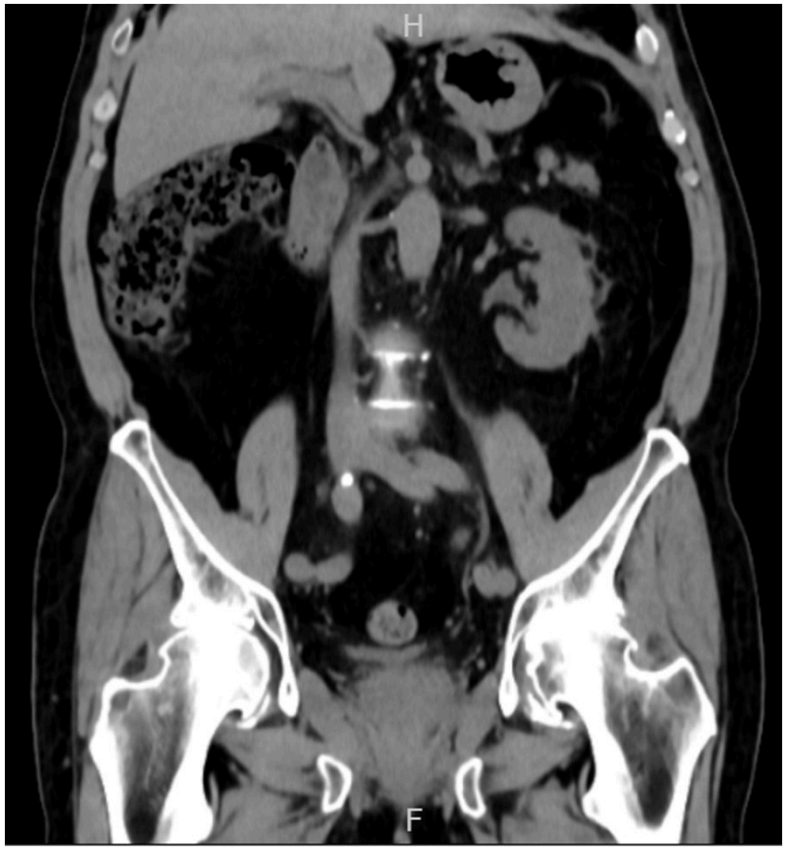


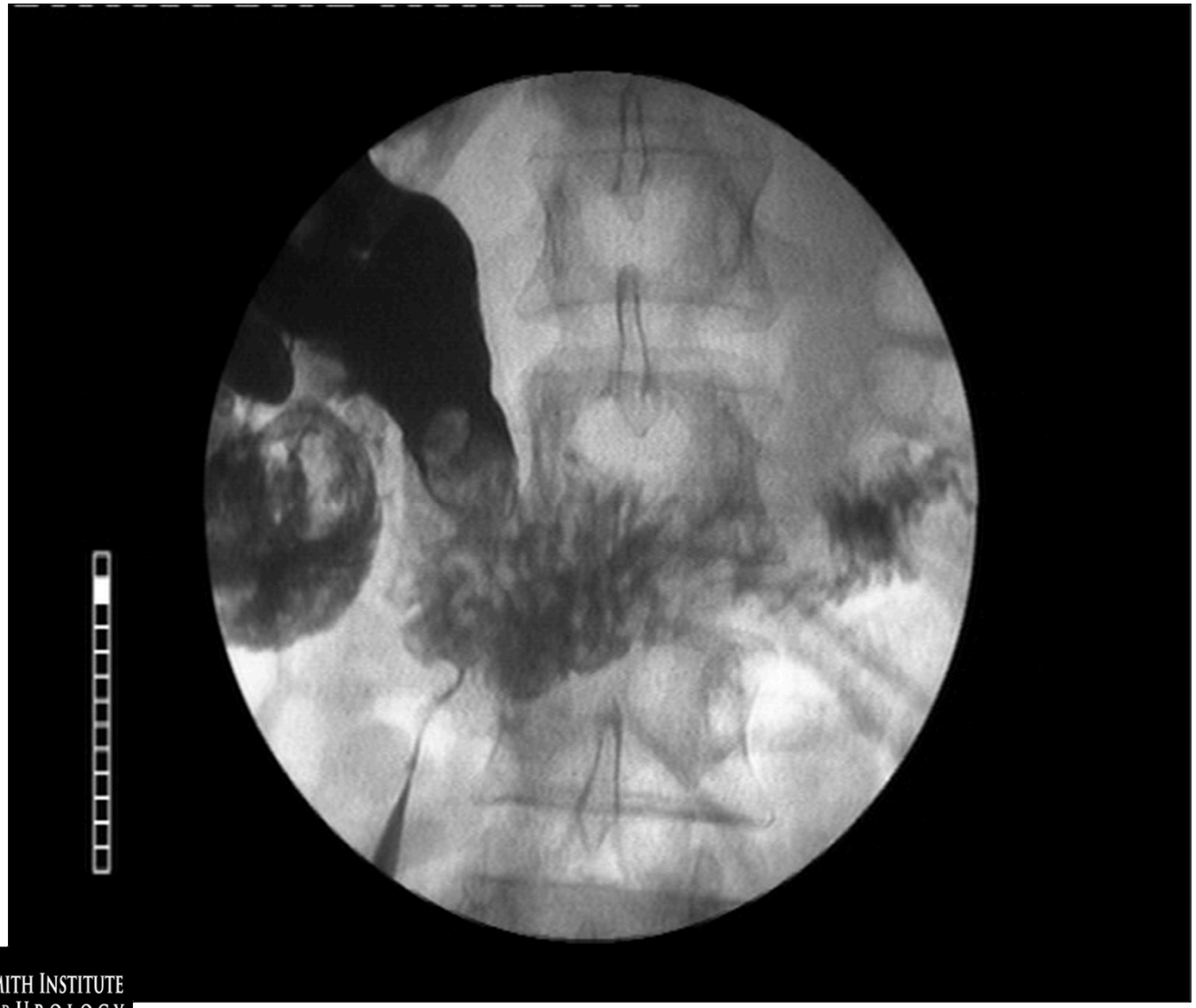
RPH

May



BOWEL INJURY

34 year female presenting with staghorn calculus of the right kidney, hydro- and pyonephrosis. During access to the pelvicalyceal system → injury to the duodenum



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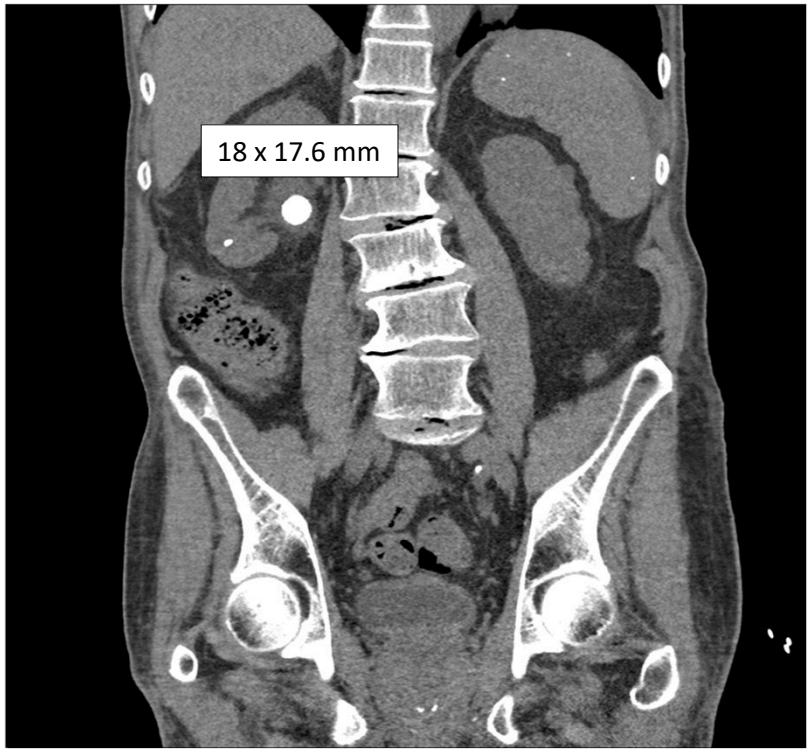
Case 1

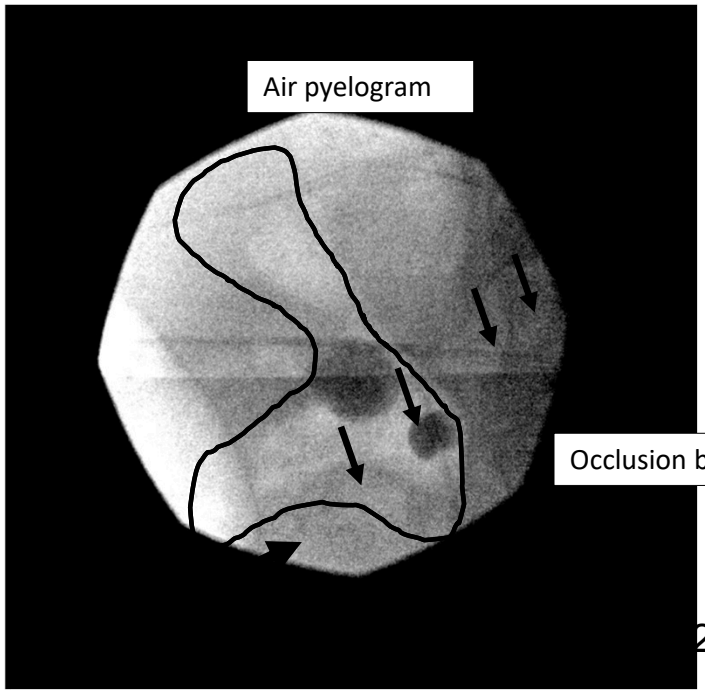
- 82-year old man with newly diagnosed metastatic prostate cancer was incidentally noted on CT obtained after a fall to have bilateral renal pelvic stones

Courtesy of
Professor Margaret Pearle, MD PhD
UT Southwestern Medical Center
Dallas, TX

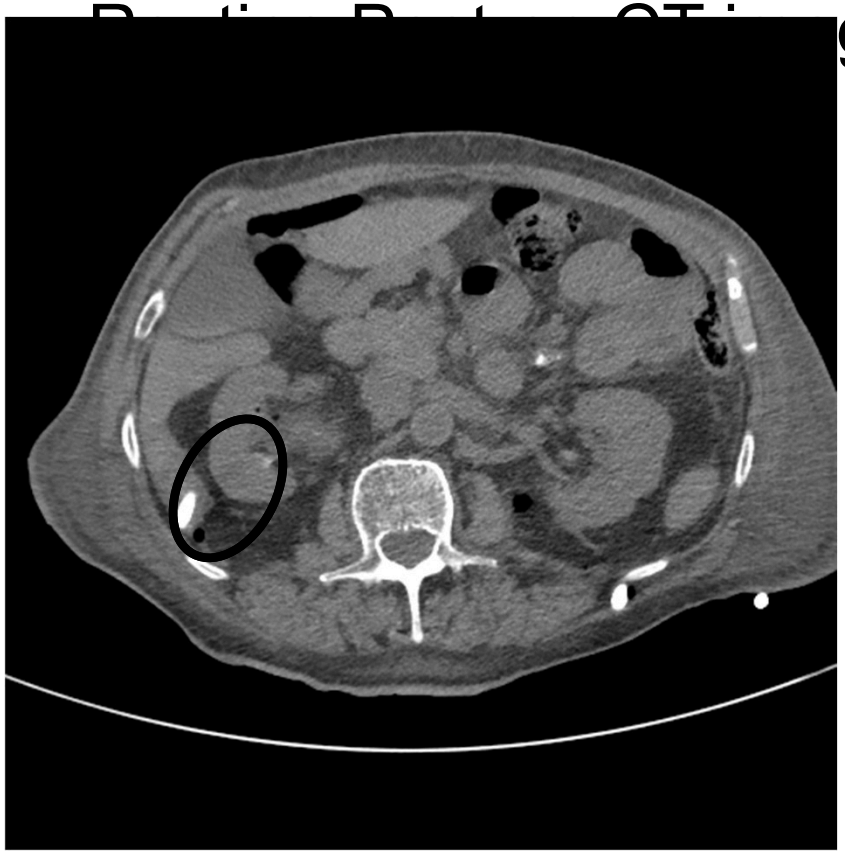

18 x 17.6 mm

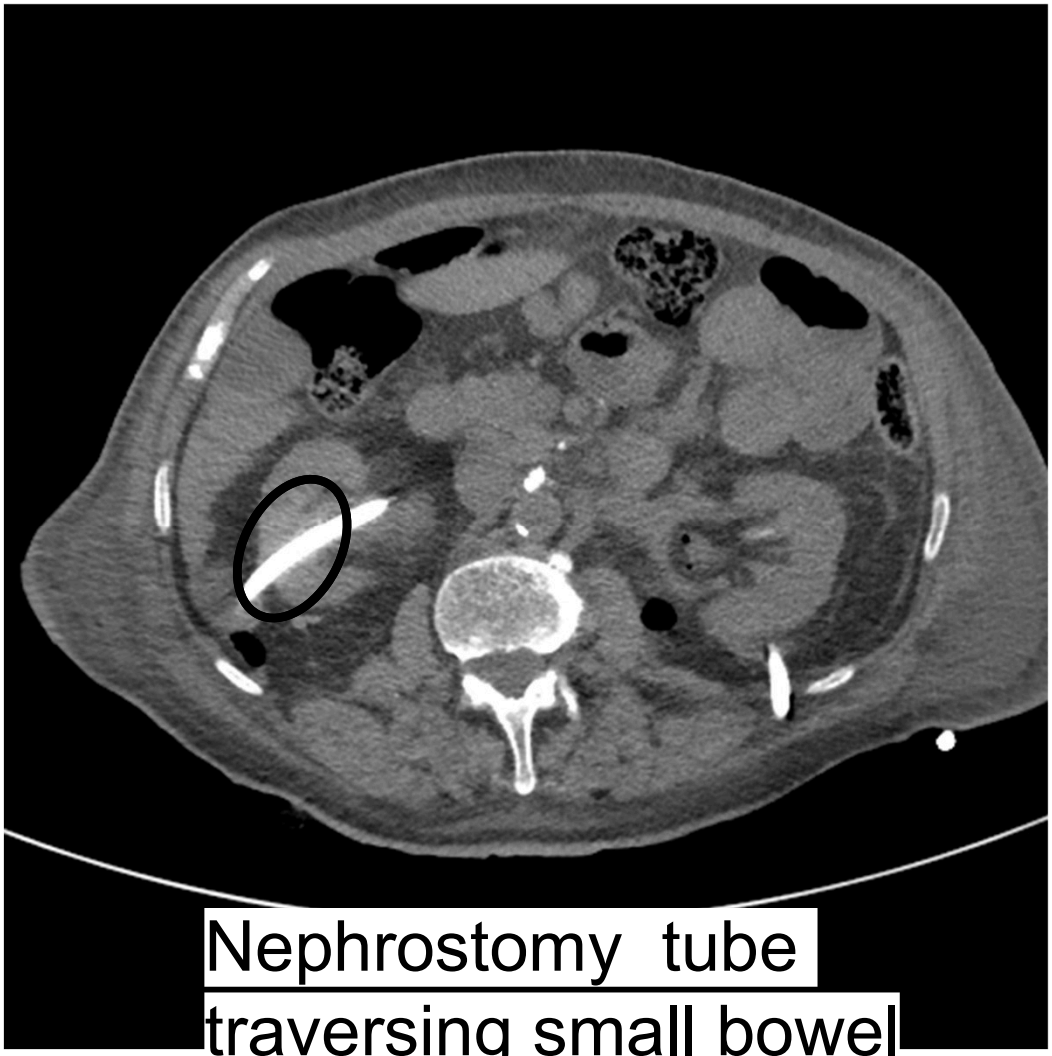
Access via right lower pole above 12th rib

Right Pcnl



Routine Post-op CT imaging




Nephrostomy tube
traversing small bowel

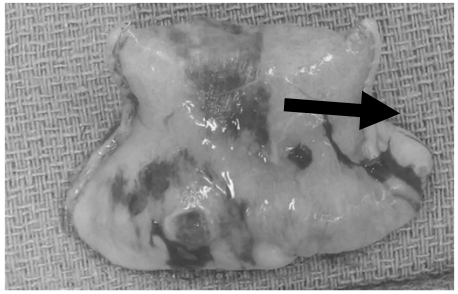
OPTIONS

- 1) Urgent exploration by general surgeons ?

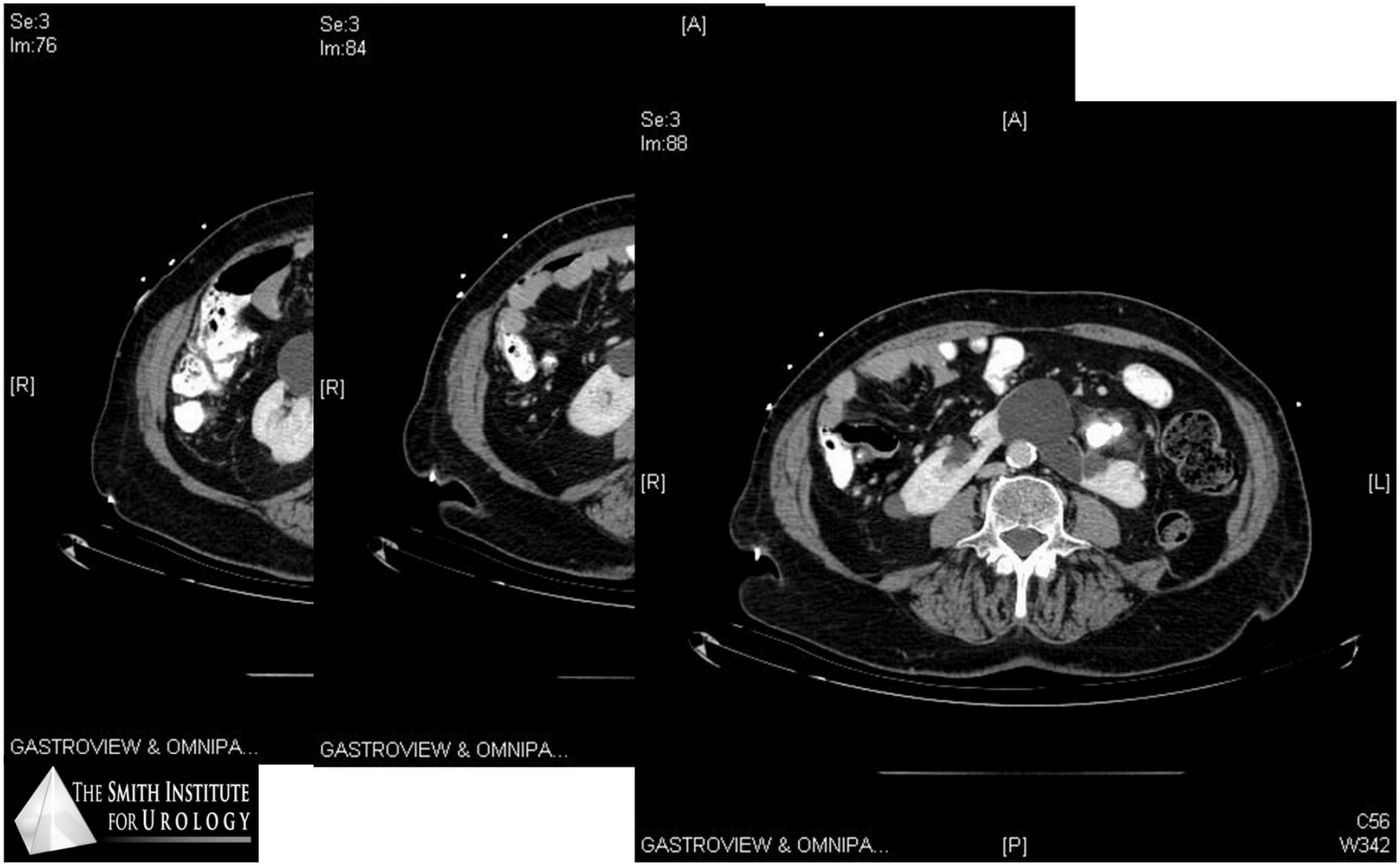
- 2) Conservative treatment with nephrostomy drainage and nasogastric suction

Case 1 – management

- General surgery performed diagnostic laparoscopy and identified NT traversing small bowel
- NT removed and 7 cm RUQ incision made
- Involved loop of SB pulled out of incision and resected with GIA stapler, then bowel re-anastomosed using GIA and TA staplers
- Skin-to-skin procedure time 55 minutes
- Stent placed

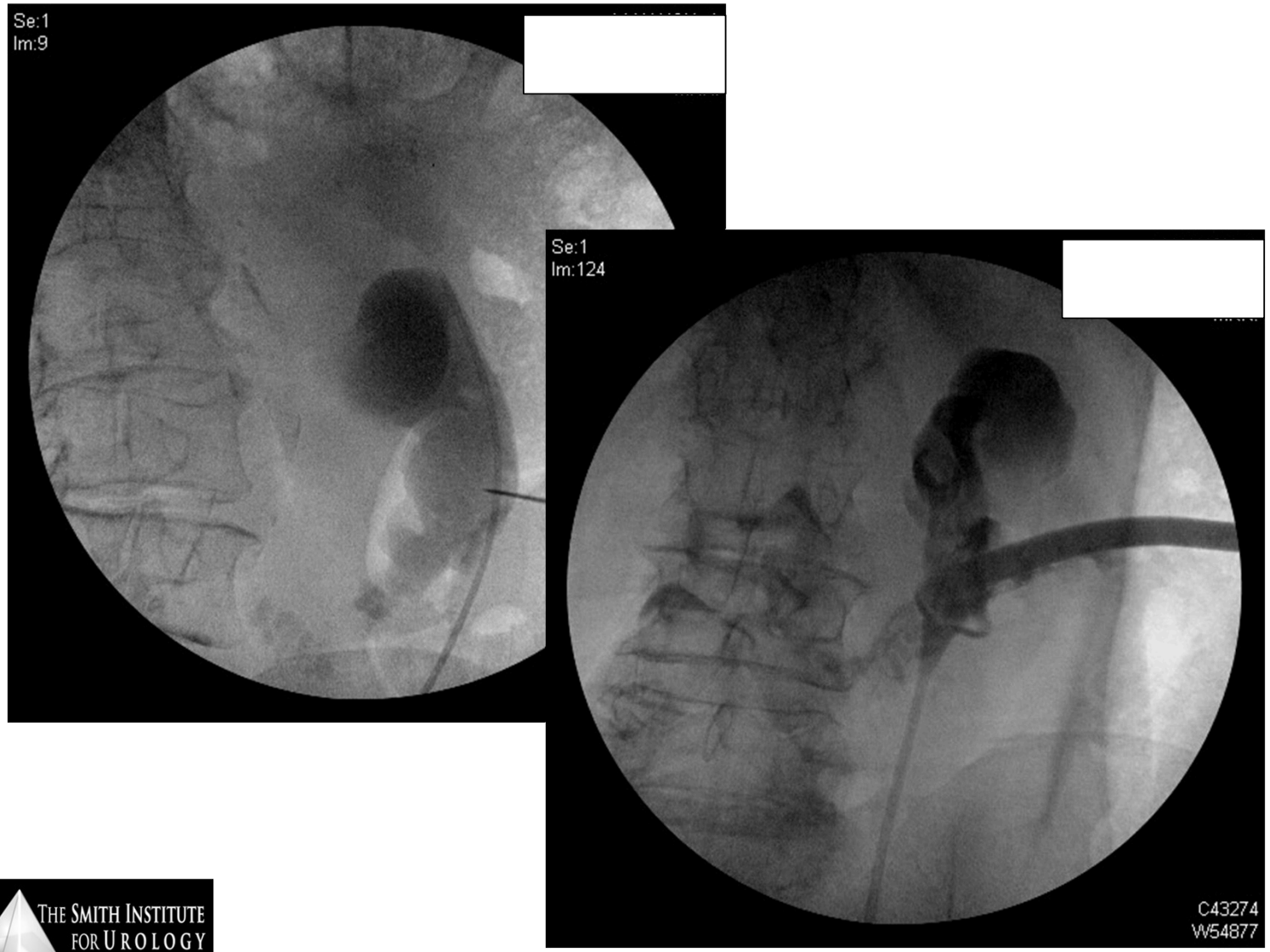


82 year old woman with
LEFT partial staghorn in horseshoe kidney



Course of Events

- 82 yo F with a horseshoe kidney and LLP partial staghorn calculus
- Case was unremarkable
- Rigid and flexible nephroscopy was performed through a single tract with high confidence that all stones were removed
- Antegrade nephrostogram at the end of the case revealed normal spontaneous antegrade flow without medial extravasation
- 24 Fr Malecot re-entry catheter was placed



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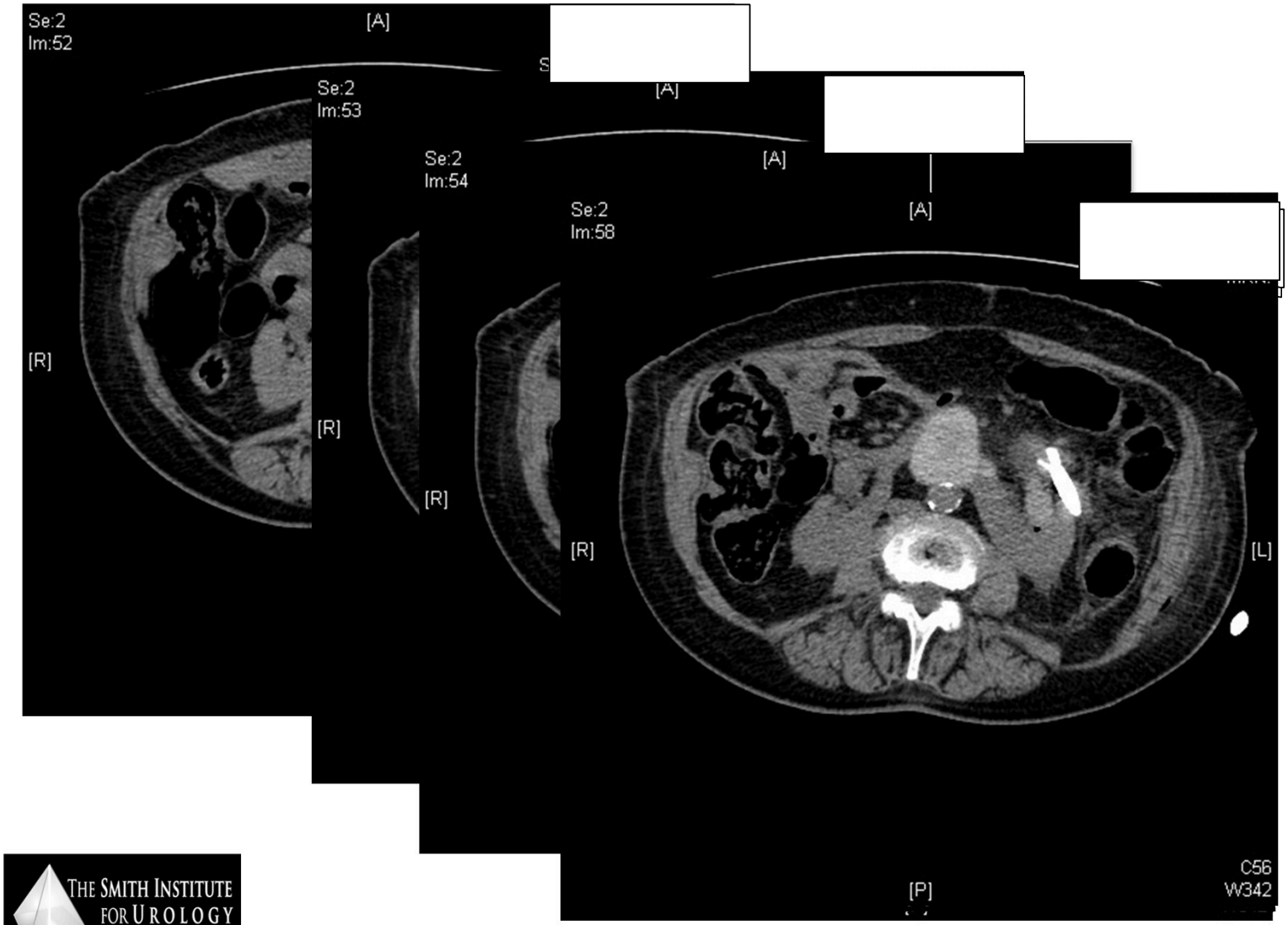
Course of Events

- CT at 24 hours performed to ensure stone-free status
- but revealed PCN traversing descending colon
- No Sepsis
- What now ???



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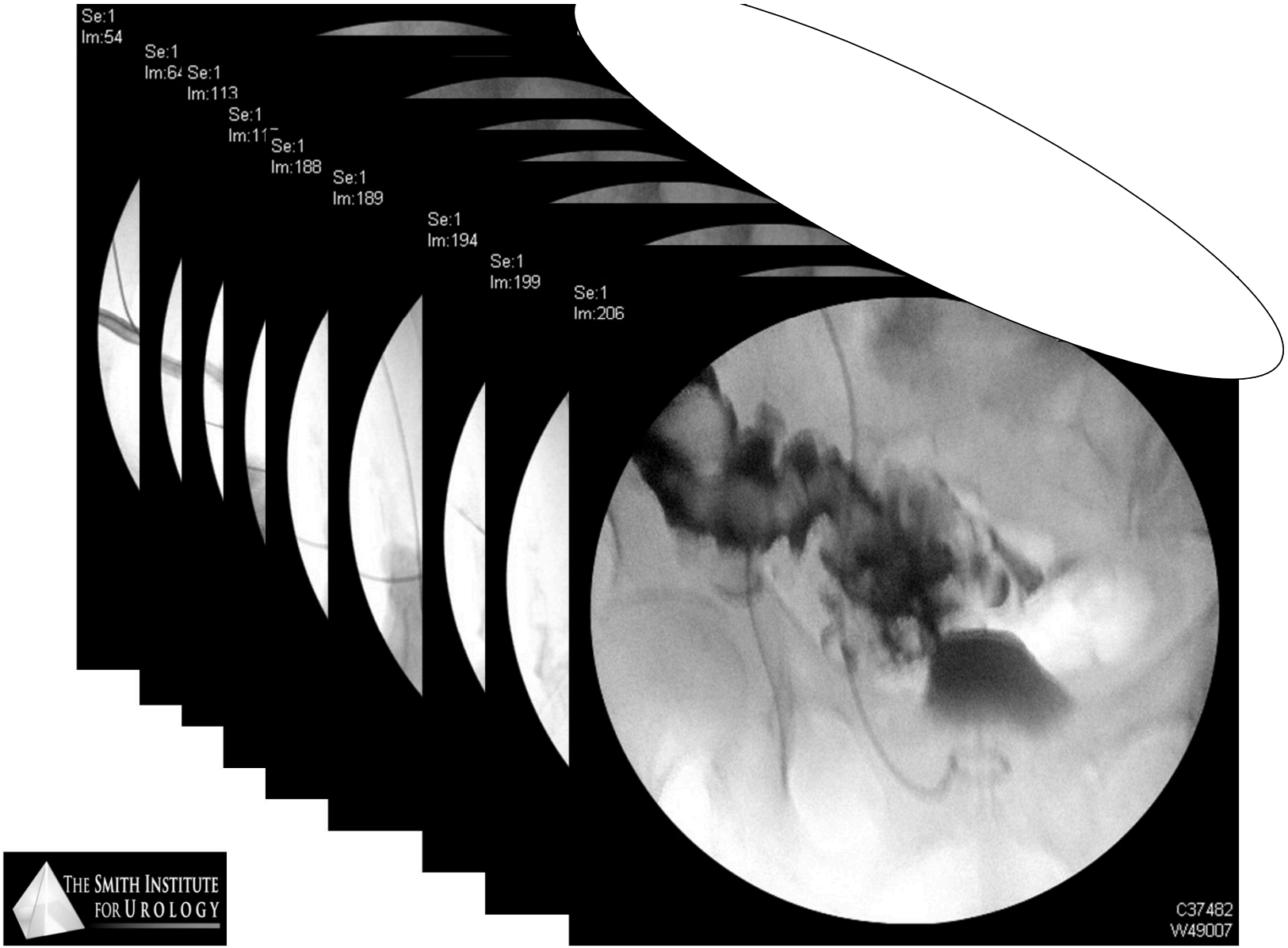
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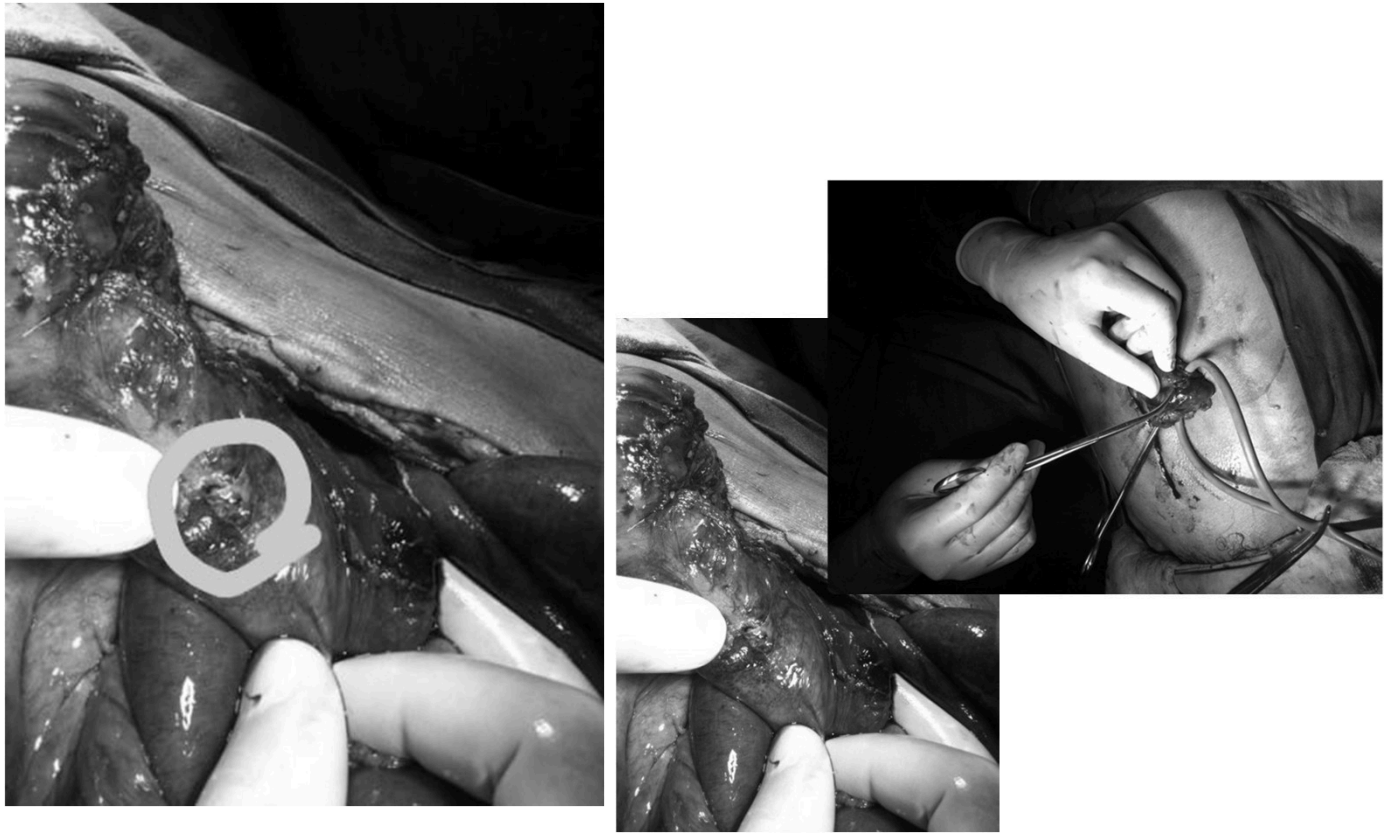
SOMETIMES YOU DON'T GET AWAY WITH IT

- Bowel injury (Prof. Khadgi)
  - miniPCNL
  - Horseshoe kidney
  - POD#2
    - Abdominal pain
    - Feculent material via neph tube site
    - Exploration
      - Colostomy



What was the Error & Who is at Risk

-
- Any renal malformation/ectopia (horseshoe kidney), distended colon (Ogilvie's, chronic constipation), prior renal surgery, prior gastric bypass, extremes of body habitus, extremities in kyphosis or scoliosis.
- Consider CT guided or US guided access
- IN HORSESHOE KIDNEYS THE UPPER CALYX IS THE PREFERRED ACCESS.

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CHEST, LIVER, SPLEEN, GALLBLADDER

-

SOMETIMES YOU DON'T GET LUCKY

Biliary Peritonitis after Percutaneous Nephrolithotomy: Case study and Management Concerns

Courtesy of

Profs. Sutchin Patel and Stephen Nakada

Case 1– 49 y.o female with right partial staghorn stone

University of Wisconsin SCHOOL OF MEDICINE AND PUBLIC HEALTH

- Upper pole access placed by interventional radiology without difficulty
- 30 F access sheath used
- 16 F reentry placed at the conclusion of the case
- 16 F malecot downsized to 8F prior to discharge due to delayed drainage on antegrade study
- Discharged on POD #1

Case 1– continued

University of Wisconsin SCHOOL OF MEDICINE AND PUBLIC HEALTH

- Presented to ER on POD #3 with right upper quadrant pain
- Patient tachycardic, otherwise VSS
- On exam she had RUQ tenderness
- Tenderness generalized to the whole abdomen on POD #5
- CT performed – showed gallbladder wall thickening and pericolic fluid without gall stones seen
- General surgery consulted and lap cholecystectomy performed

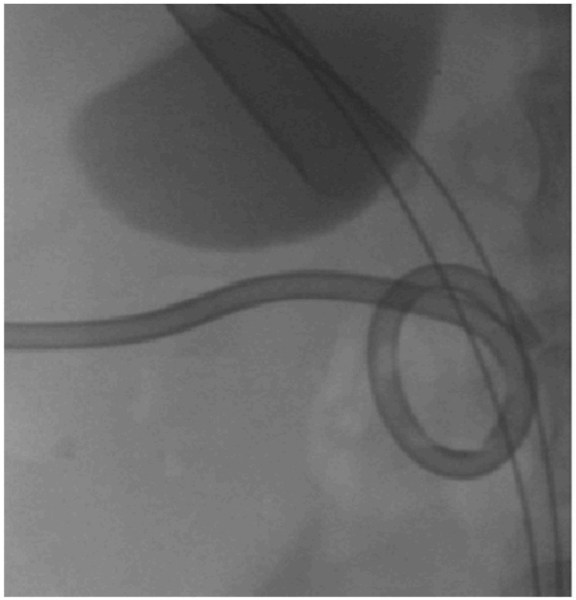
Case 2- 55 y.o. female with right 10 cm stone burden

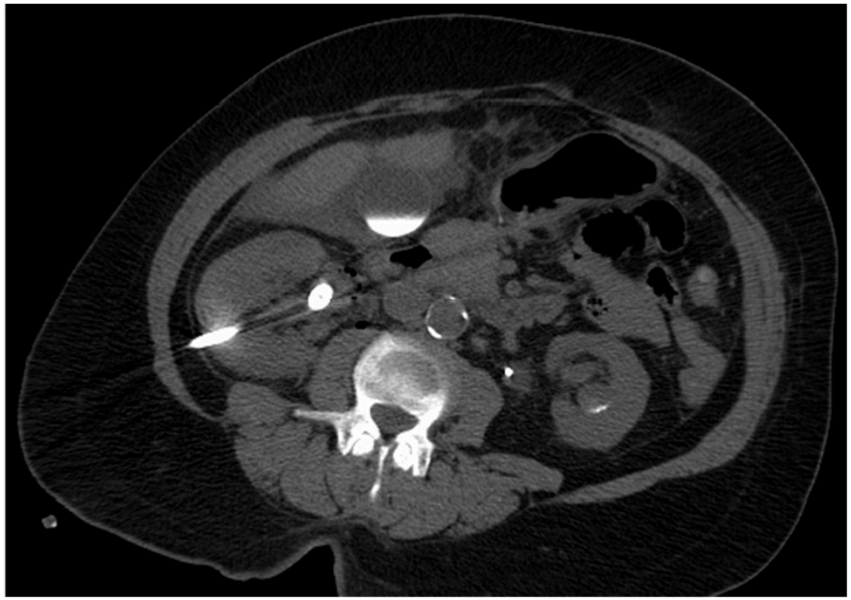
University of Wisconsin SCHOOL OF MEDICINE AND PUBLIC HEALTH

- Nephrostomy in place prior to procedure from outside institution
- Upper pole access placed by interventional radiology – during access attempts the gallbladder was inadvertently punctured and filled with contrast
- 20 ml of bile was aspirated from the gallbladder and the needle was removed
- Upper pole access below 12^{th} rib successful
- 30 F access sheath used
- 24 F reentry placed at the end of the case

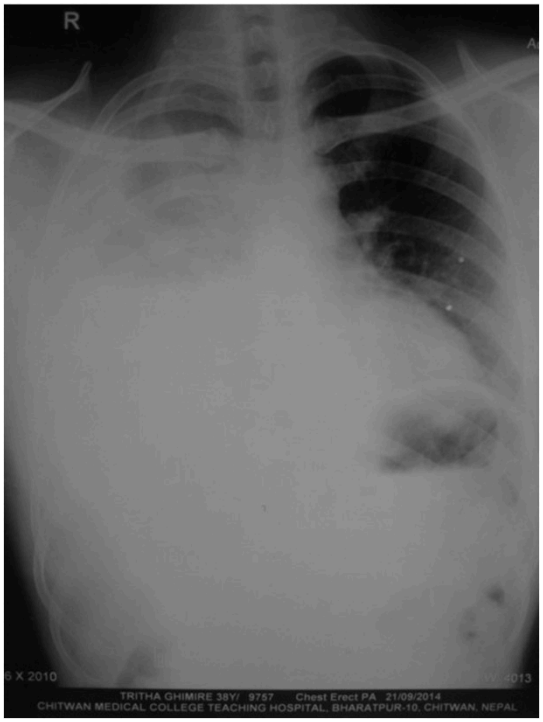
Case 2- intra-op image and CT scan

University of Wisconsin
SCHOOL OF MEDICINE
AND PUBLIC HEALTH





Hydrothorax /effusion



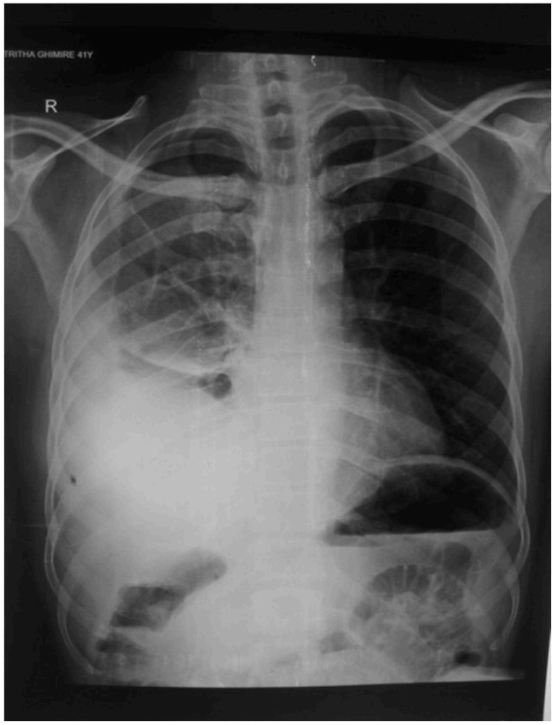
- 41y/o man
- Mini PCNL
- upper pole and renal pelvis
- Post op day 1
- CXR
- Large right pleural effusion

(Prof Khadgi)

Hydrothorax /effusion

- Deep inspiration
  - chest pulm toilet
- Post op day 8
- CXR
  - Large right pleural effusion
  - Near resolution after 1 week
  - Remained asymptomatic
  - CXR 2 months
    - Complete resolution

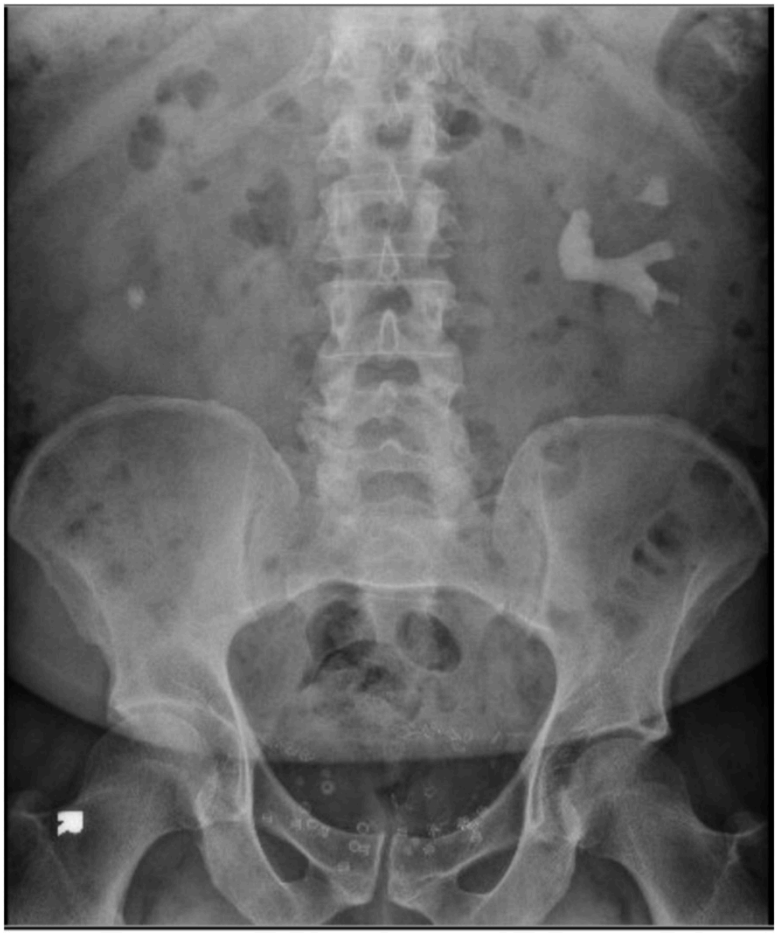
(Prof Khadgi)



- **WHAT'S THE WORST THAT CAN HAPPEN?**

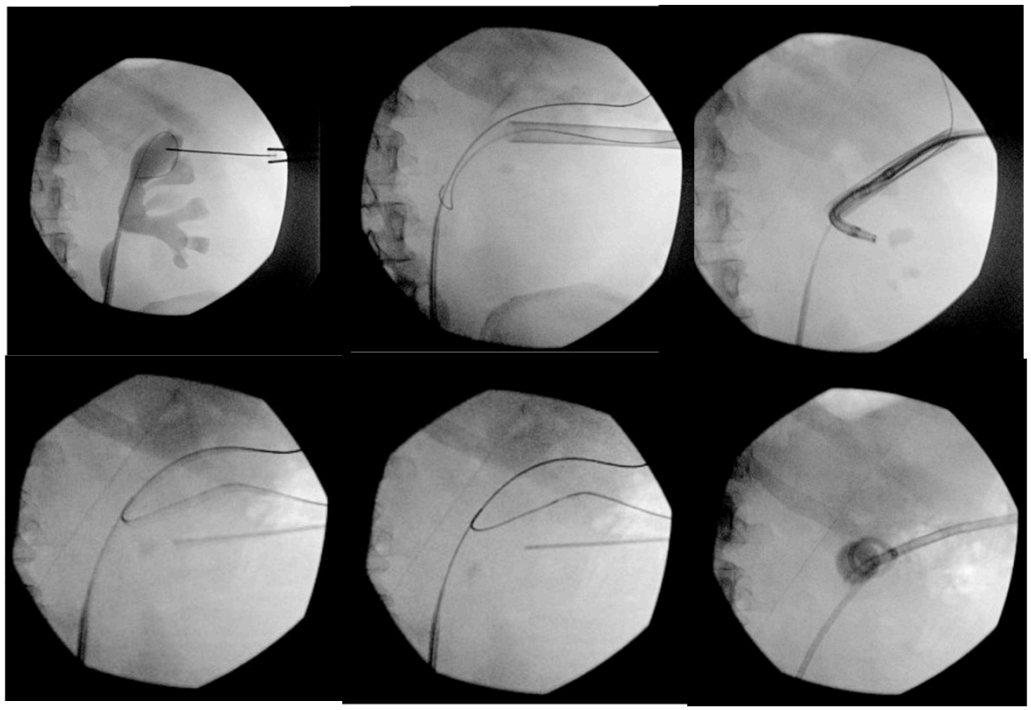
Hemothorax

- 54 y/o man
- Recurrent left staghorn stone



Hemothorax

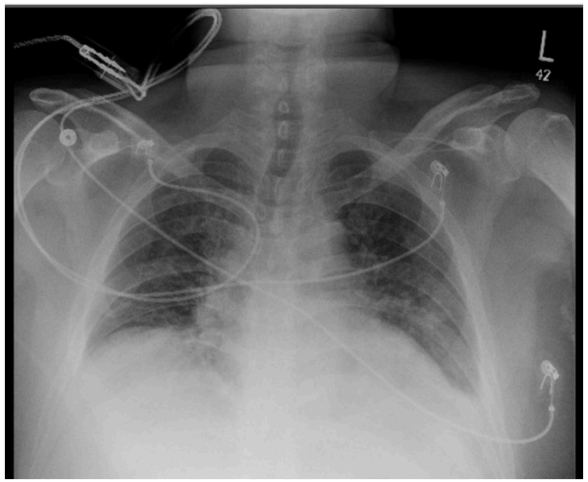
- PCNL
- Single stage
- 3 punctures, 2 dilations
- 1 upper pole between 11^{th} and 12^{th} ribs
- Stent plus Council nephrostomy tube
- Discharged without event POD#1

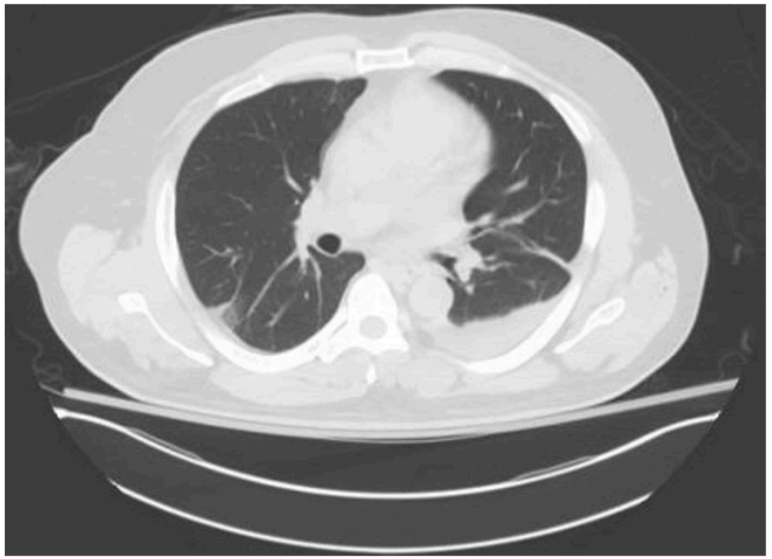


Hemothorax

POD#4 ED c/o chest pain

- CT angio—small bilateral PE's
- Pulm consult recommended full anticoagulation due to Klinefelters.
- Heparin started IV



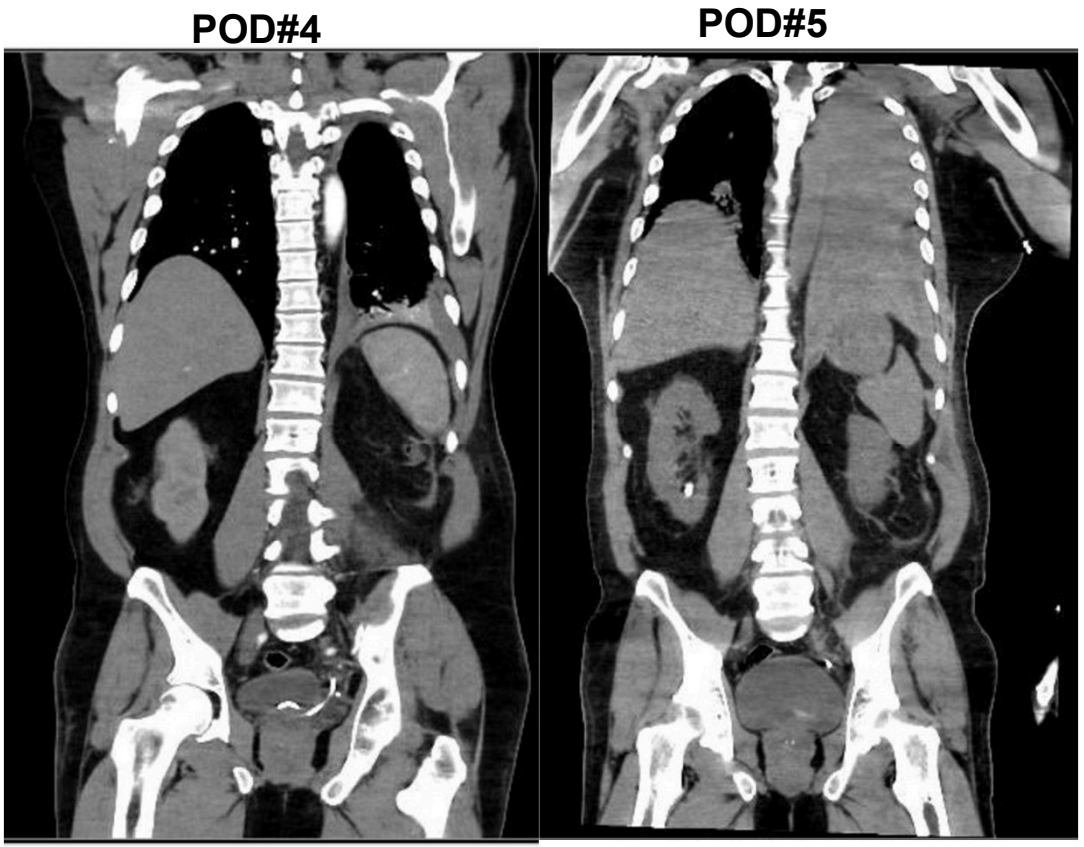


Hemothorax

- Sudden severe chest pain POD#5

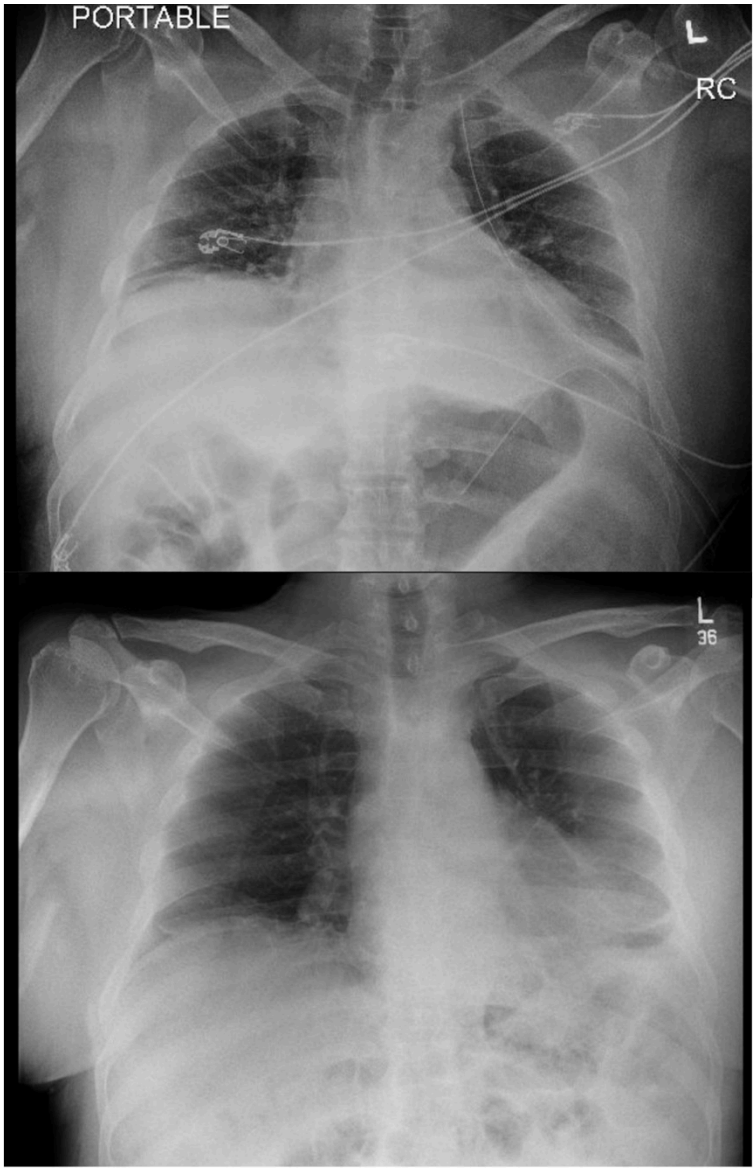
- Transient drop in BP
- Cardiac enzymes normal
- Hg/HCT stable
- Hematuria not worse

- CT Chest/abd/pelvis showed left chest filled with fluid/blood



Hemothorax

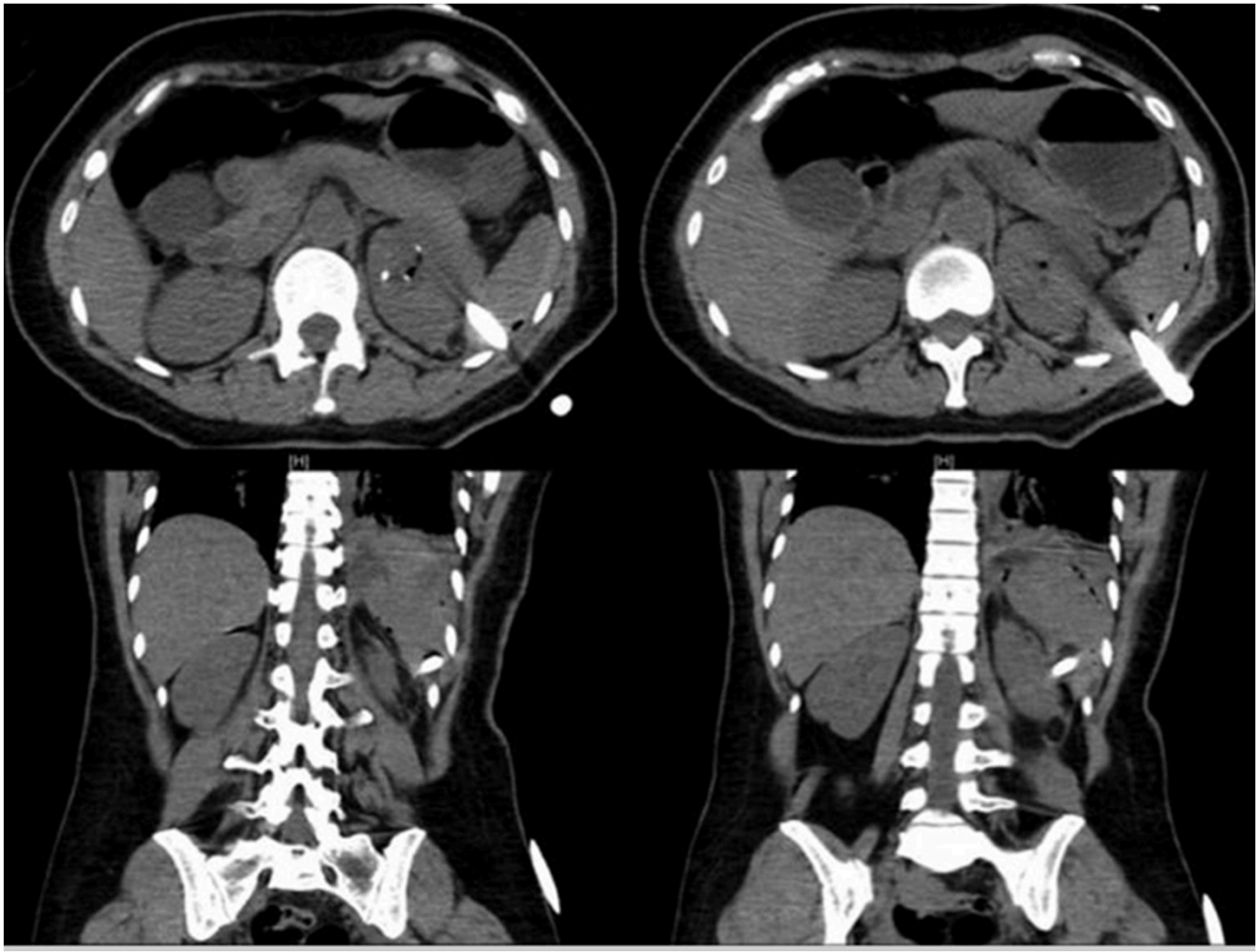
- Thoracic surgery—VATS, chest tube x 2, ICU stay
- Anticoagulation stopped
- Full recovery



Routine Upper Pole Stone Case

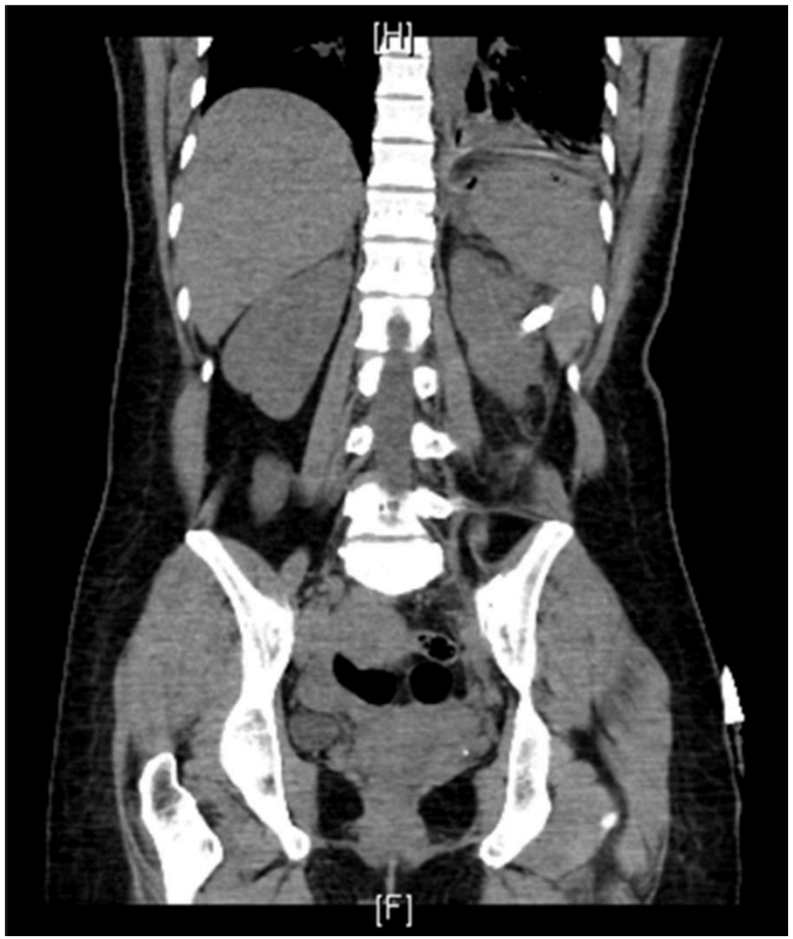
- 45y F underwent L PNCL
- Initial access was above 12th rib
- Postop CXR was negative
- Pt. did well postoperatively, pain controlled, Foley and nephrostomy urine light pink.
- Next morning short of breath and left upper abdominal pain.

When in doubt ,perform a CT



Course of Events

- POD#1
- CT revealed
  - Left hydro/pneumothorax as well as re-entry tube traversing the spleen
- Pigtail catheter placed , and PTX quickly resolved



Course of Events

- Pt's underwent TOV POD#1 but remained with Chest tube and nephrostomy tube
- Daily CXR revealed no return of PTX. Pt. did develop abdominal pain along with finding of pneumoperitoneum, which was short lived
- When would you remove the tubes
- …..Which first ??

Course of Events

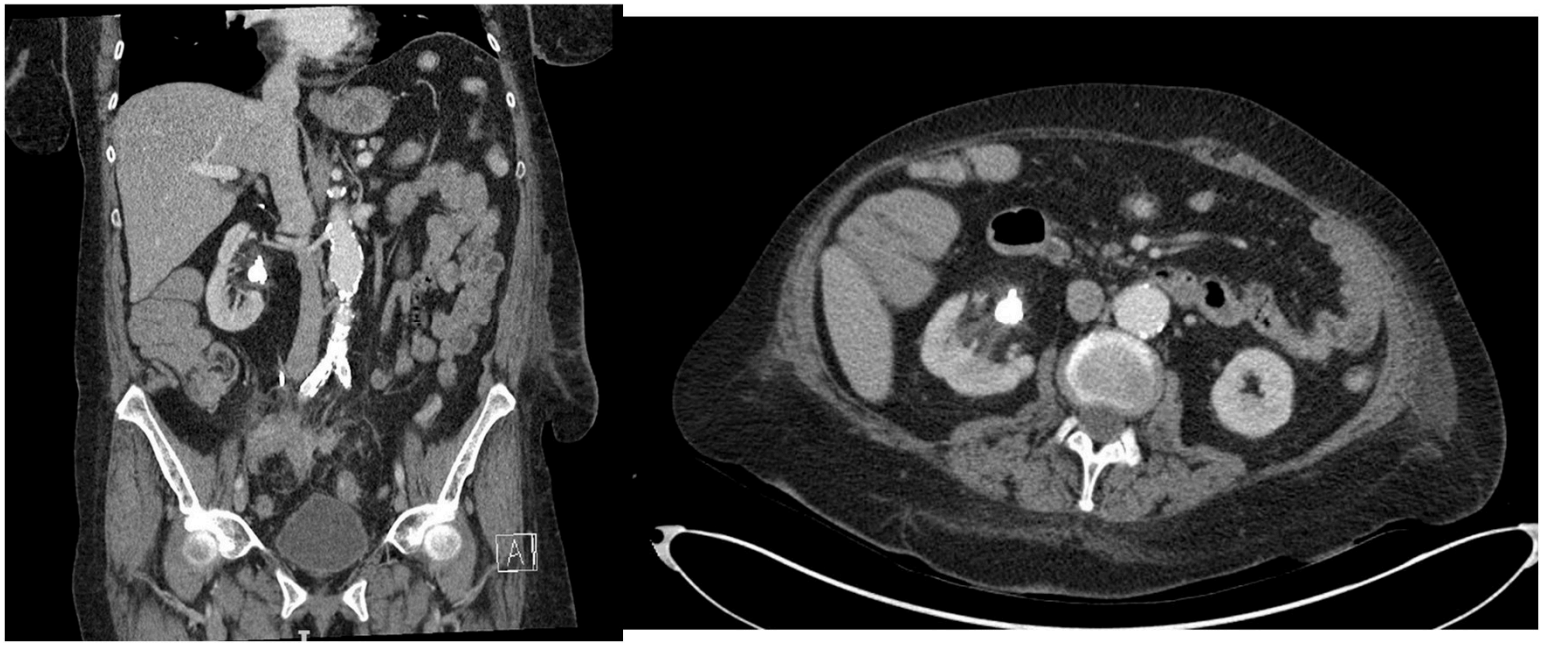
- POD # 6 Nephrostomy tube removed
- POD#7 chest tube removed, also with no issues
- POD#8 repeat CXR showed no pneumo-peritoneum or –thorax and pt. was discharged home ambulating, tolerating diet, pain controlled, no resp difficulty.

Action Items

- Conservative management of abdominal and thoracic PCNL complications is a viable option in the stable pt. with close clinical monitoring
- High index of suspicion should be maintained after high stick in PCNL, even with negative postop CXR

HPI

- 63 yo F with a PMHX of appendiceal cancer, carotid stenosis, PVD, iliac stents and AAA with large R renal stone burden
- Preop Ucx: >100k Kleb, on cx specific cipro

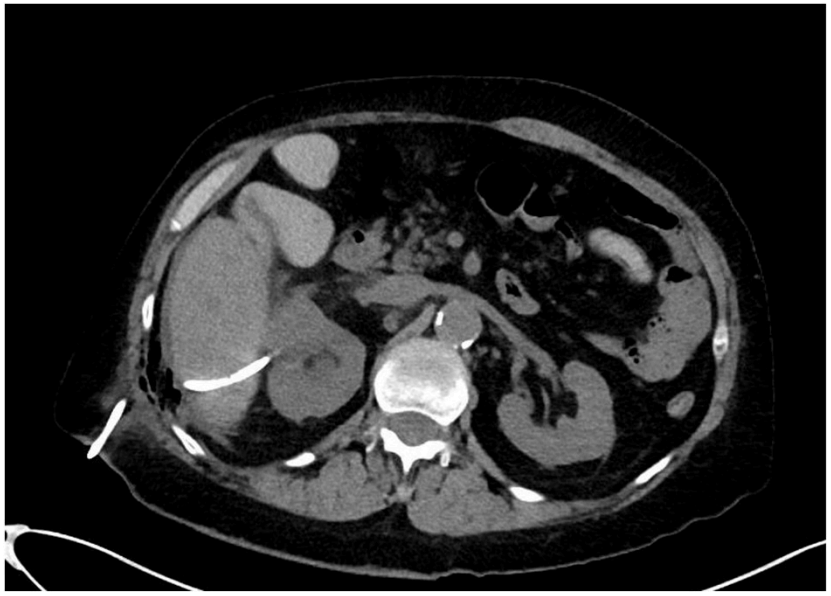


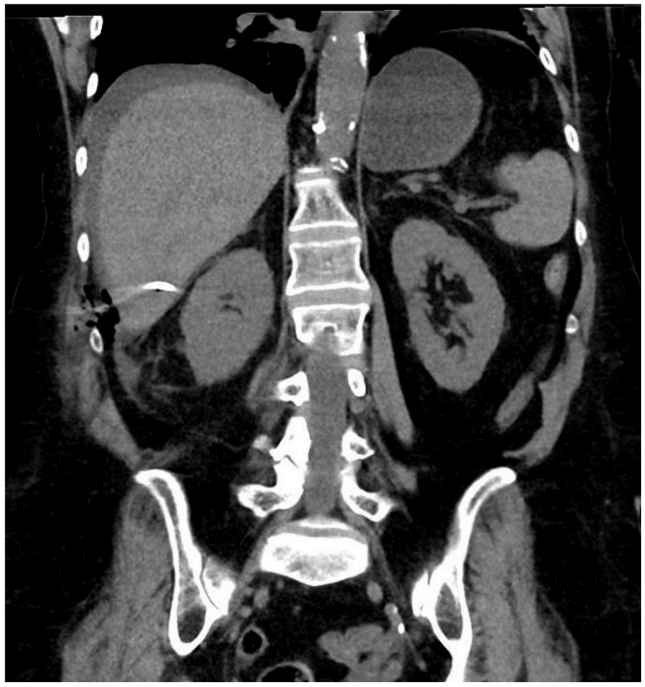
Intraoperative and Hospital Course

- OR for R PCNL
  - Uneventful R PCNL via upper pole access
  - 8.5F x 24cm NU stent placed
  - PACU labs with Hgb 11.5 and POD1 Hgb to 12.3
  - Mild pain and discomfort on POD1, remained hemodynamically stable, no transfusion

Postoperative Course

- Per routine, obtained postoperative day 1 CT scan:





Post-operative Course

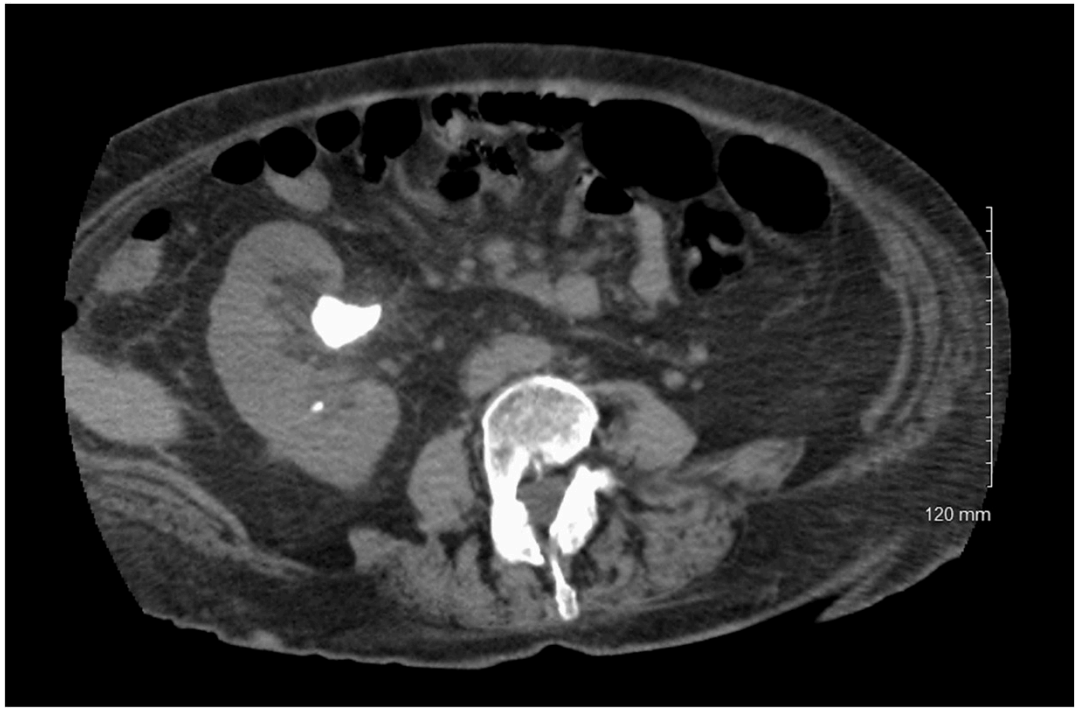
- PCNU tube removed slowly in clinic at POD14
- Remained hemodynamically stable, no pain or complications s/p tube removal

- Pathology: 70% CAP, 30% COM

Case 2

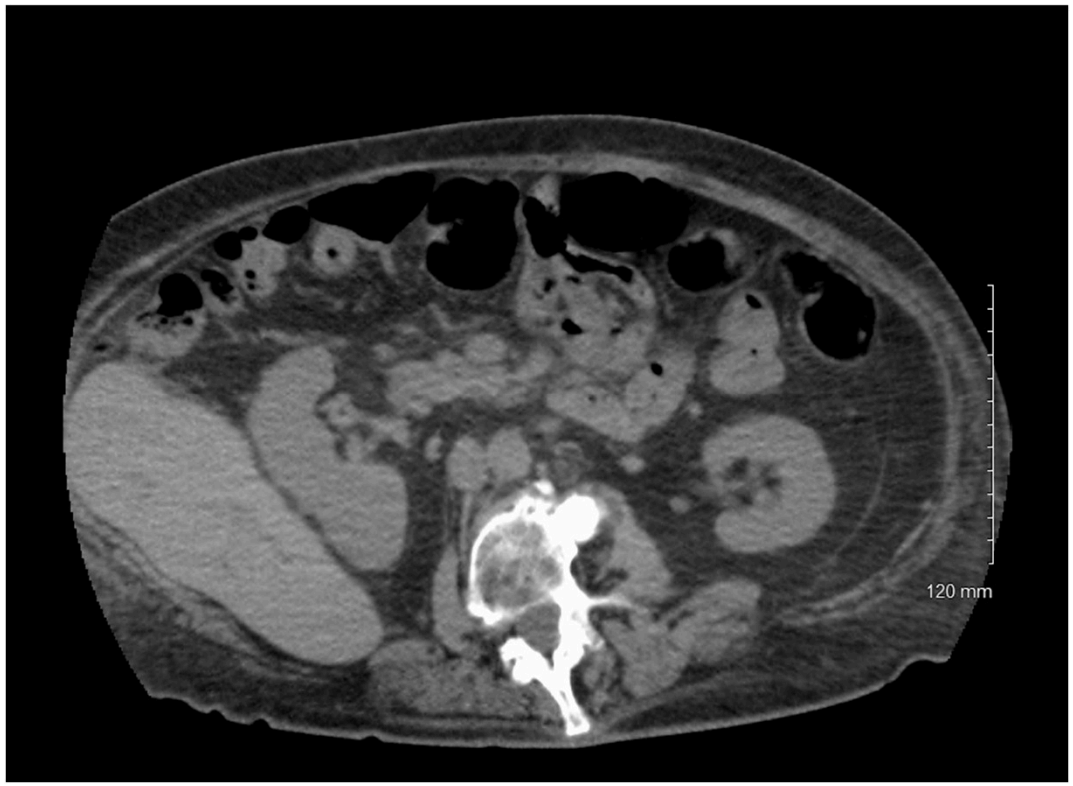
- 56 yo F with 3cm renal pelvis stone
- Hx of Afib on warfarin, morbid obesity (550 lbs before gastric bypass, now 300 lbs)
- Medically cleared and warfarin may be held for surgery

Courtesy of
Professor Margaret Pearle, MD PhD
UT Southwestern Medical Center
Dallas, TX


120 mm

Case 2 – management

- PCNL performed seemingly uneventfully except that kidney was very “mobile” and anterior
- No post-op issues
- Routine imaging obtained on POD#1



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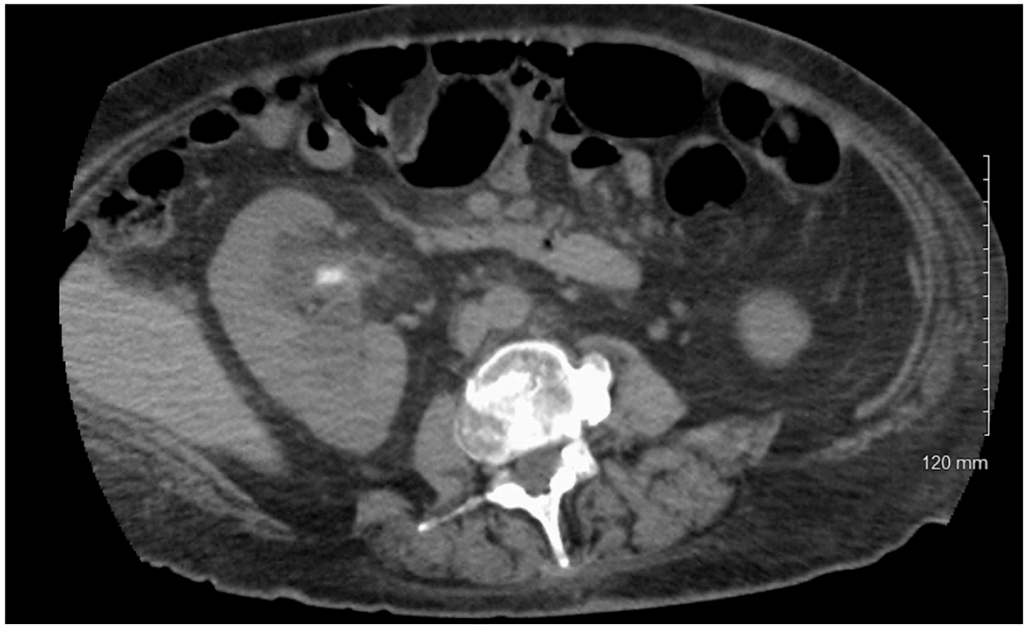
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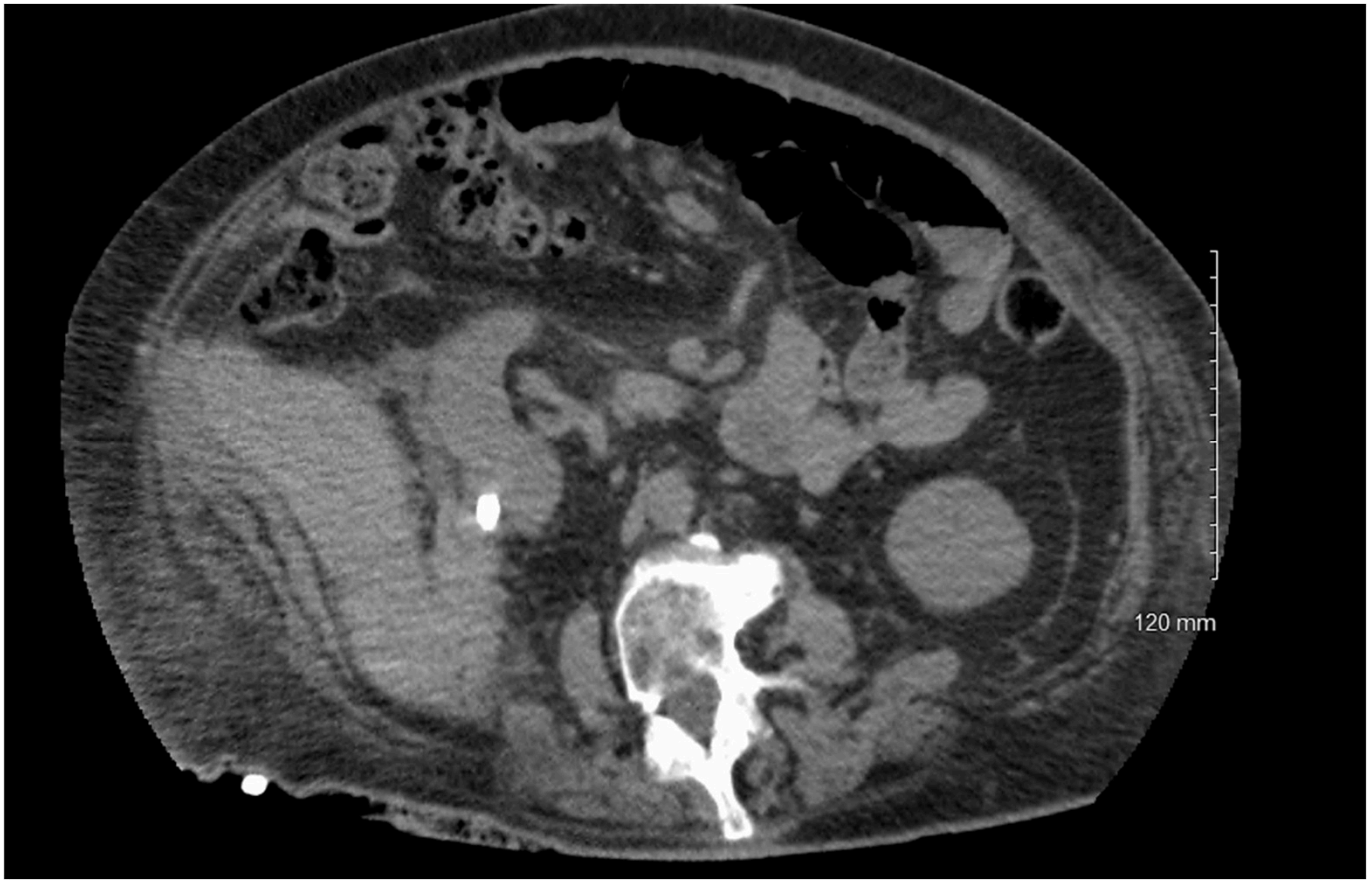
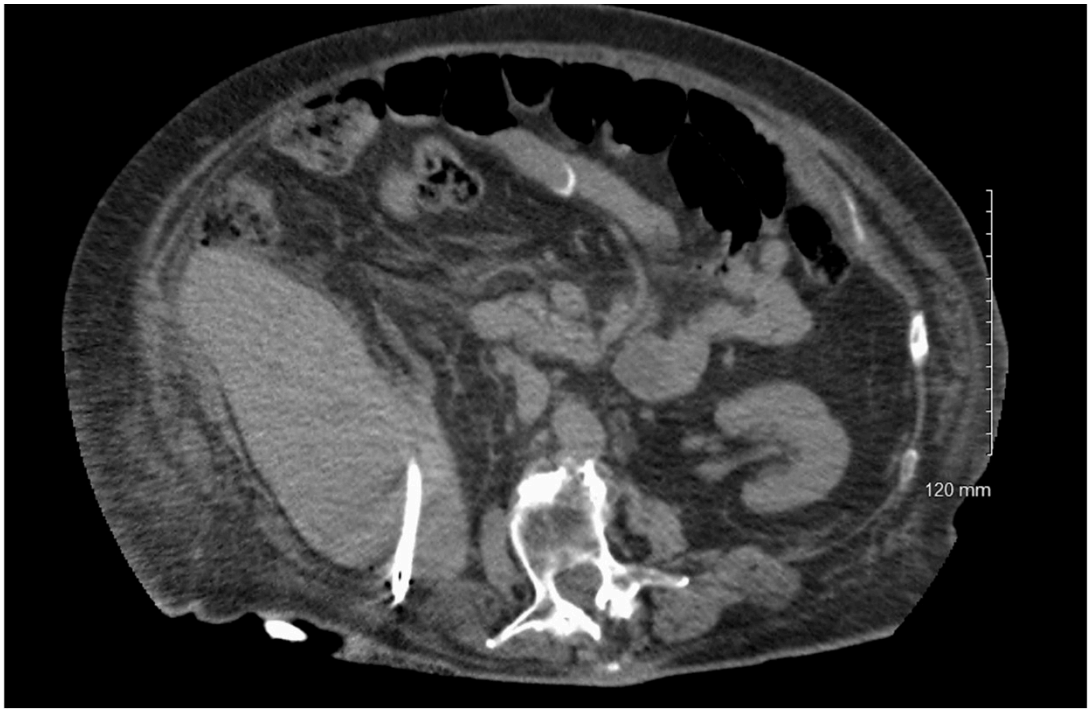


PERI-HEPATIC HEMATOMA

Nephrostomy tube through liver with significant peri-hepatic hematoma

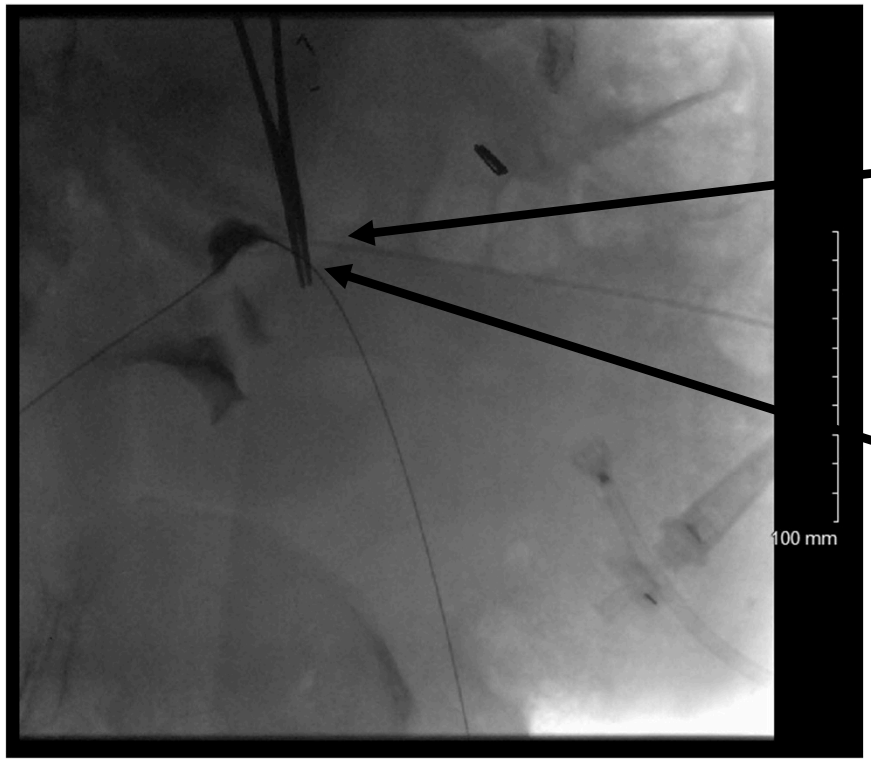


NOW WHAT ??

Case 2 – post-op

- CT showed no residual stones, but NT tract through liver
- Good antegrade drainage

- IR consulted to remove NT fluoroscopically and consider instillation of hemostatic agent upon withdrawal of NT with/without embolization
- Kumpe catheter used to identify medial liver capsule (pooling of contrast in an extra-renal location by lateral view)
- Kumpe catheter retracted into hepatic parenchyma and injected with Gelfoam slurry


Kumpe
Edge of renal capsule
100 mm

Case 2 - follow-up

- Pt was admitted to ICU for serial hematocrits
- Hematocrits were stable and she was ultimately discharged home
- Anticoagulation restarted 2 weeks post-operatively without incident

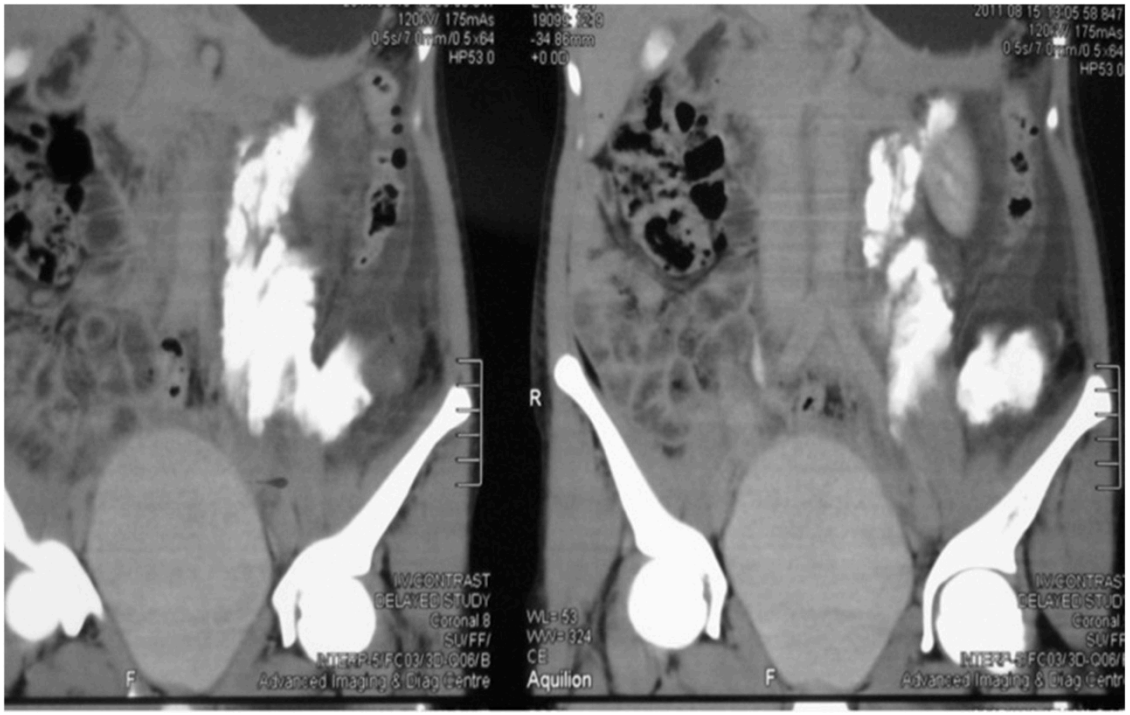
Conclusion

- Liver injuries can be managed conservatively, especially with small tubes
- Post operative PCNL imaging is useful
- US directed access may be useful in narrow windows or enlarged spleen/liver

URINE LEAK

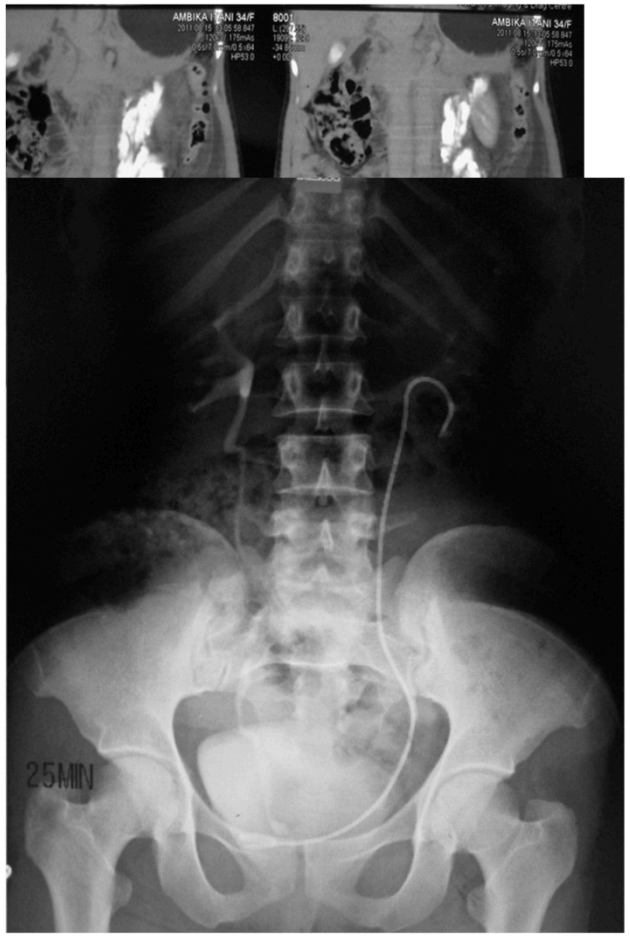
PERIRENAL URINOMA/ URINE EXTRAVASATION

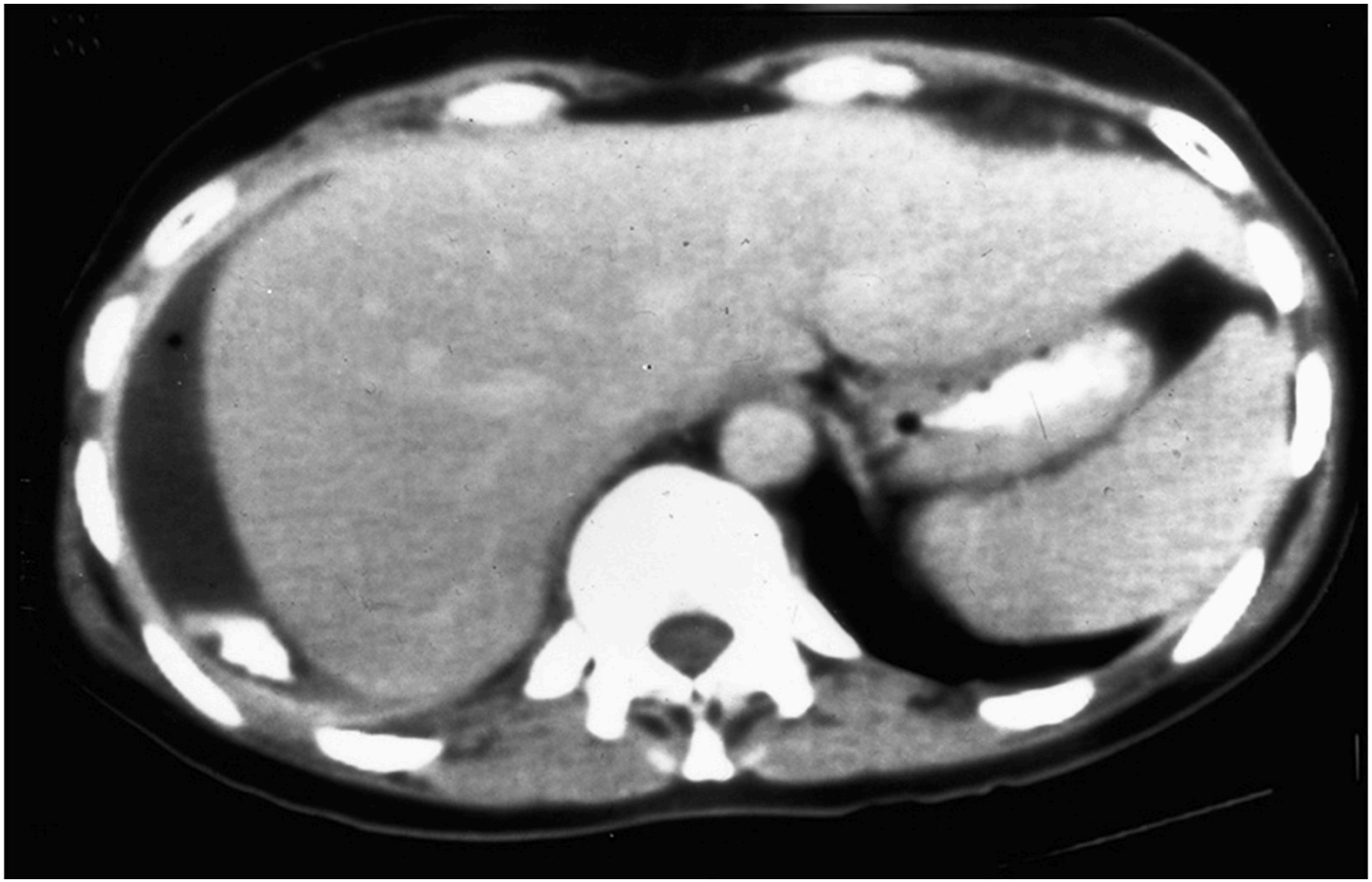
- 34Y/O
- Tubeless miniPCNL
- POD#2 developed fever and abdominal pain
  - Ultrasound and CT Urogram



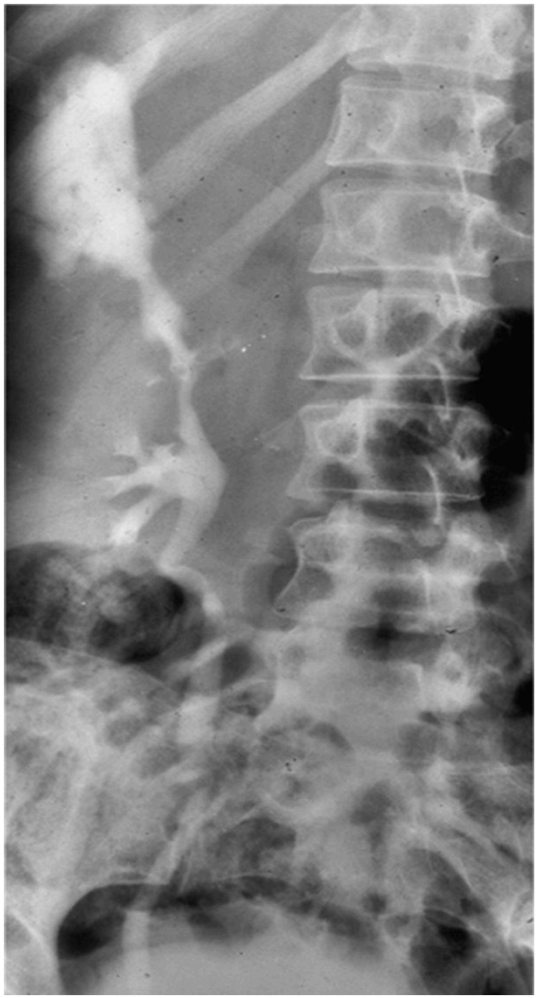
PERIRENAL URINOMA/ URINE EXTRAVASATION

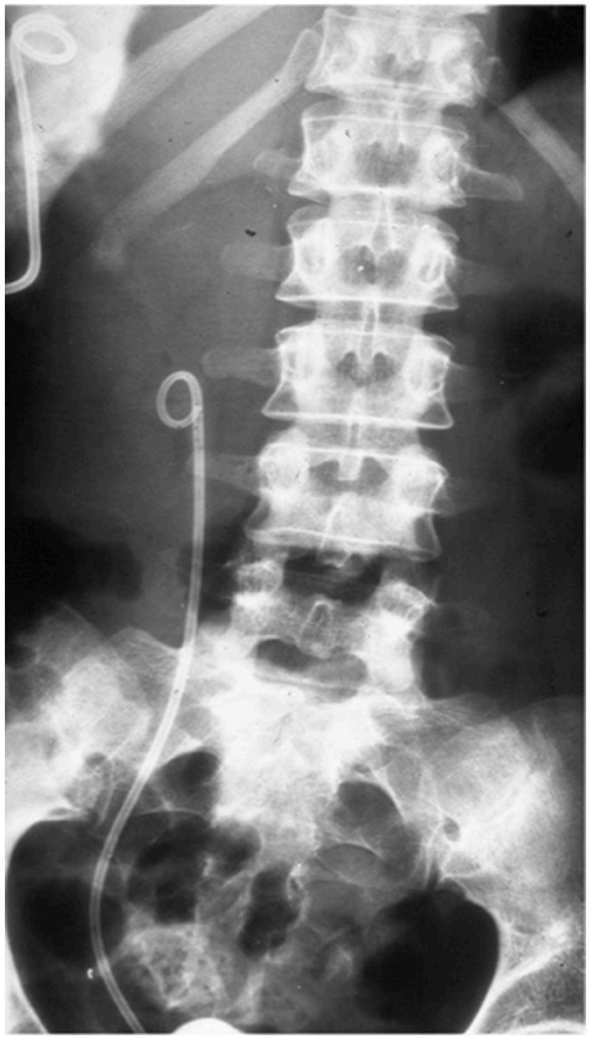
- 34 Y/O
- Tubeless miniPCNL
- POD#2 developed
  - fever and abdominal pain
  - Ultrasound and CT Urogram
  - Left ureteral stent placed
  - IVP done:
    - Complete resolution
    - Stent removed after 2 weeks



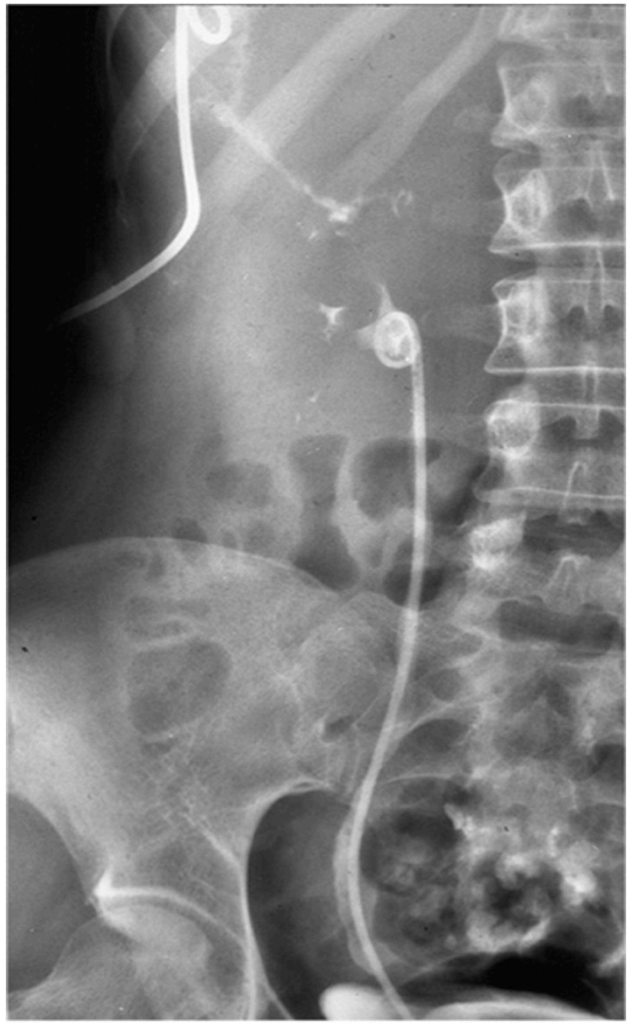


Perirenal Urinoma



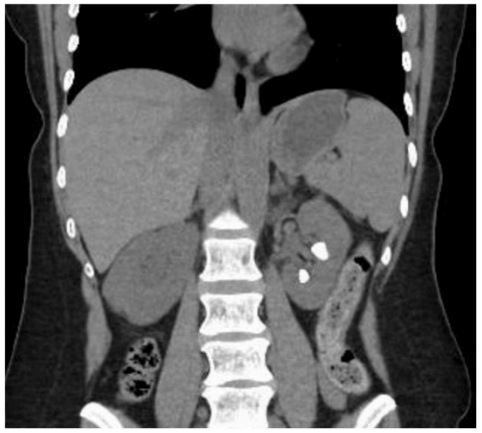


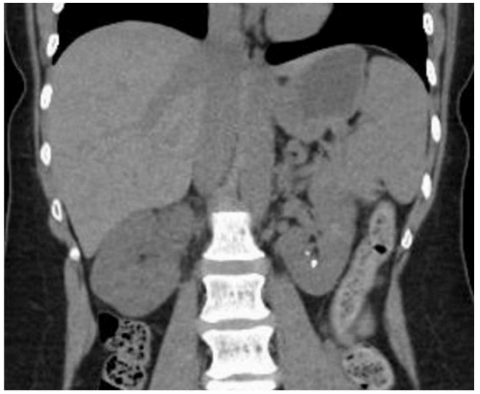
Retroperitoneal drain clamped.
Patient developed fever.
Double pigtail stent obviously occluded.
Retrograde pyelogram…
collapsed system and drains directly through fistula.
WHAT NEXT??



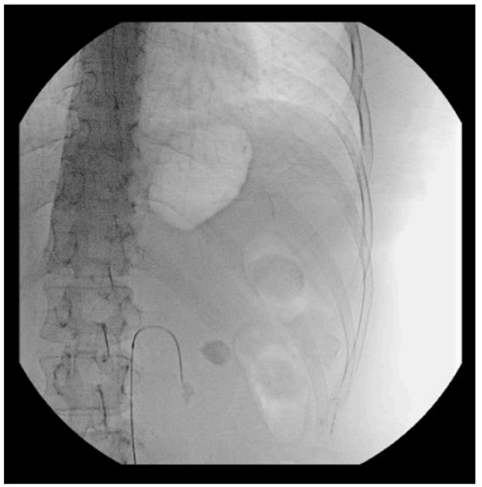
Nephrocutaneous fistula

- 48 y/o woman
- Failed Ureteroscopy
- Multiple LEFT renal stones

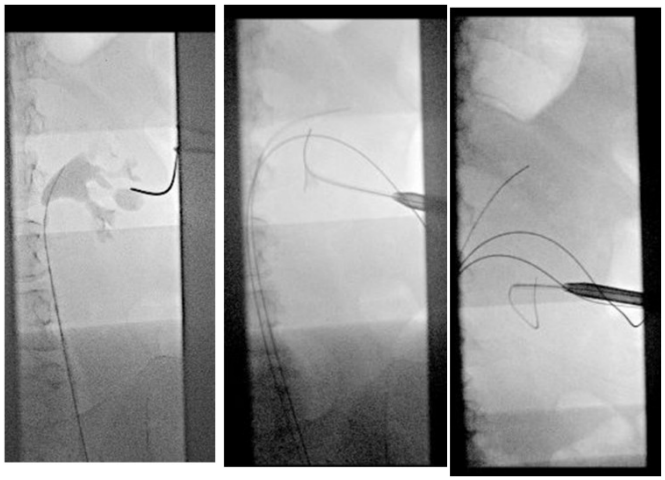


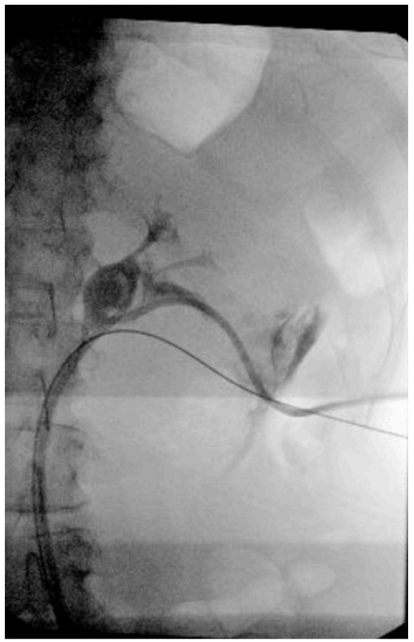


Nephrocutaneous fistula



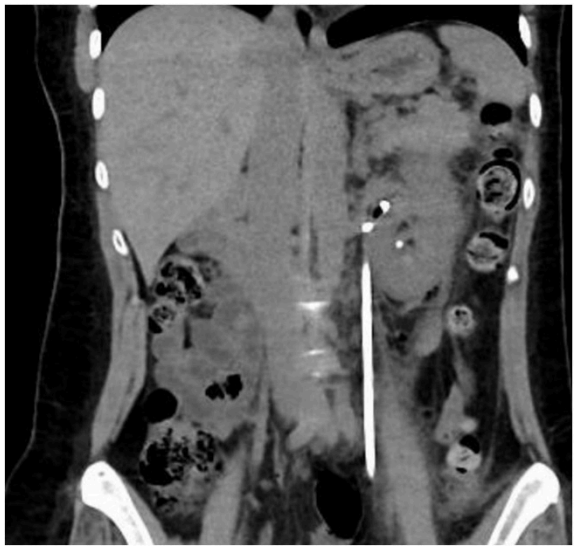
- 3 punctures
- 3 dilations, including obstructed infundibulum
- One nephroureteral tube





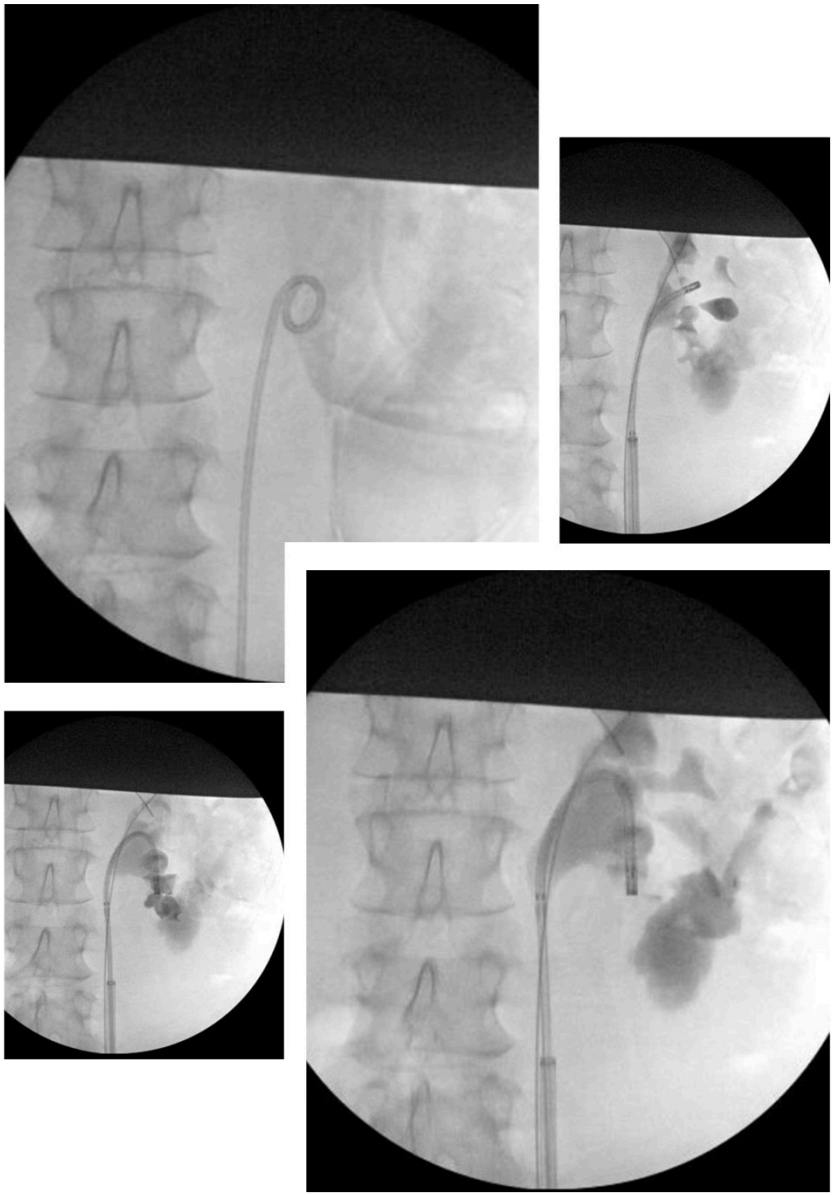
Nephrocutaneous fistula

- One residual stone post op
- Nephroureteral tube removed after 5 days



Nephrocutaneous Fistula

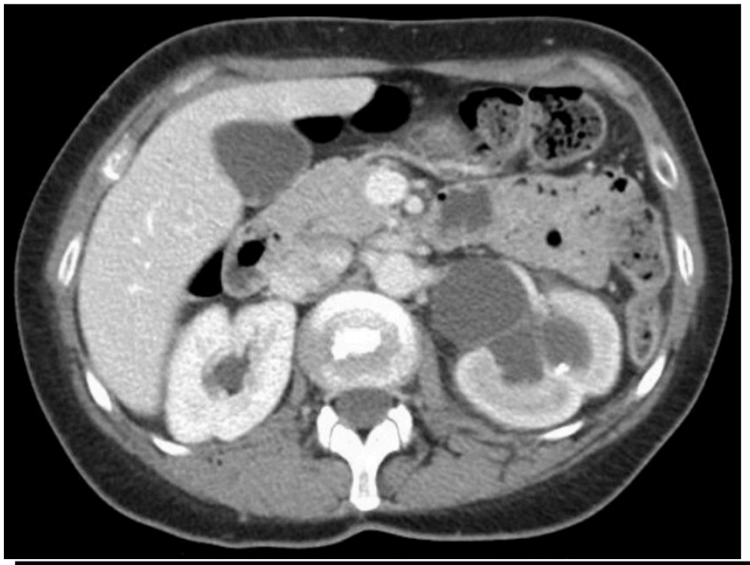
- Persistent leak via flank despite Foley catheter
- Ureteroscopy
  - Fulguration of necrotic tissue in tract
  - Stent placed x 2 weeks
- Resolution

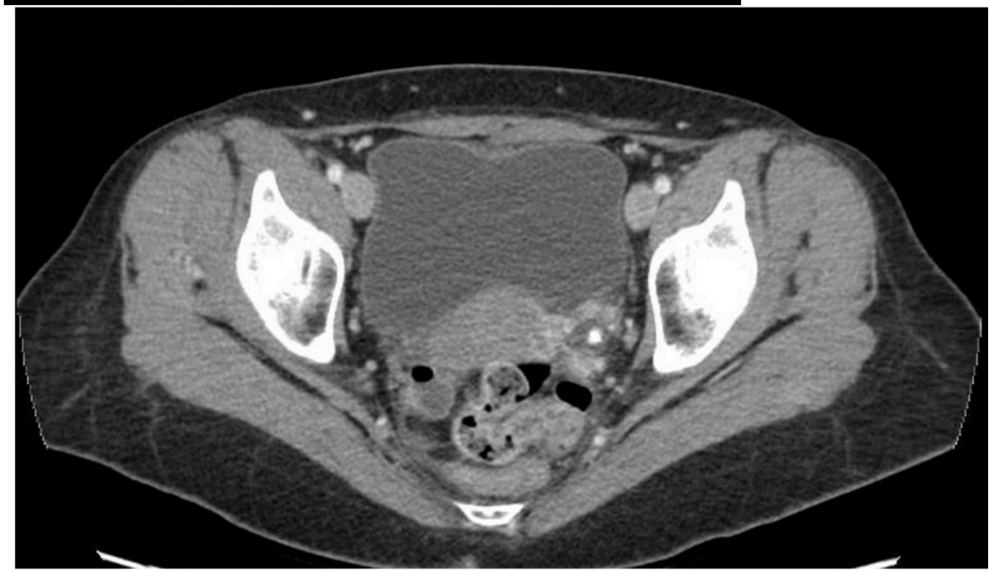


2 years later…

residual stone and new stones

Left ureterscopy, stent insertion





THE URETER DOES NOT LIKE YOU

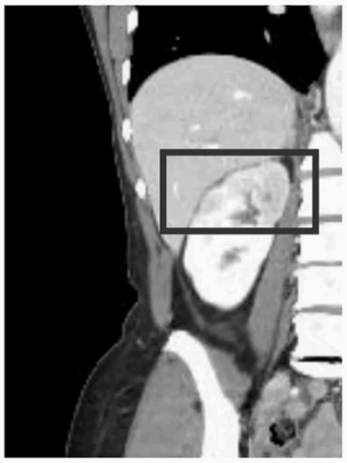
THE URETER IS NOT YOUR FRIEND

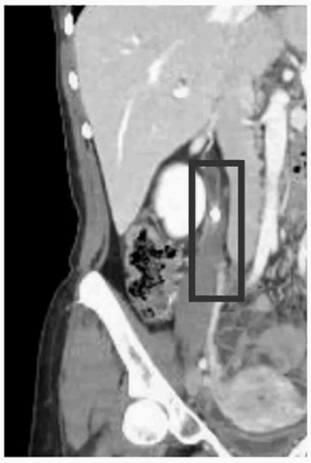
Duplicated ureter, impacted stone

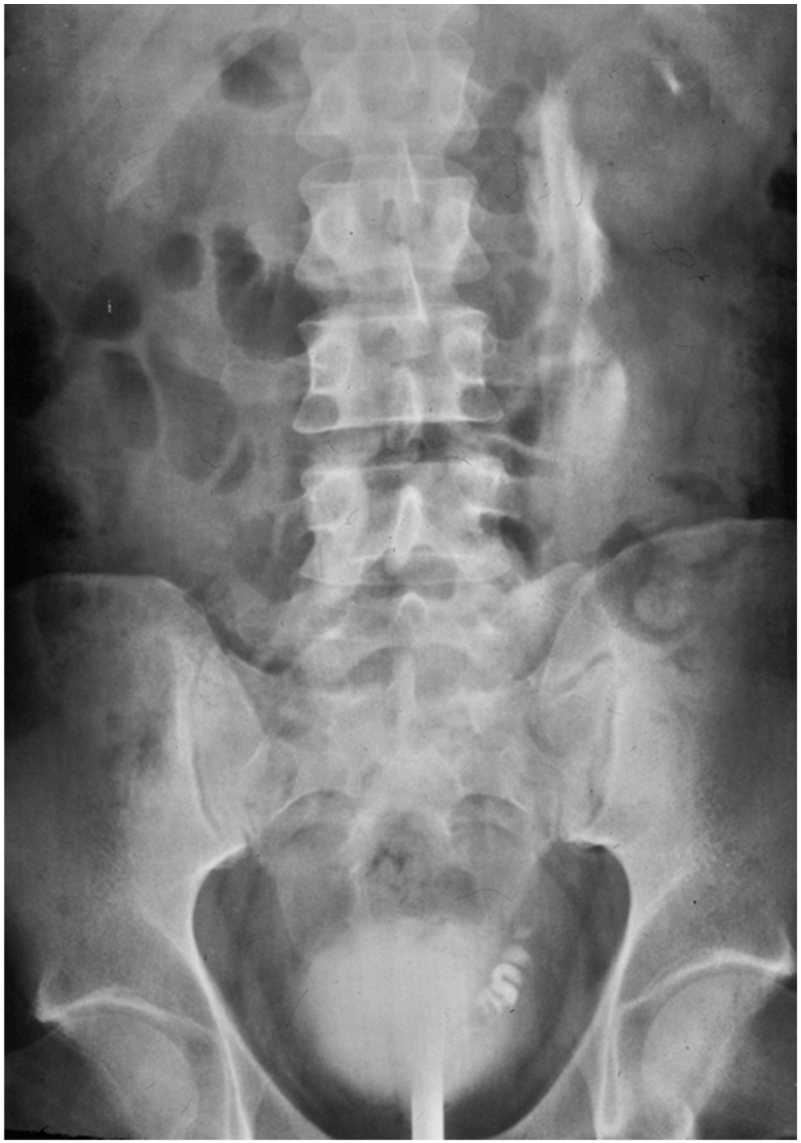
Duplicated ureter, impacted stone

Our Patient

- 57 year old female with a duplicated right collecting system who is symptomatic with an obstructive proximal ureteral stone and delayed upper moiety nephrogram







AVULSED URETER.
Treatment of choice ?

OPTIONS

1. Percutaneous nephrostomy.
2. Boari Flap
3. Ileal interposition
4. Auto-transplant.
5. Nephrectomy

Respect the ureter

OR YOU WILL CRY!

Ureteral Avulsion Repaired via RAL Boari and Psoas Hitch

Arun Rai MD, MBA
Clinical Director of Quantitative Data Sciences
Brady Urological Institute
The Johns Hopkins Hospital
Baltimore, MD

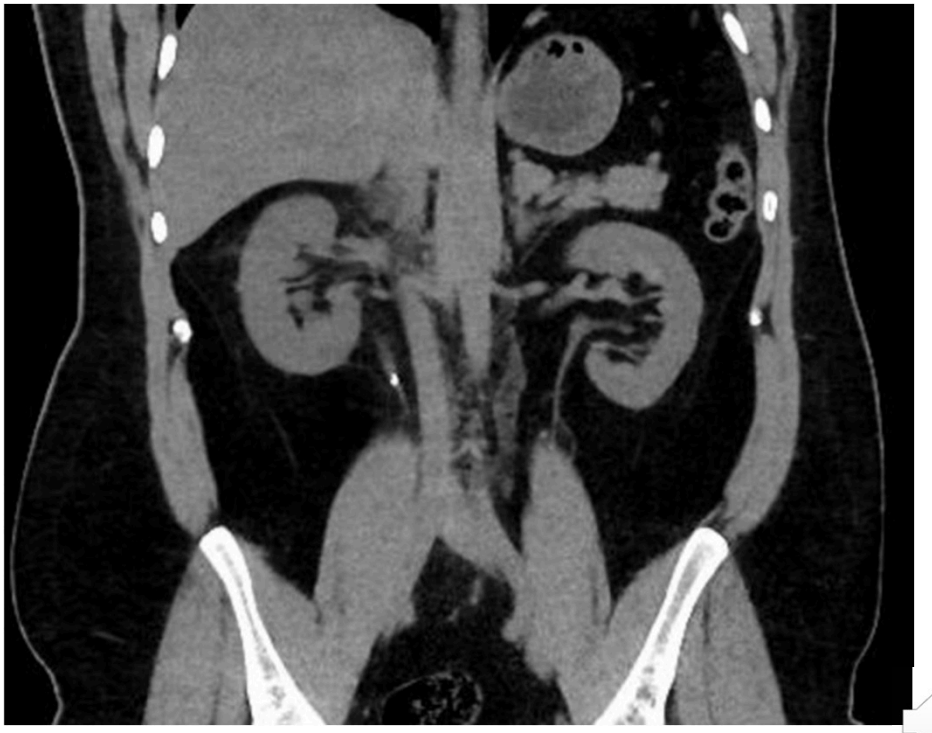
Patient Presentation

- 42 yo M with no significant PMHx who presented to ER with incidentally diagnosed 4 mm proximal to mid ureteral stone with symptomatic pain and discomfort with +UTI, treated with antibiotics and discharged home for MET
- He had continued pain, scheduled for URS and treated with abx
- PMHx: obesity, HLD, HTN, no prior kidney stones, no DM
- PSHx: none
- FHx: NR
- SocHx: Worked as a cab driver
- Labs: WBC 13, Hgb 12, Cr 0.8, UCx + E. coli (treated prior to URS)

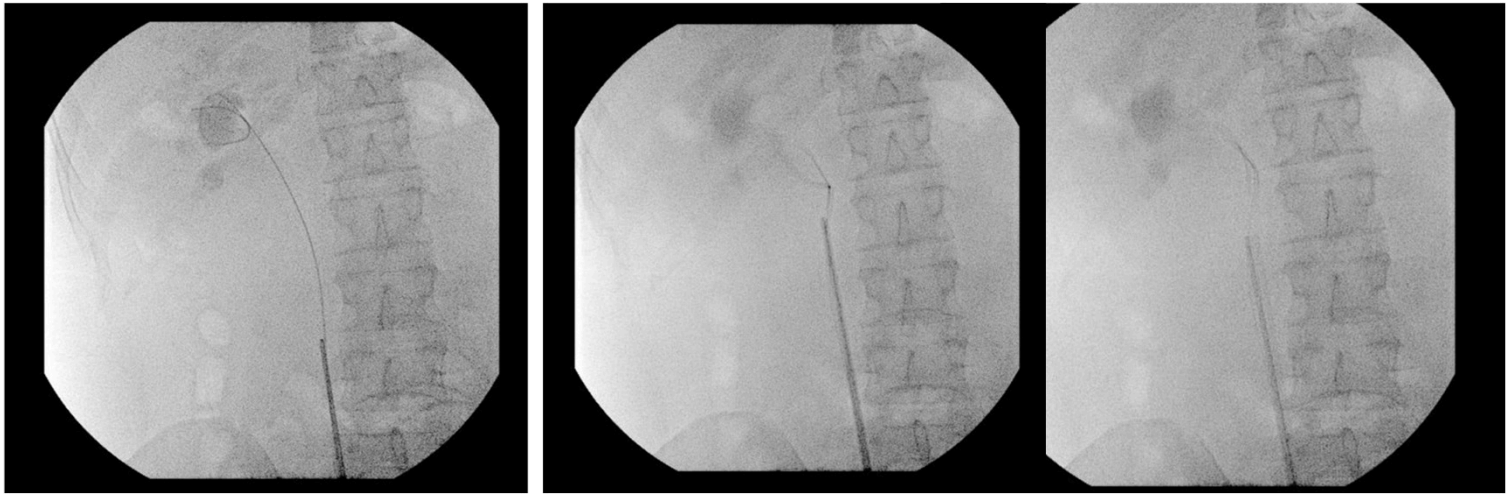
Imaging:

CT imaging:
Notable for 4 mm proximal ureteral stone, no other stones noted in the kidney, no significant hydronephrosis

Minimal perinephric fat stranding

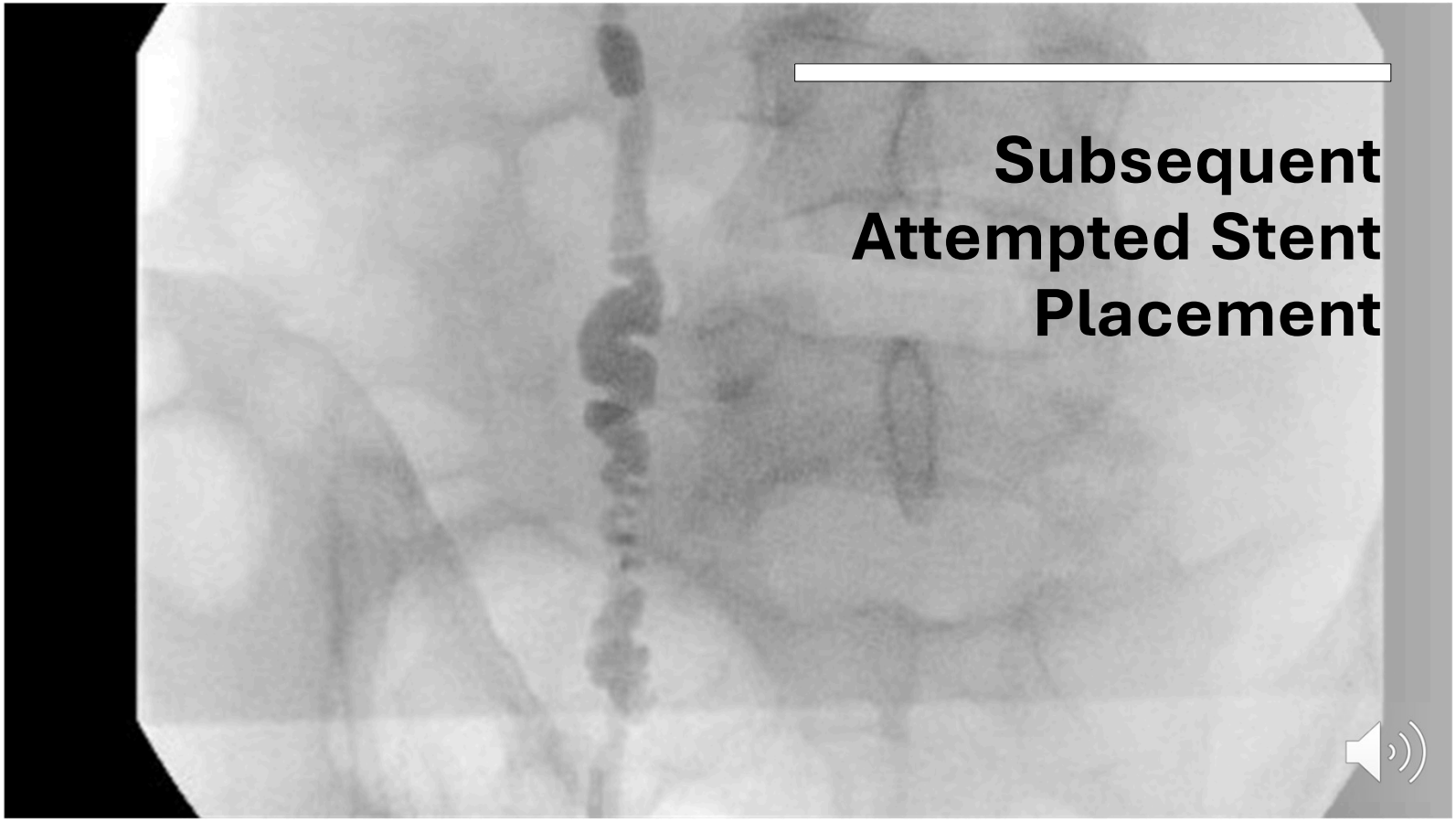


Initial URS



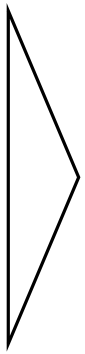
Initial Ureteroscopy

- Operative Report:
  - Semirigid URS with wire and retrograde pyelogram demonstrating contrast in kidney
  - Direct visualization of stone and 200 nm fragmentation of the stone with subsequent removal of the stone and placement of a 7F x 26 cm double-J ureteral stent
  - Noted narrow ureteral lumen, but able to accommodate scope alongside 0.035 guidewire
- Presented 1 week later for ureteral stent removal
- Again presented to the ER in within 10-12 days post stent removal with flank pain, nausea/vomiting and signs of urosepsis, with WBC 16, UCx + nitrates, LE; started on Zosyn
  - Decision made for emergent stent placement


Subsequent
Attempted Stent
Placement

What Are the Options?

- Auto-transplant
- Boari reconstruction
- Ileal Ureter (ileal interposition)
- Nephrectomy
- ?Chronic nephrostomy tube



Given age, comorbidities, decision was made to attempt
renal salvage with Boari reconstruction, but prepared for possible ileal interposition

Ureteral Avulsion Repaired via RAL Boari and Psoas Hitch

Arun Rai MD, MBA
Clinical Director of Quantitative Data Sciences
Brady Urological Institute
The Johns Hopkins Hospital
Baltimore, MD

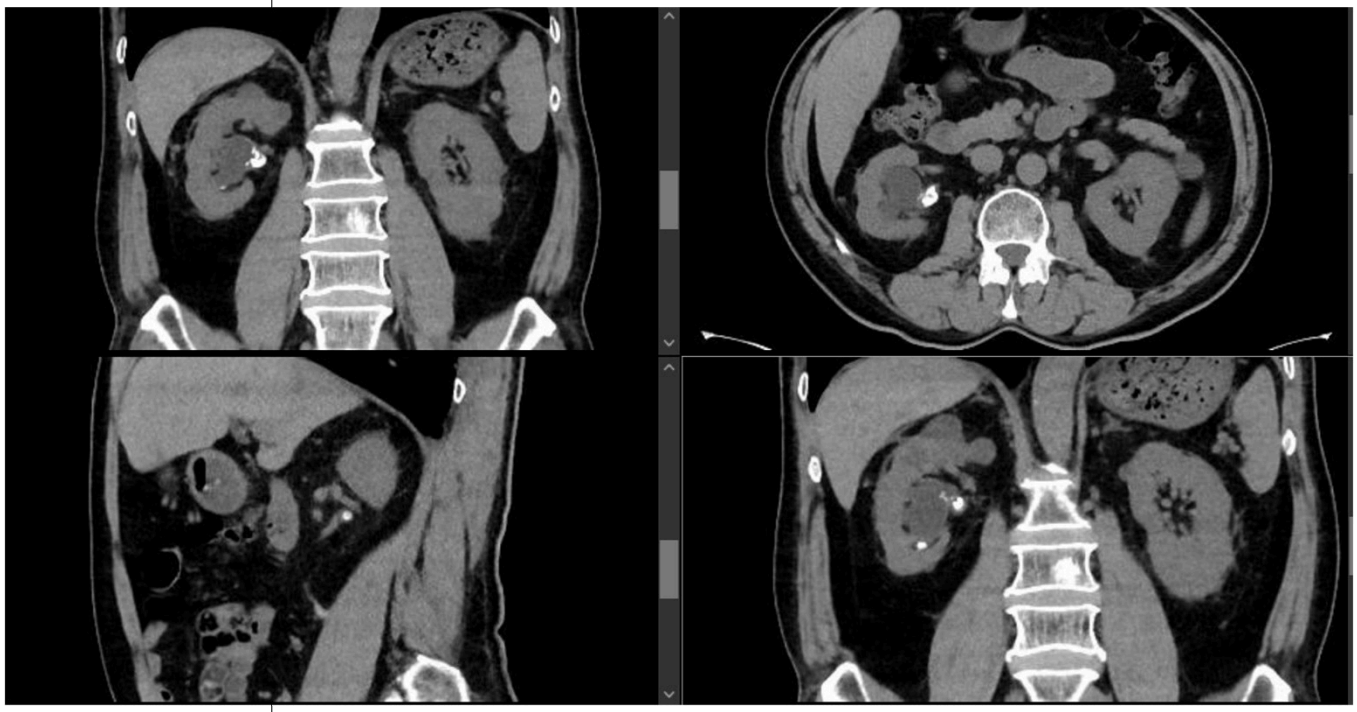
Ureteropelvic junction problems

Case Presentation

- 65y/o man
- Right renal pelvis stone

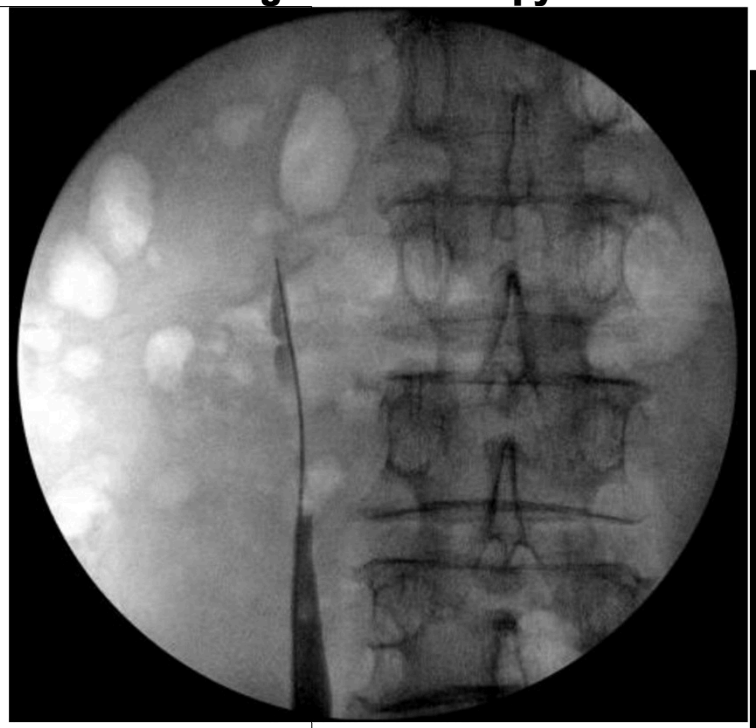
- Ureteroscopy
  - Stone migrated into renal pelvis and UPJ
  - Thulium fiber laser fragementation
  - Some basketing
  - Stent placed
  - Second stage planned

UPJ stone, treated with ureteroscopy

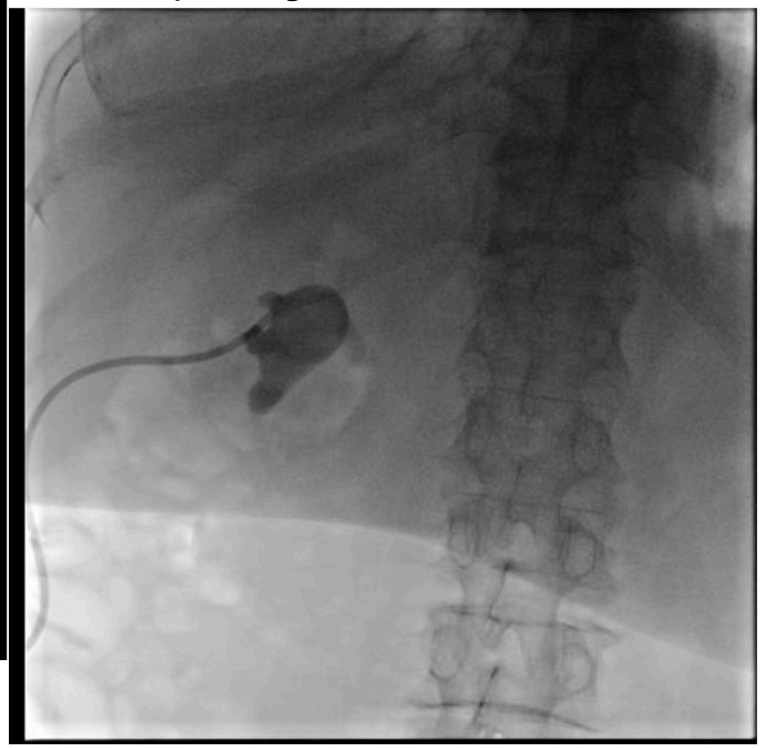


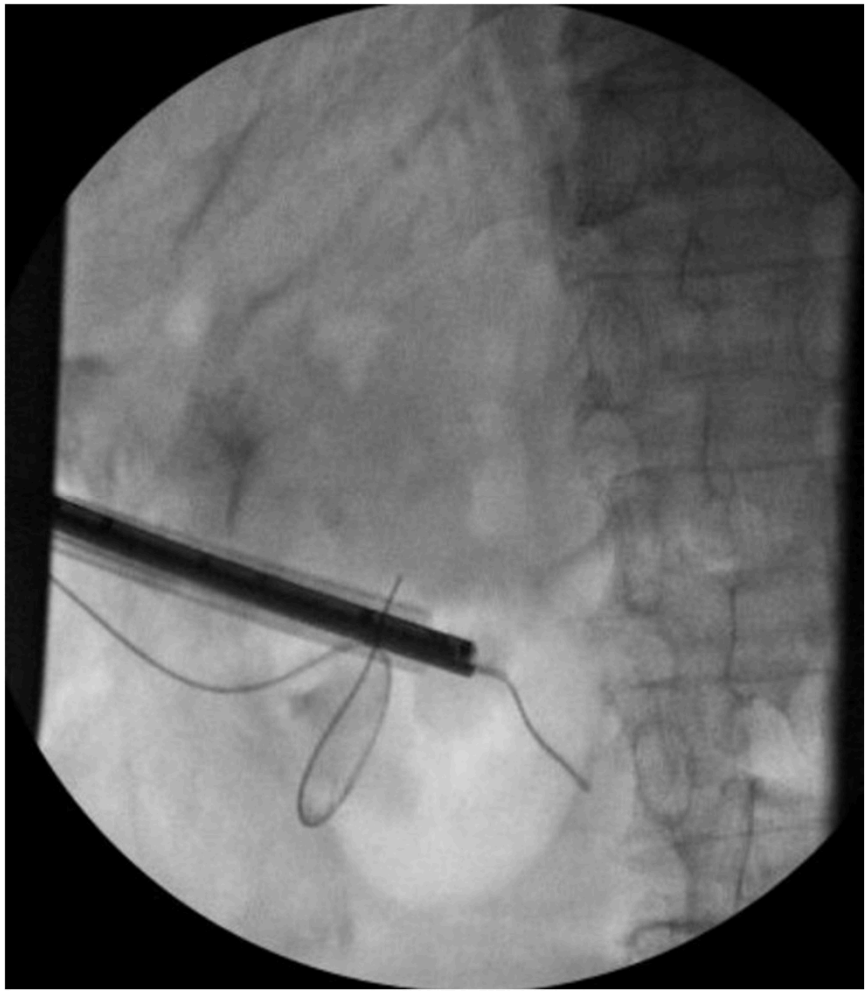
CT after first stage ureteroscopy

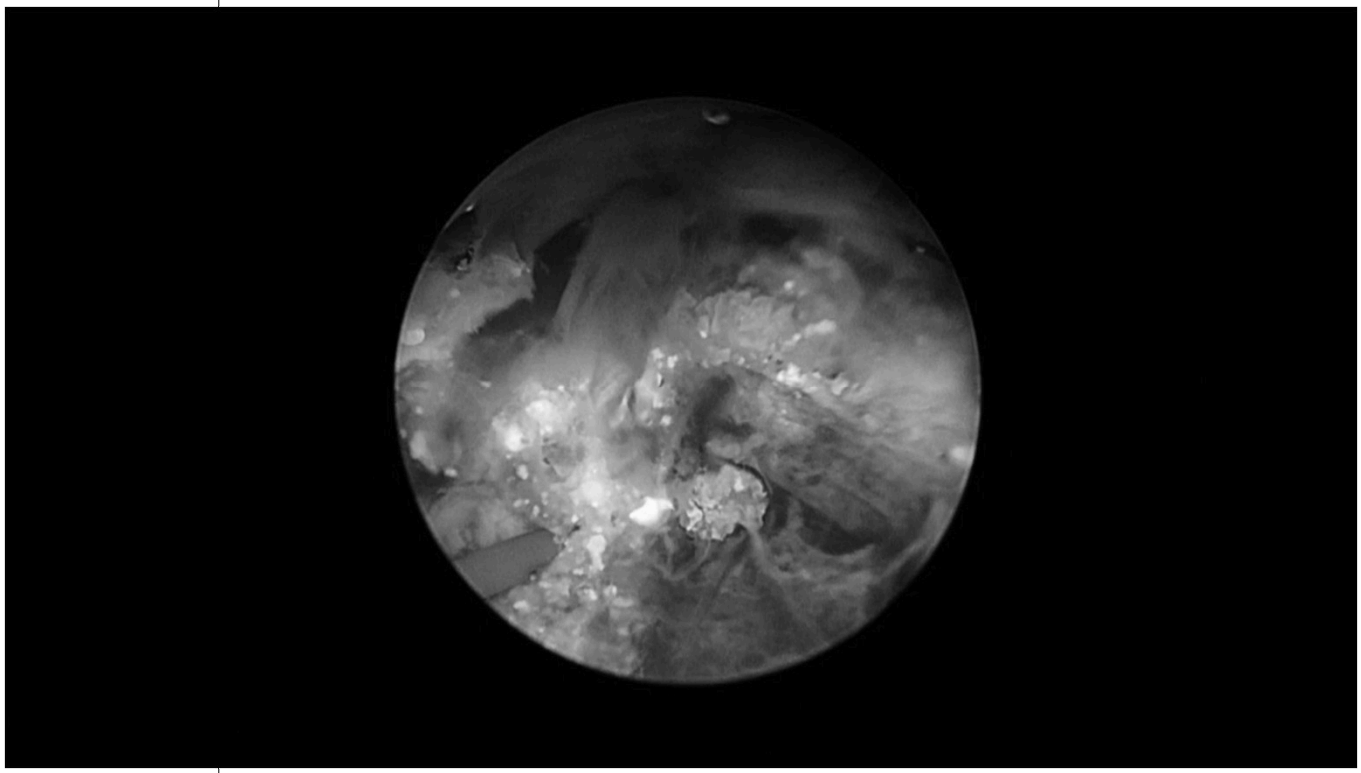
2nd stage ureteroscopy

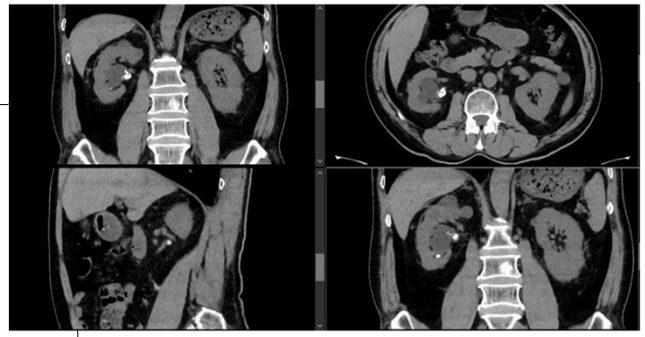


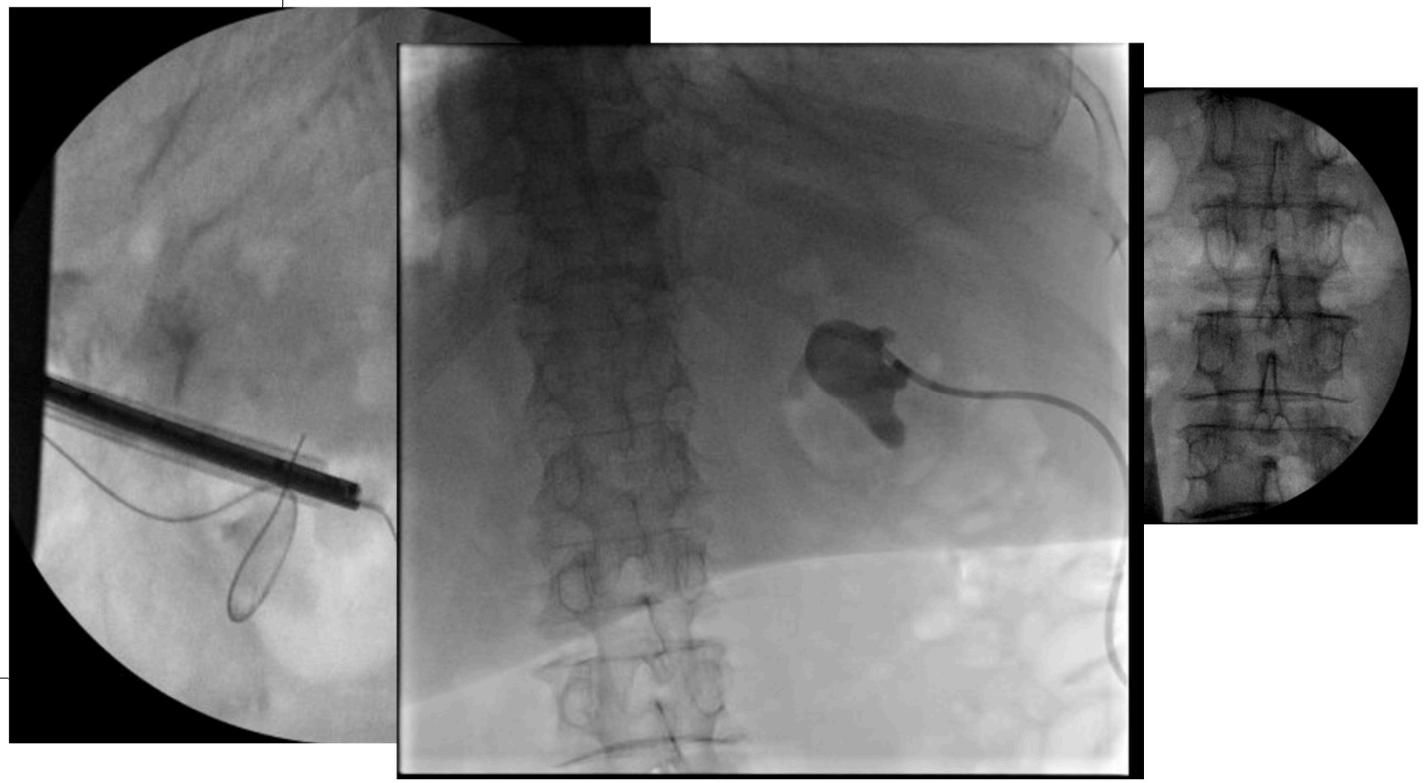
Nephrostogram





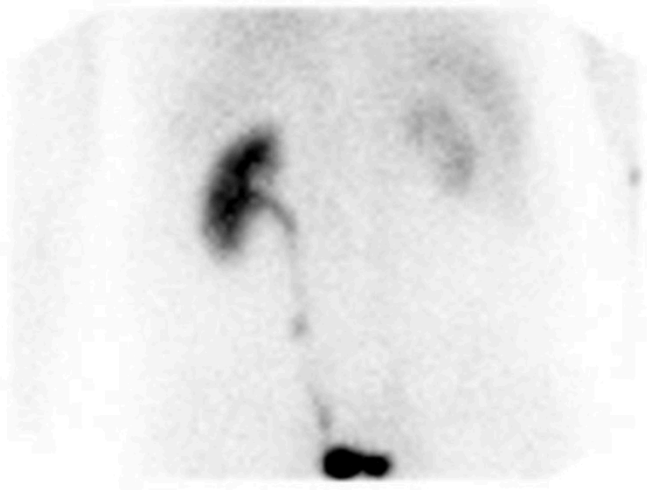






Case Presentation

- NM renal scan split function
- 7% Right
- 93% Left



- Laparoscopic nephrectomy
  - Pathology: Inflammation and scarring and glomerulosclerosis consistent with non-functioning kidney

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Ureteral disruption

Percutaneous Endoscopic management of atypical pediatric ureteropelvic junction obstruction

Case Presentation

- 12 year old boy
- Acute on chronic Left flank pain
  - several months

- Mild hydronephrosis by renal ultrasound at 3 months

- NM renal scan at age 3 months
  - 55% Right 45% Left split
  - T1/2 Left side 19 minutes

Case Presentation

- Physical exam notable for mild L flank pain
- Labs within normal limits, Cr 0.6
- MRI completed after initial ER visit demonstrated moderate L sided hydronephrosis with an elongated renal pelvis and small persistent filling defect lining the ureteropelvic junction. No crossing vessel identified

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Case Presentation

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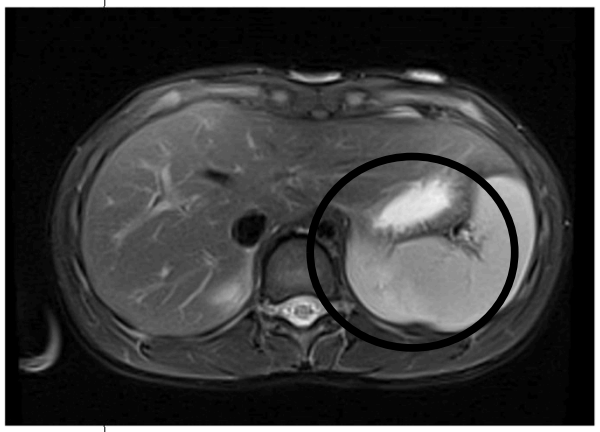

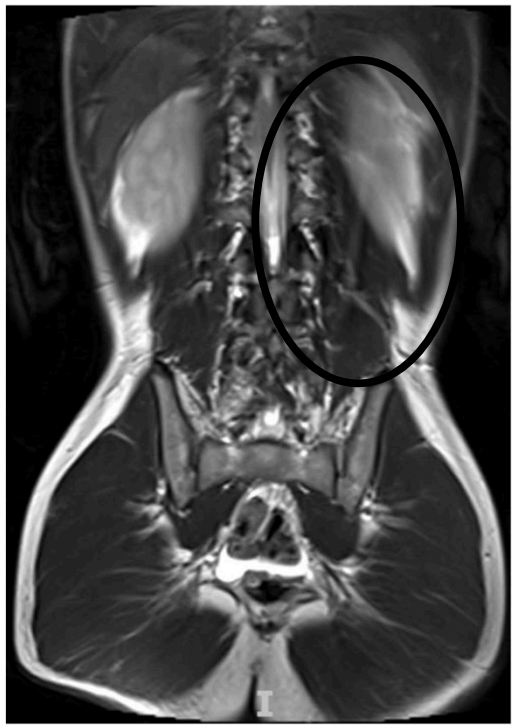

Case Presentation

- Based on imaging findings, decision was made to proceed with percutaneous renal access to assess the potential filling defects
- DDx: stones, intrinsic obstruction, benign/malignant growth

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Intraoperative Course

- Once recognizing tissue as most likely benign fibroepithelial tissue, the decision was made to proceed with laser ablation
- A bulls-eye lateral calyx was selected given excellent access to the ureteropelvic junction

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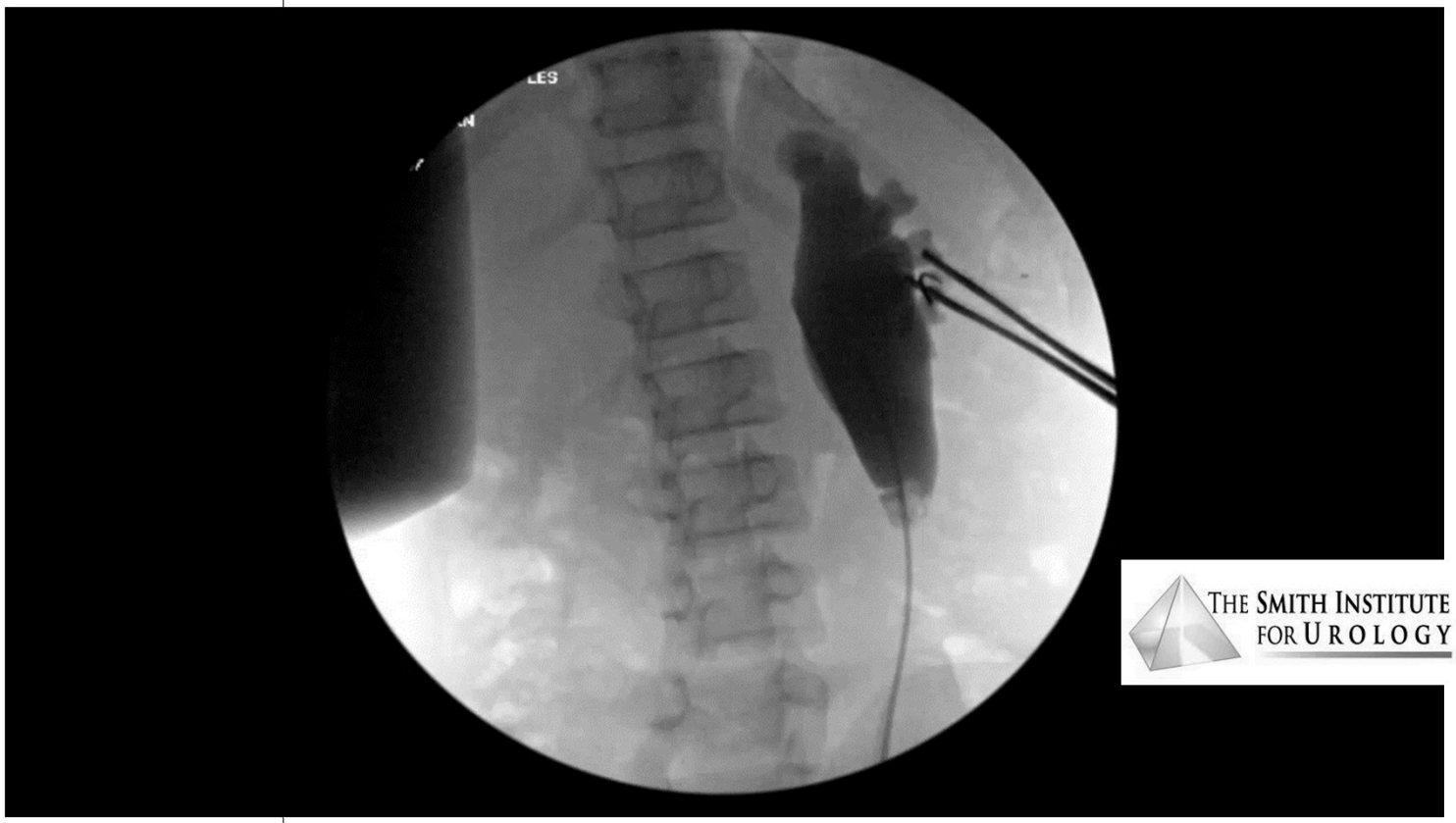
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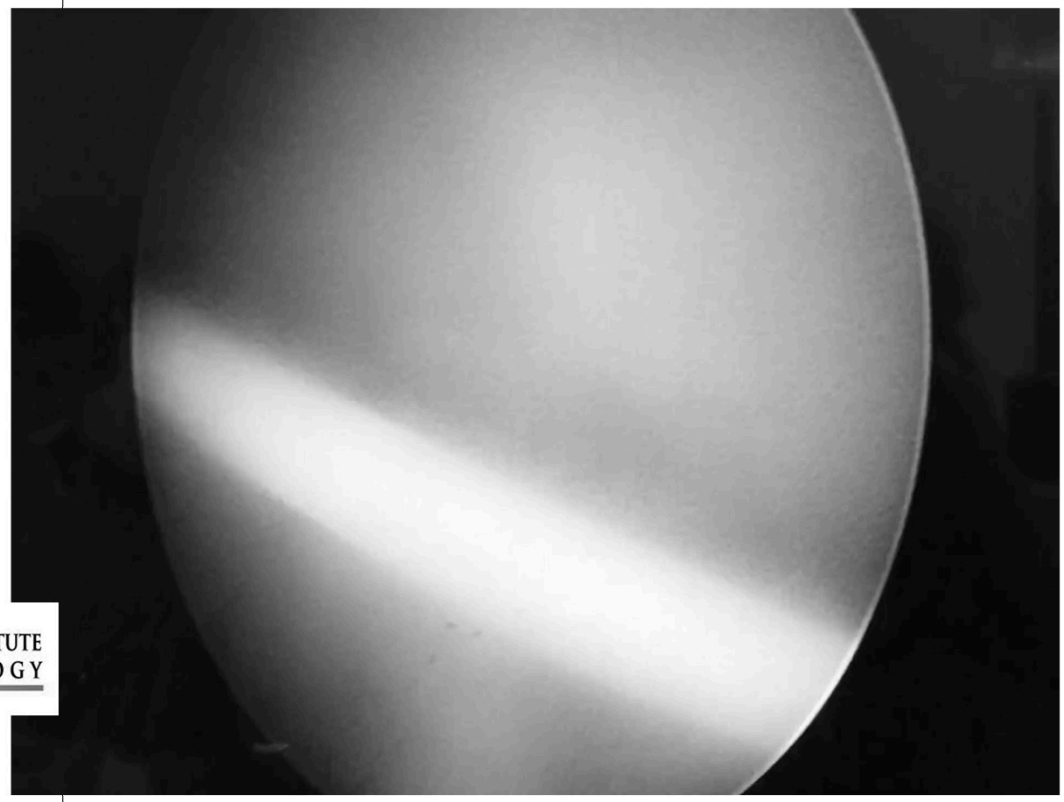

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Post Operative Course

- Patient remained stable throughout, a stent and a foley catheter was left in place
- Foley was removed on POD2

- Stent was removed after 4 weeks
- Retrograde pyelogram showed stricture at UPJ/proximal ureter

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Post Operative Course

- Pathology: Benign fibroepithelial polyps
- Ultimately had robot assisted laparoscopic pyeloplasty

Conclusions

- Fibroepithelial polyps are more rare in children than adults[1], and result in approximately 0.5% of UPJ obstruction
- More often in the pediatric population, pediatric polyps are found in the UPJ or upper ureter (73%)[2]
- Preoperative diagnosis is challenging in pediatric population given small lumen of ureter

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1. Ludwig et al. Can Urol Assoc J. 2015;9(9-10):E631-7.
2. Niu ZB et al. Pediatr Surg Int. 2007;23(4):323-6.

Conclusions

- In a systematic review of polyps in the adult population, endoscopic resection was the most common form of management with a low complication rate[3]
- Recurrence rate is fairly low, however complications can occur, current literature recommends imaging at 3 and 12 months post operatively in the asymptomatic patient

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3. Ludwig et al. Can Urol Assoc J. 2015;9(9-10):E631-7.

Uretero-Iliac Fistula following Chronic Ureteral Stenting

Northwell Health

Case Presentation

83 year old woman

Colon cancer s/p colectomy with colostomy and radiation

Multiple small bowel obstructions

Ureteral stricture s/p stent placement "years ago"

Presented after a fall with noted frank hematuria on admission

- PMH: HTN, HLD, hypothyroidism, hx of HIT, breast cancer and a right ureteral stent that was in place greater than 15 years
- PSH: colon ca s/p resection with colostomy and radiation, b/l knee replacement

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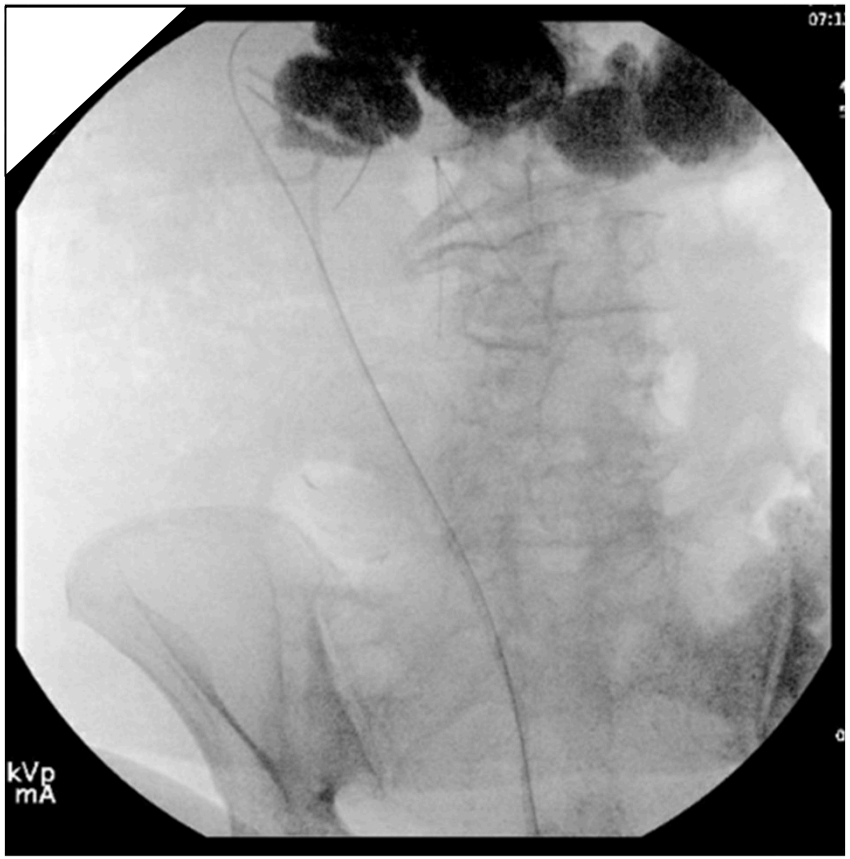

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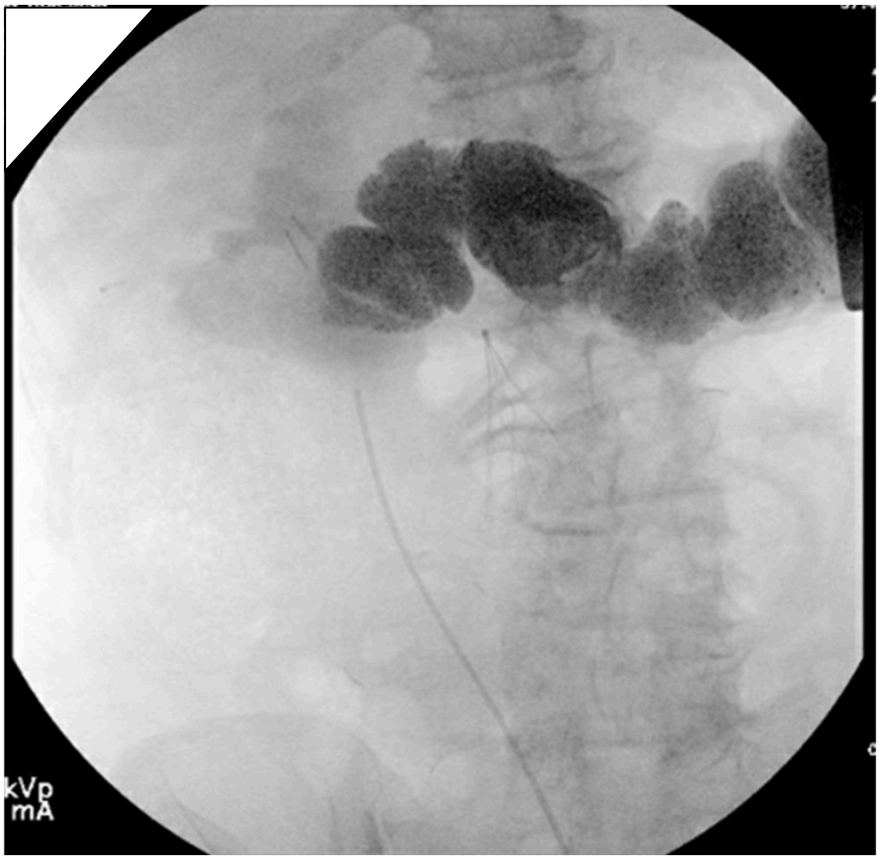

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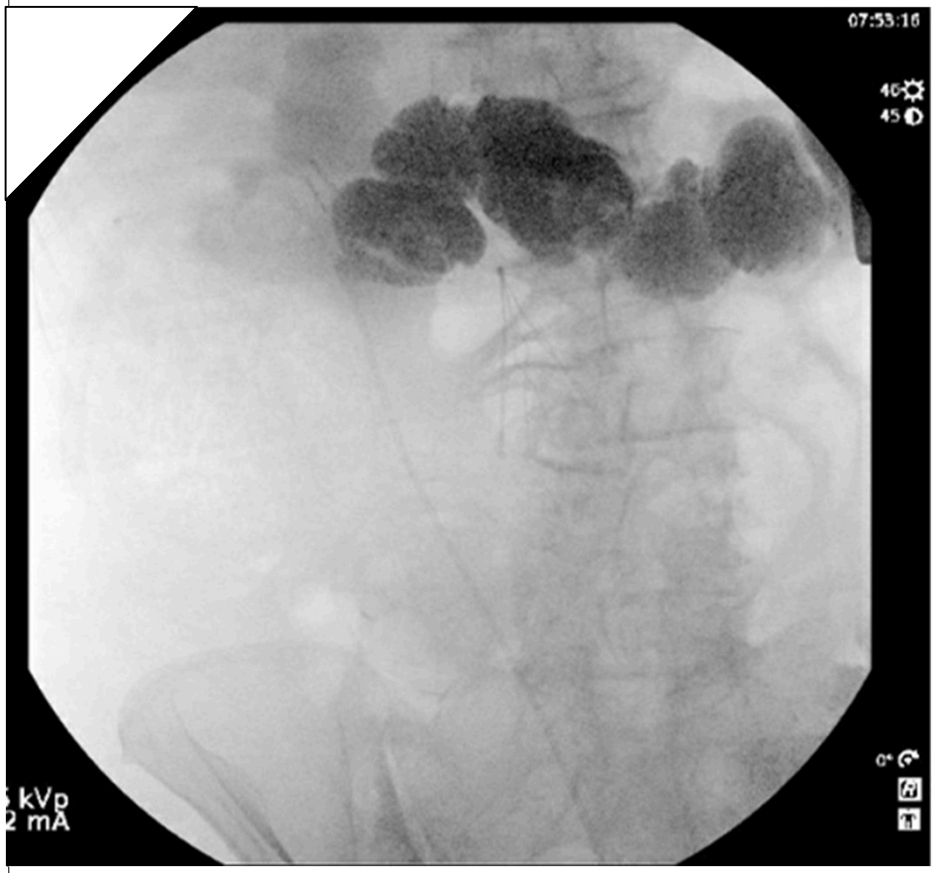

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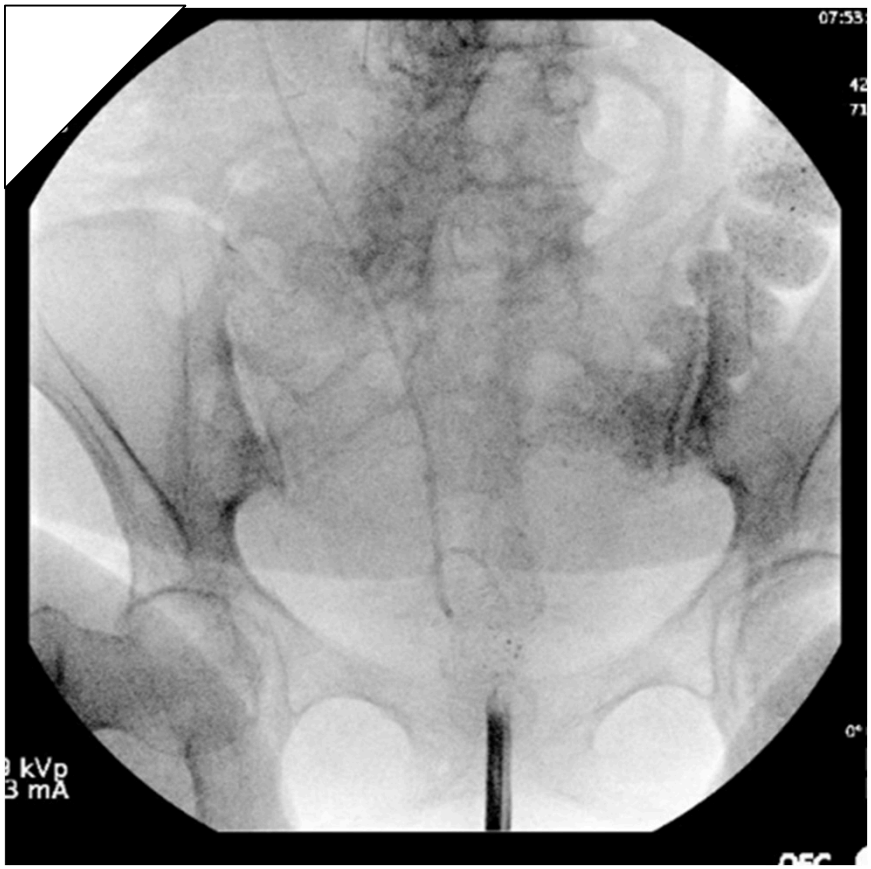

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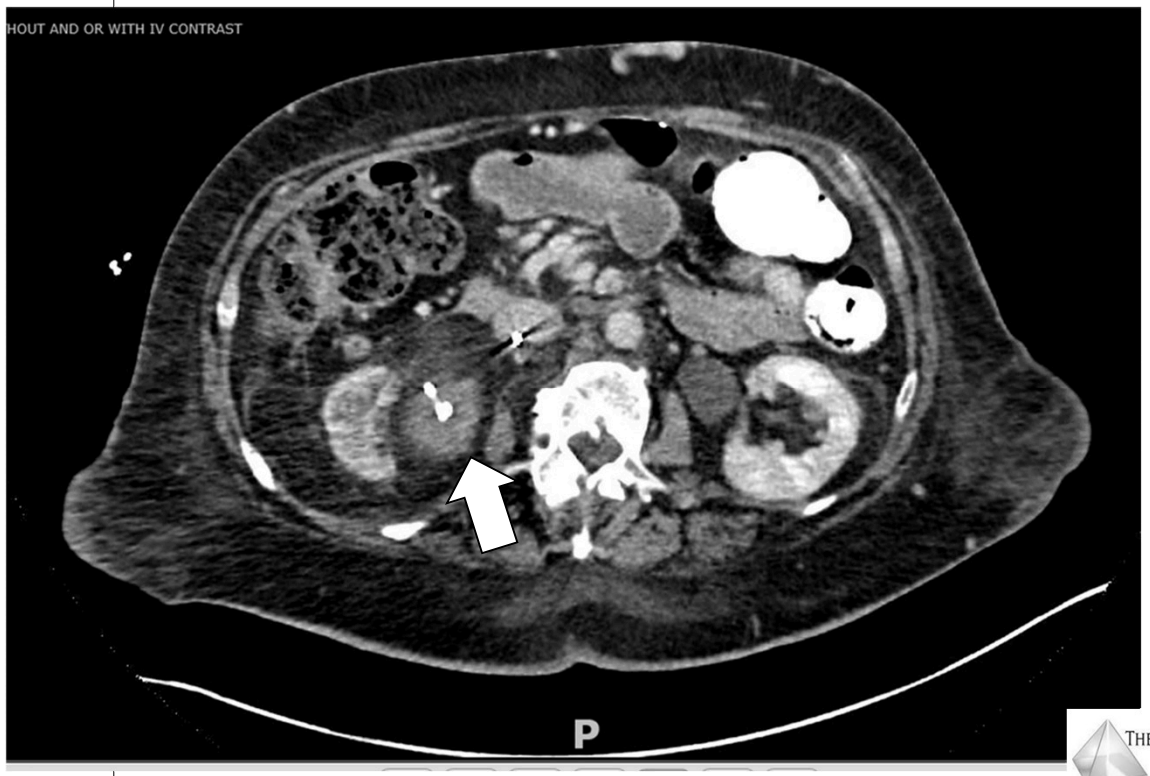

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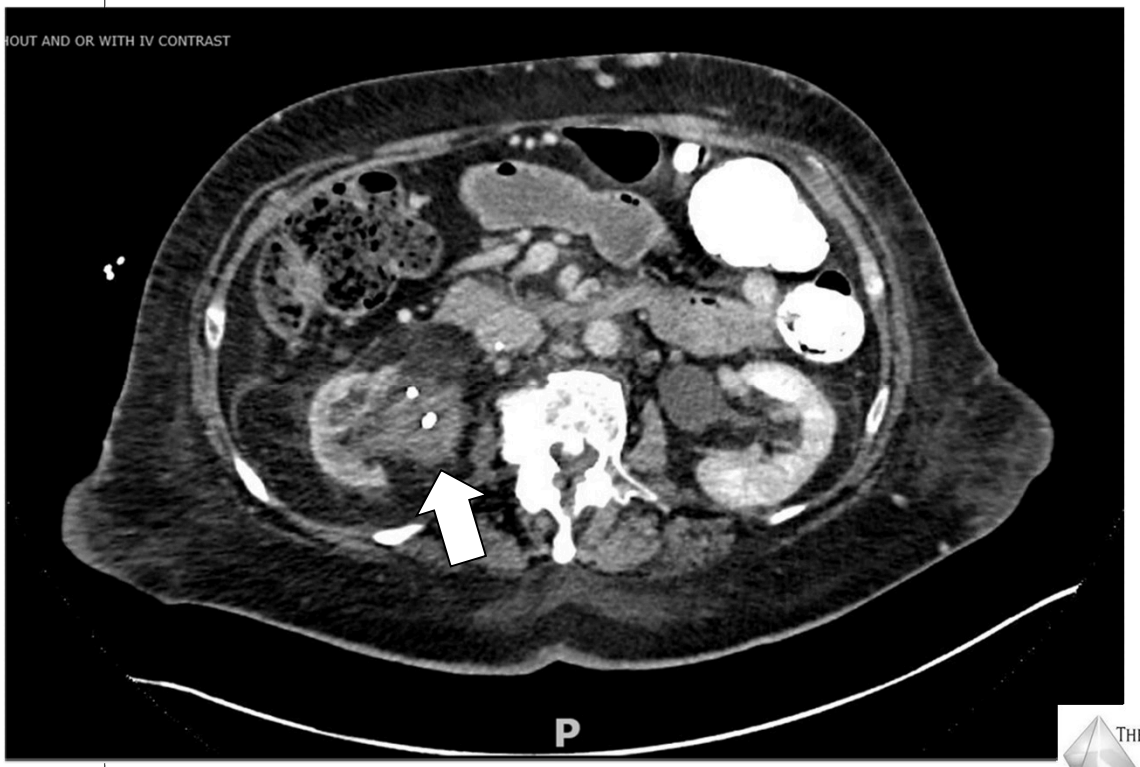

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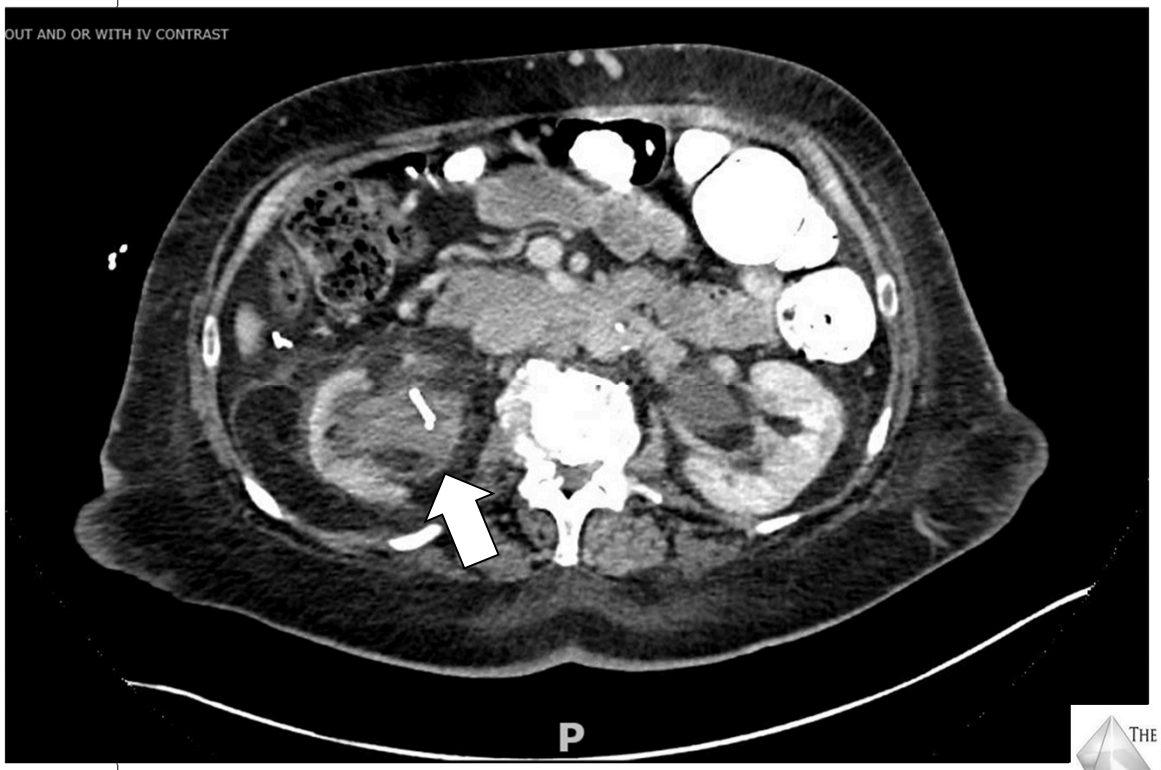

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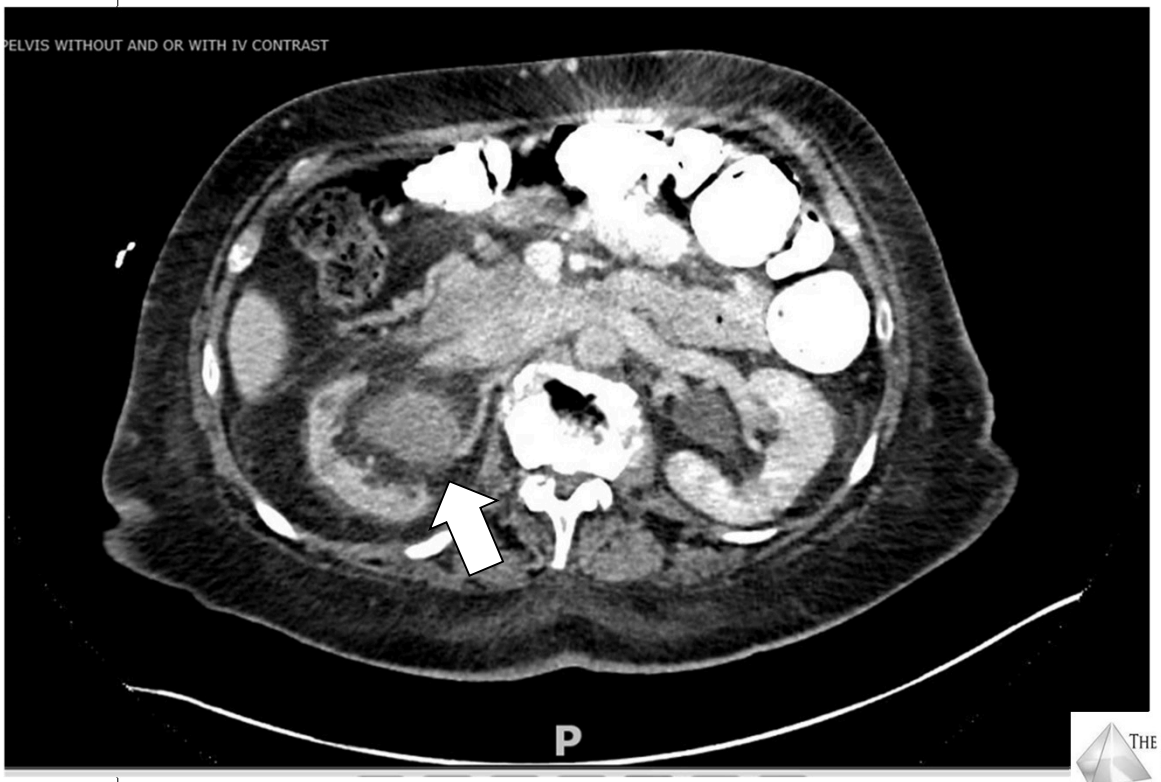

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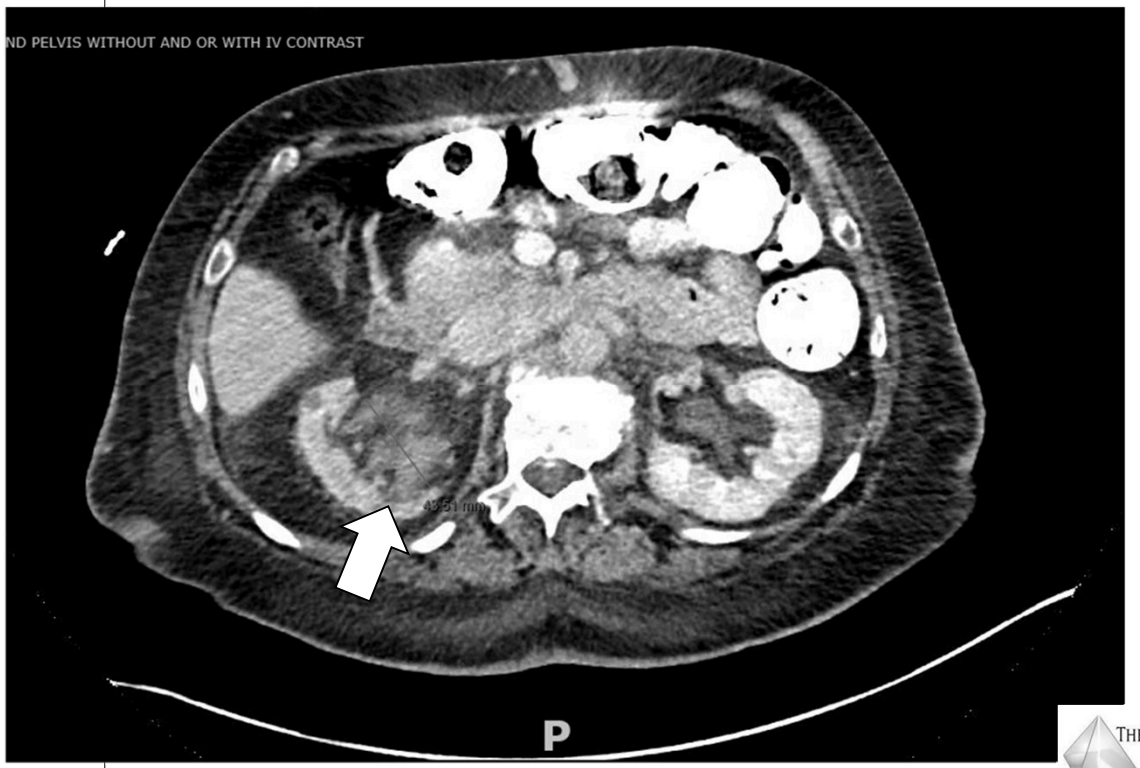

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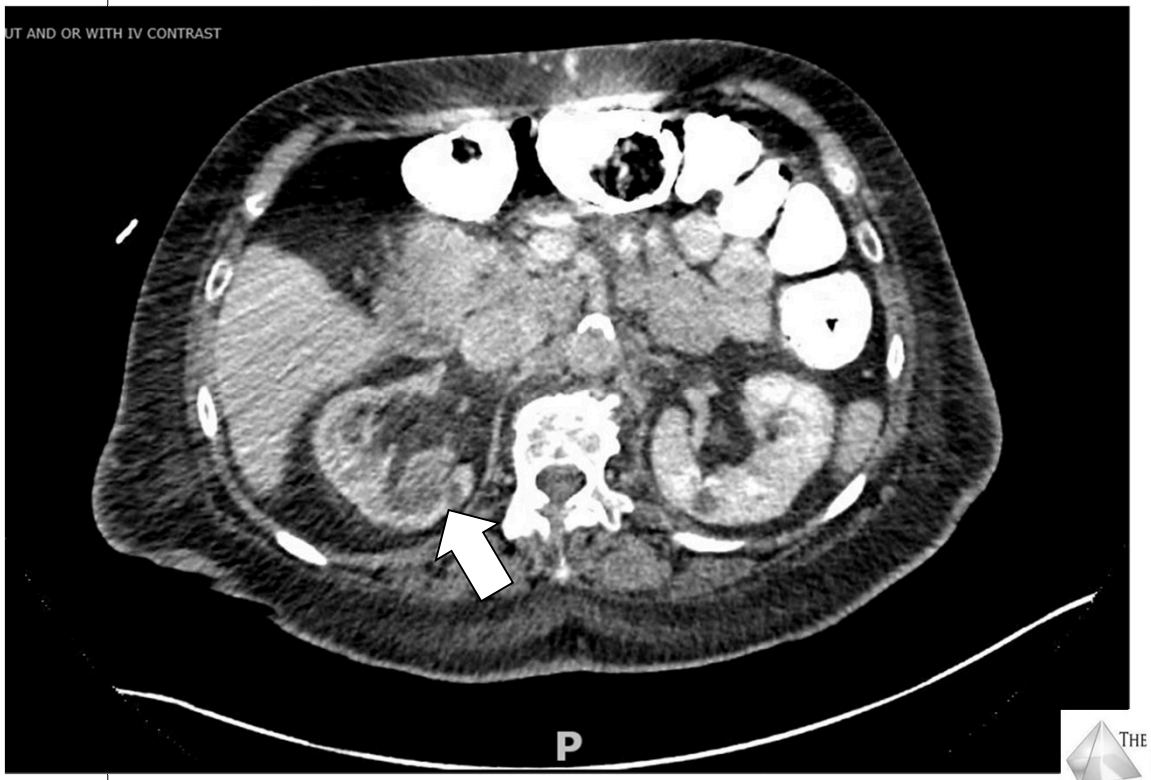

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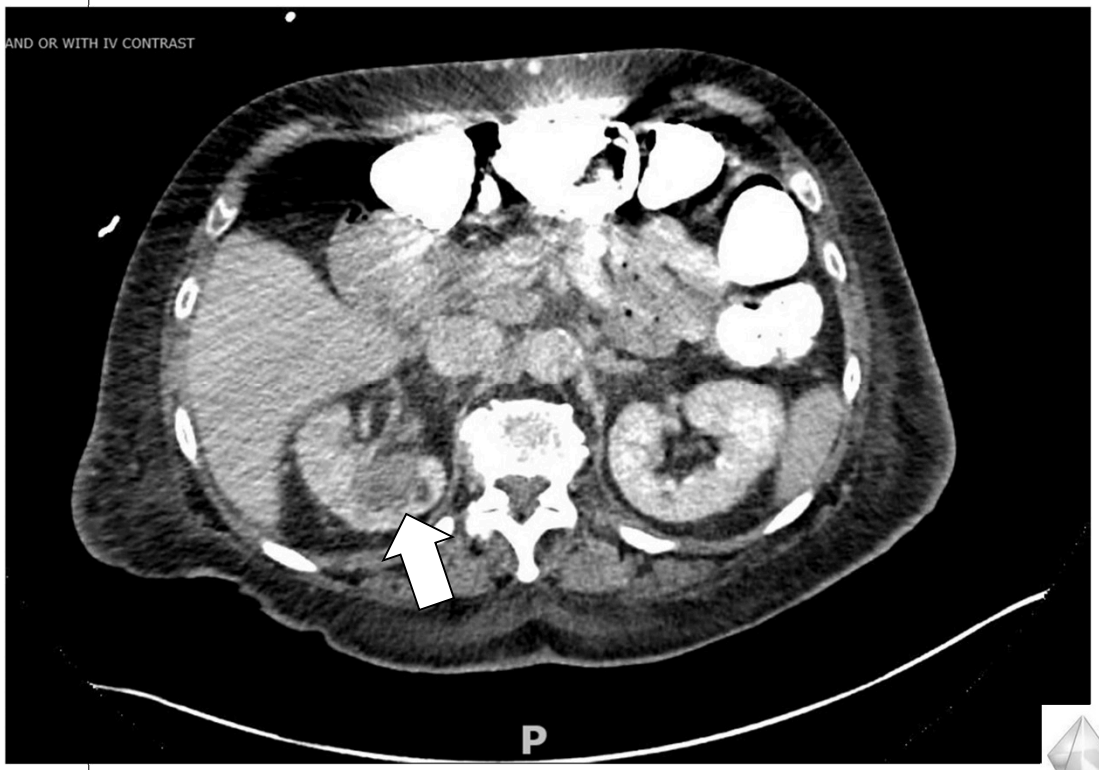

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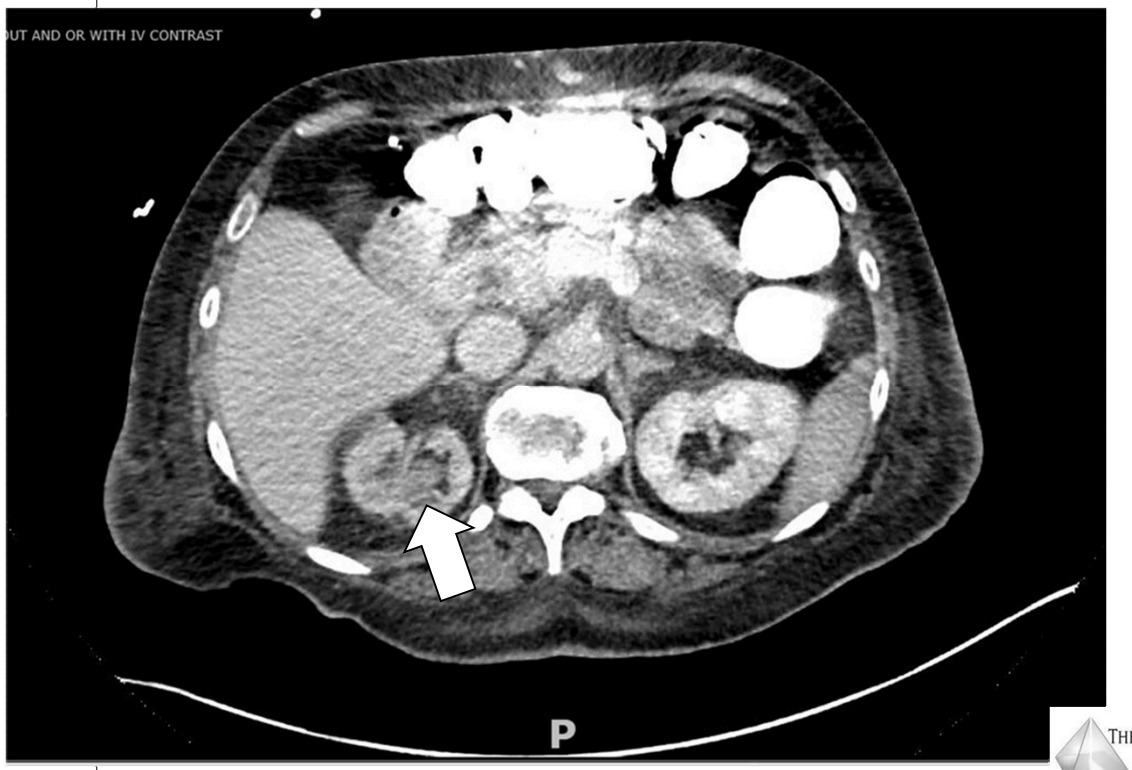

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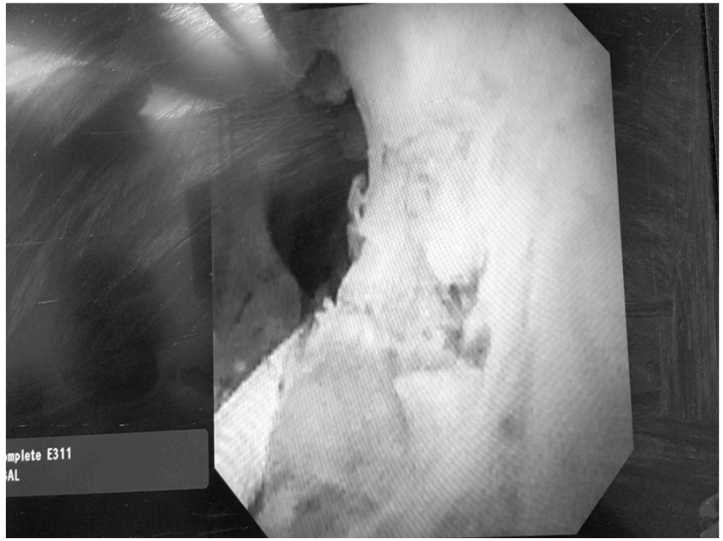

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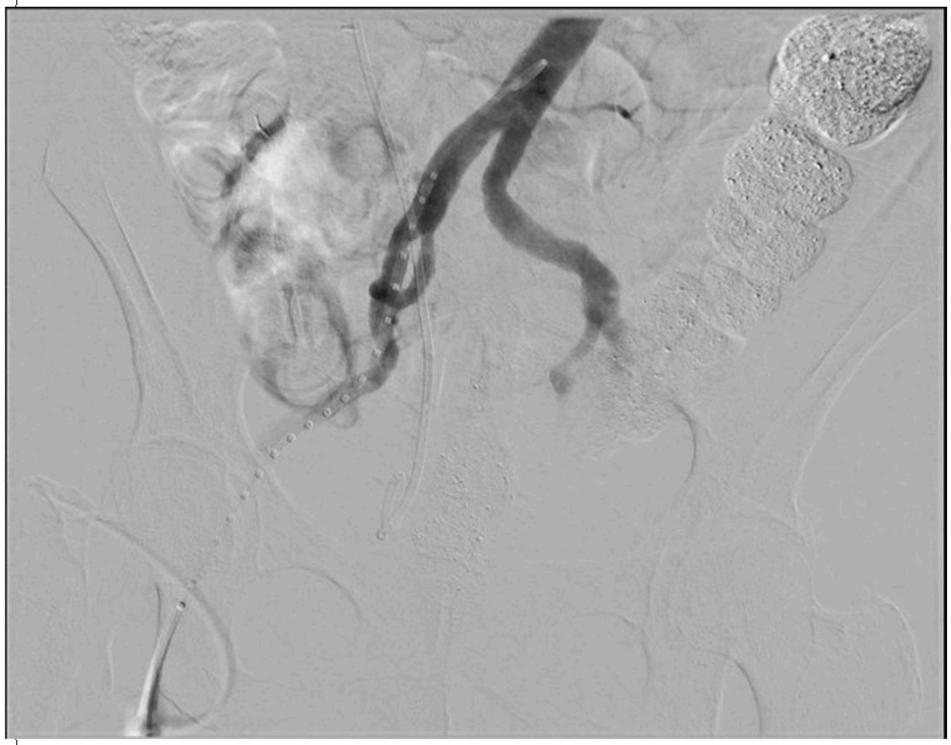

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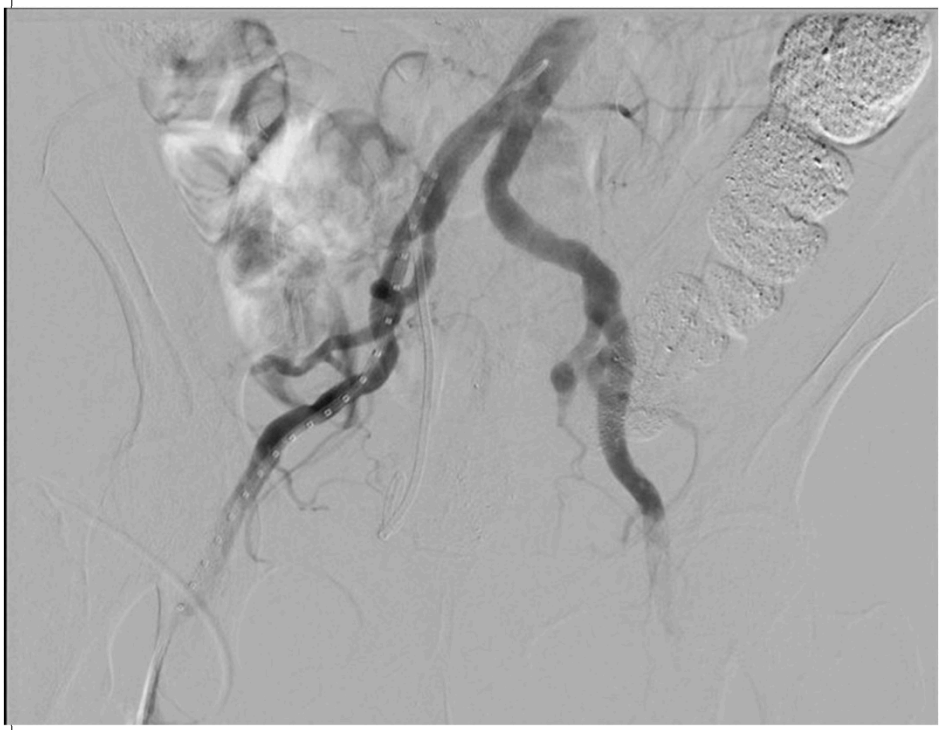

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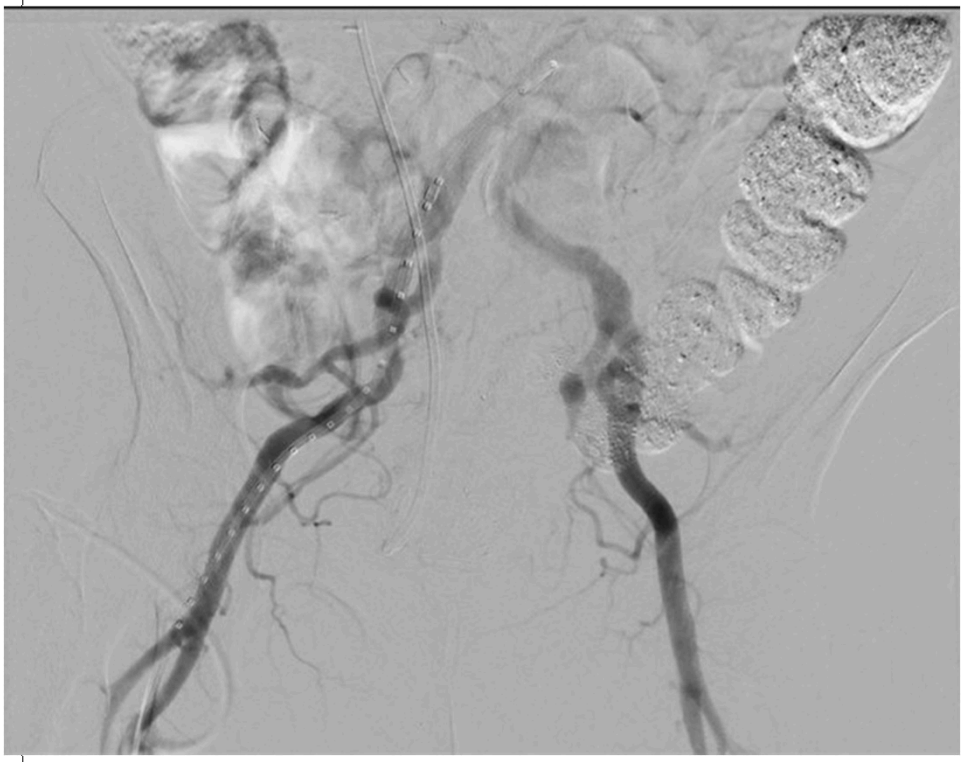

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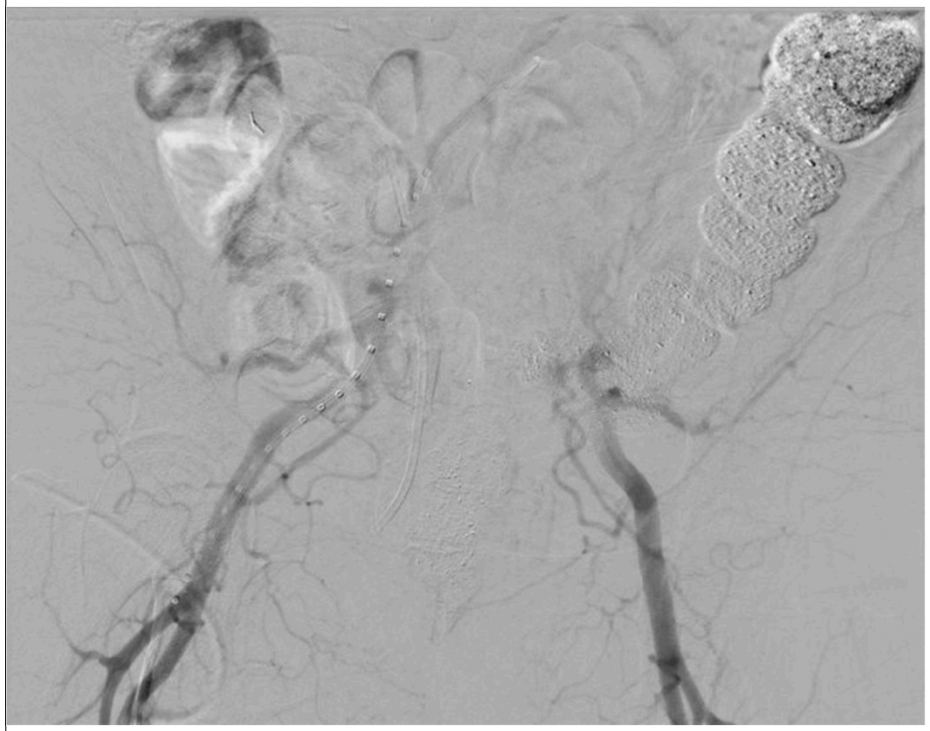

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Review of Literature

Review of L

	Surgical History	Other risk factors	Presenting Symptom	Workup prior to diagnosis	Final diagnostic workup	Outcome
Muñoz Guillermo et al. 2020	Cystoprostatectomy and cutaneous ureterostomy	Permanent b/l 8F ureter stents	Gross hematuria and lateralizing pain	CTU, CT angiography, CT arteriographies x2	Flexible URS	Hematuria stopped POD 2, asymptomatic 16 months post
Crane et al. 2019	Cystoprostatectomy with ileal conduit urinary diversion	Chronic indwelling NU catheter	Gross hematuria, flank pain, weakness, tachycardia	CT angiogram x2, provocative angiogram	Fluoroscopy on attempted URS	Patient did well with no recurrent hemorrhagic events
Miyauchi et al. 2020	Hysterectomy and chemoradiotherapy	Chronic ureteral stent	Gross hematuria	Cysto, contrast-enhanced CT, CTA	Retrograde pyelography	Gross hematuria disappeared, no recurrent hemorrhage, patient died 11 months later 2/2 progression of primary disease
Berastegi-Santamaria et al. 2020	Hysterectomy and double adnexectomy, lymphadenectomy and omentectomy with pelvic radiotherapy	Indwelling double J catheter	Pulsatile bleeding on catheter replacement, anemia	CT with and without contrast x 2, arteriography	Diagnostic angiography	Hematuria progressively disappeared, catheter removed without complication x 1 month

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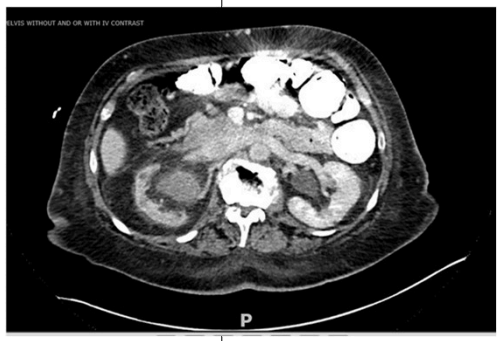

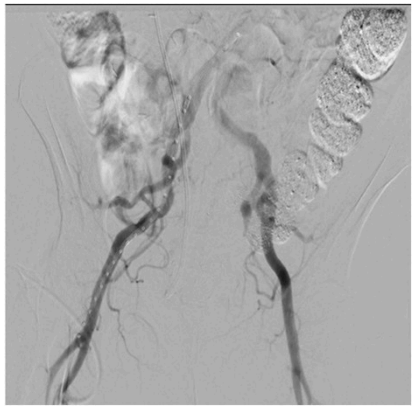

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Fungal ball

FB age 47
Right Flank pain
Fever and chills
Nausea and Vomiting

PAST HISTORY.
2009 Stone in kidney and UPJ
Treated with ESWL x 3 and subsequent urs
Post –op stone free.
Renogram Rt 35% Lt 65%
Drainage Rt 13min Lt 4mins
DIABETES

- Migrated Clips after partial nephrectomy

Northwell Health®

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Case Presentation

- 62y/o man
- Robot assisted laparoscopic partial nephrectomy
- New stone in right kidney 1 year post op

Northwell Health®

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MINI-PCNL FOR MULTIPLE HEM-O-LOK CLIPS FORMING STONE NIDUS IN THE COLLECTING SYSTEM

TAREQ ARO, ARUN RAI, DAVID HOENIG, ARTHUR SMITH, ZEPH OKEKE

Northwell Health

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@tareqaro

THANKYOU