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MAY 15-18

# 006IC - Disasters in Endourology and How to Avoid Them

## Friday, May 15

## Faculty

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# PART 2

## DISASTERS IN ENDOUROLOGY & HOW TO AVOID THEM

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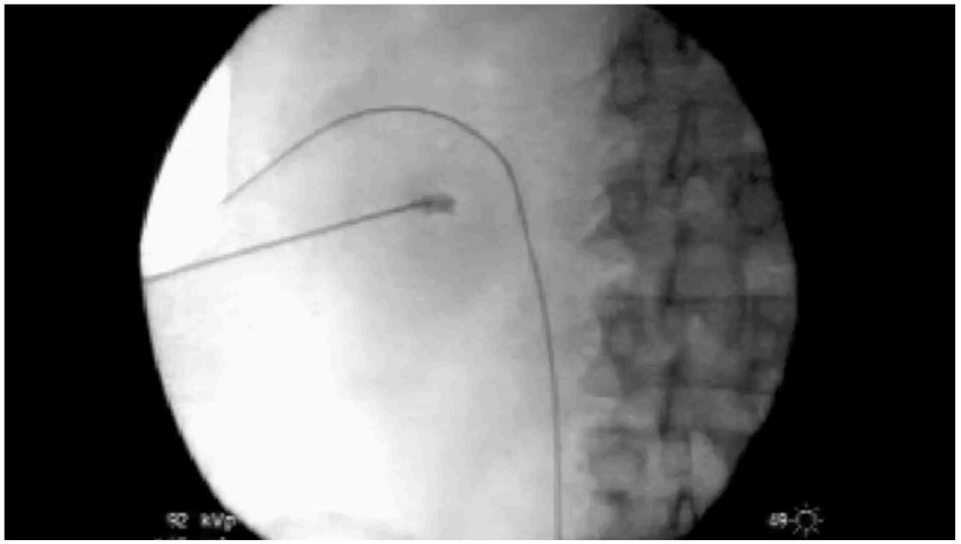
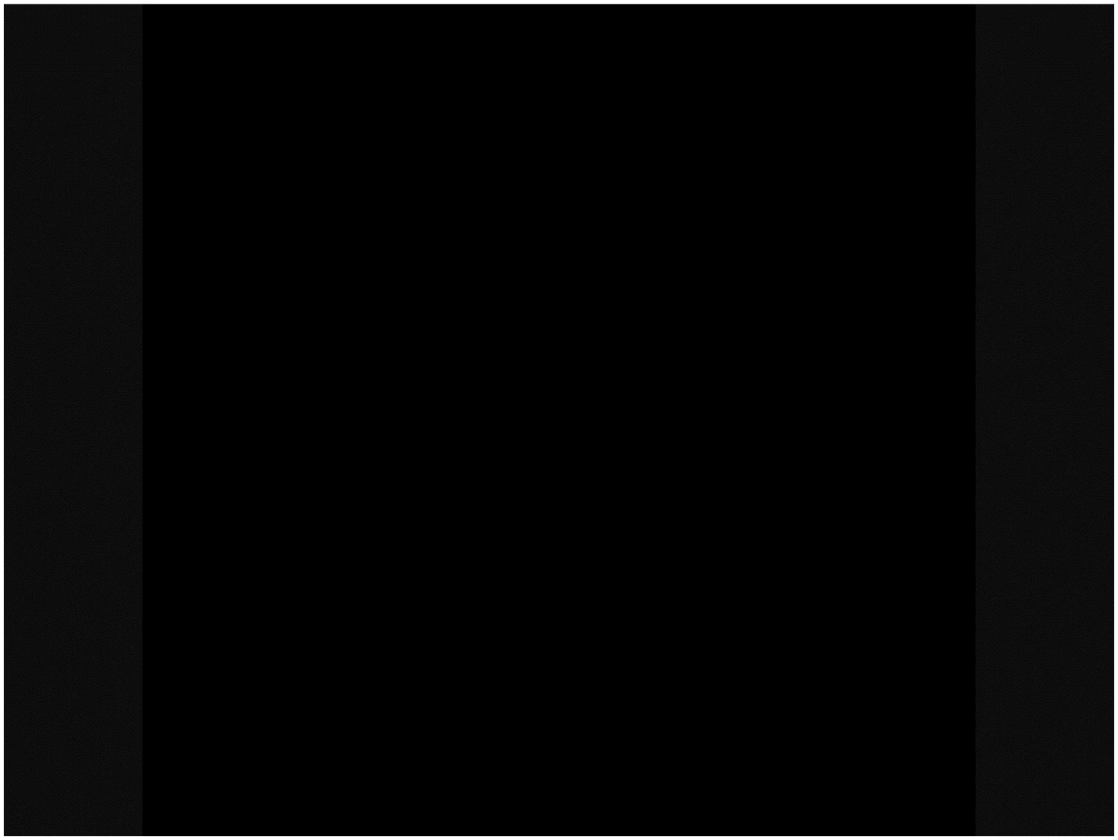
ACCESS
PROBLEMS

Early extravasation



Caval entry



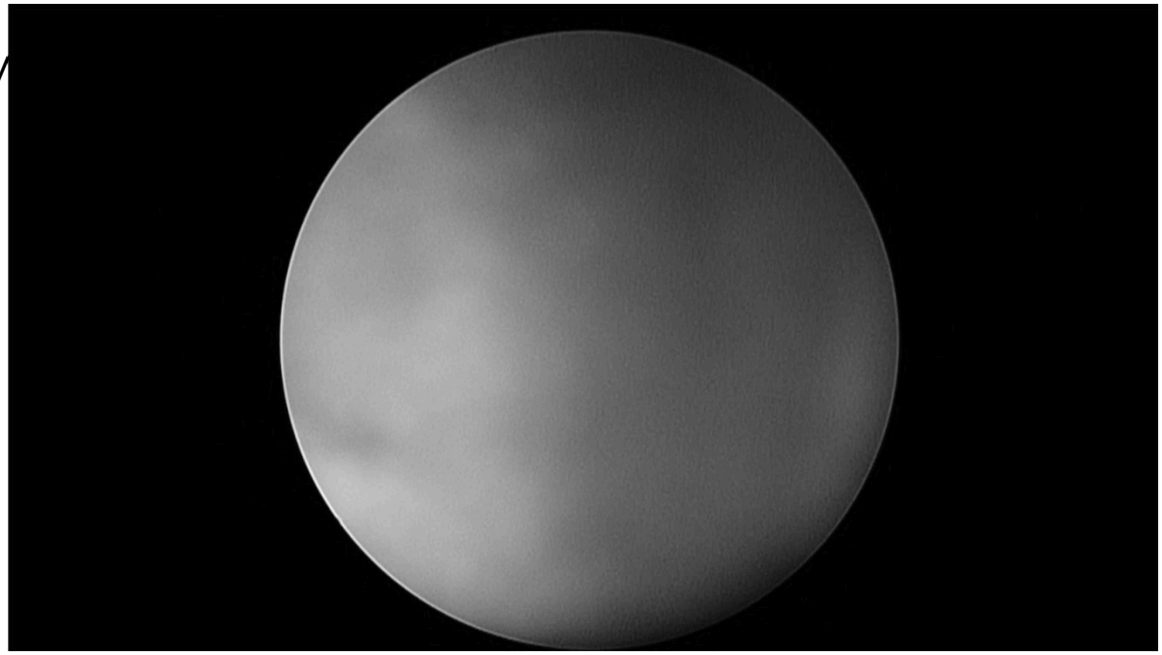
Dilation is short

Red out

LOST IN RETROPERITONEUM

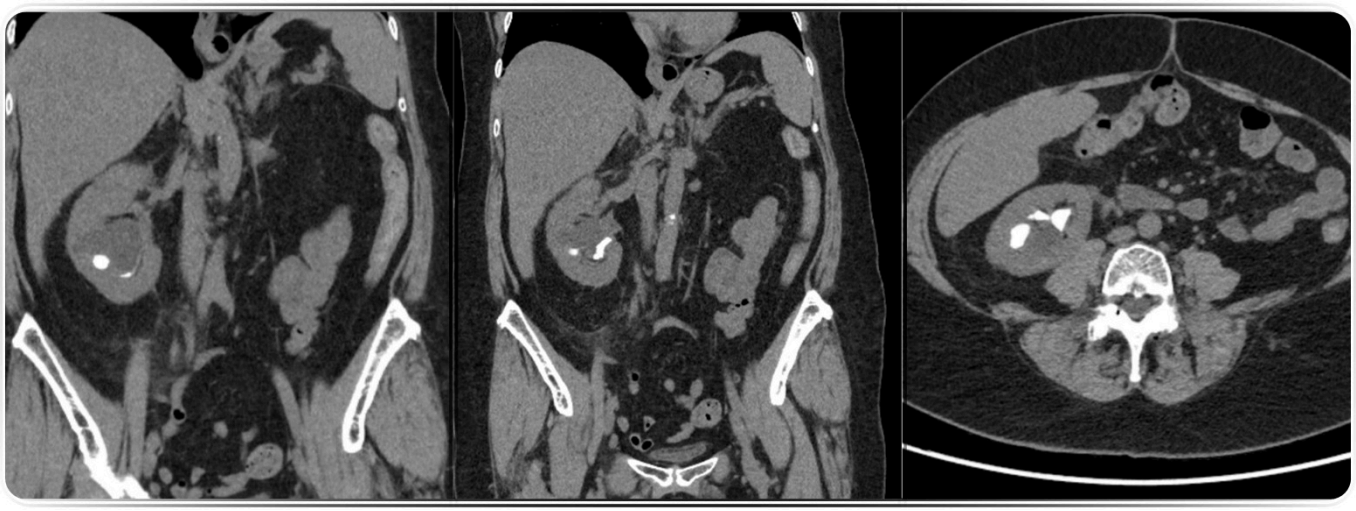
(miniPCNL, megaHeadache)

Lost wire
Sheath retracted



CYST IN YOUR WAY

- 70-year old female with history of kidney stones causing urosepsis in 2019, failed URSLL due to number of stones and “difficult anatomy” who presents with recurrent UTIs. She is on antibiotic prophylaxis, methenamine, and vitamin C.

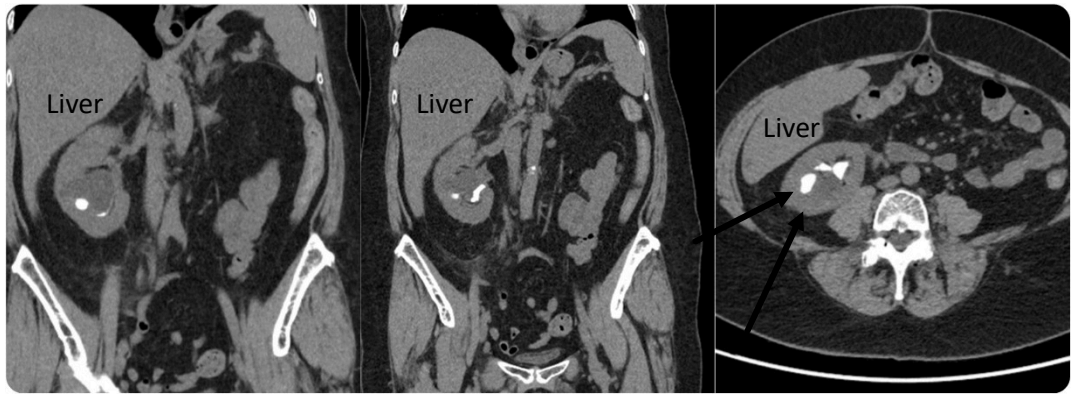


CT SCANS

How would you do your access?

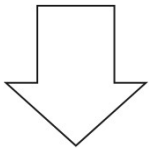
Prone or Supine?

US or Fluoro?



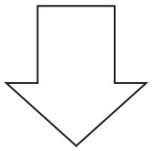
## Do you try to evade the cyst?

- Evading cyst will allow removal of stones—less risk
- Will not permit treatment of cyst
- May make it difficult to remove all stones



## Do you aspirate cyst?

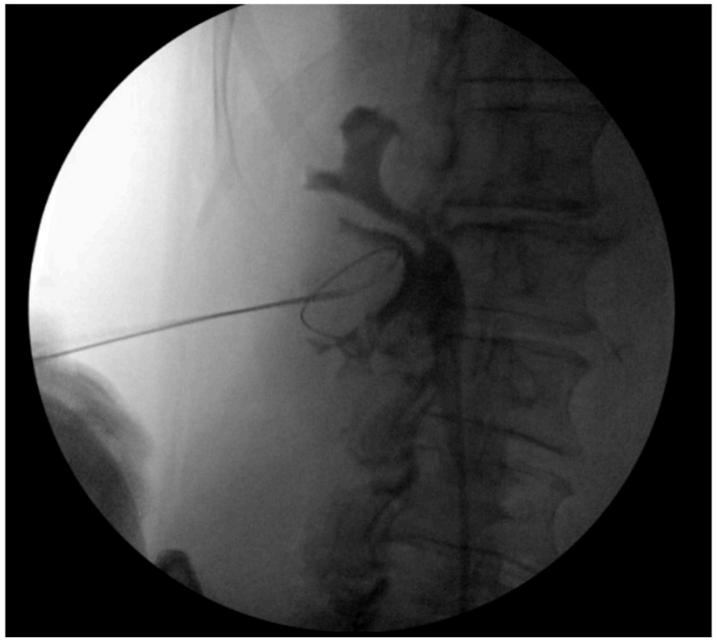
- Aspirating will allow easier navigation around collecting system
- Will not prevent cyst recurrence; obstruction and infections and new stone formation may persist

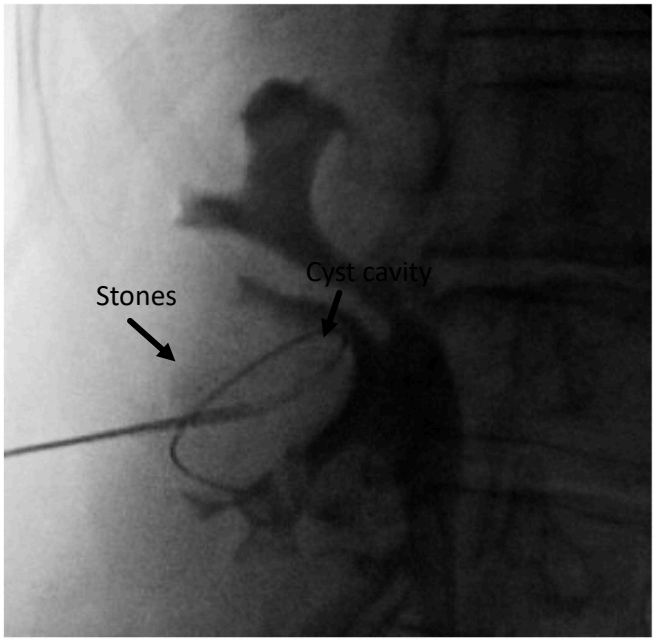


## Do you enter cyst?

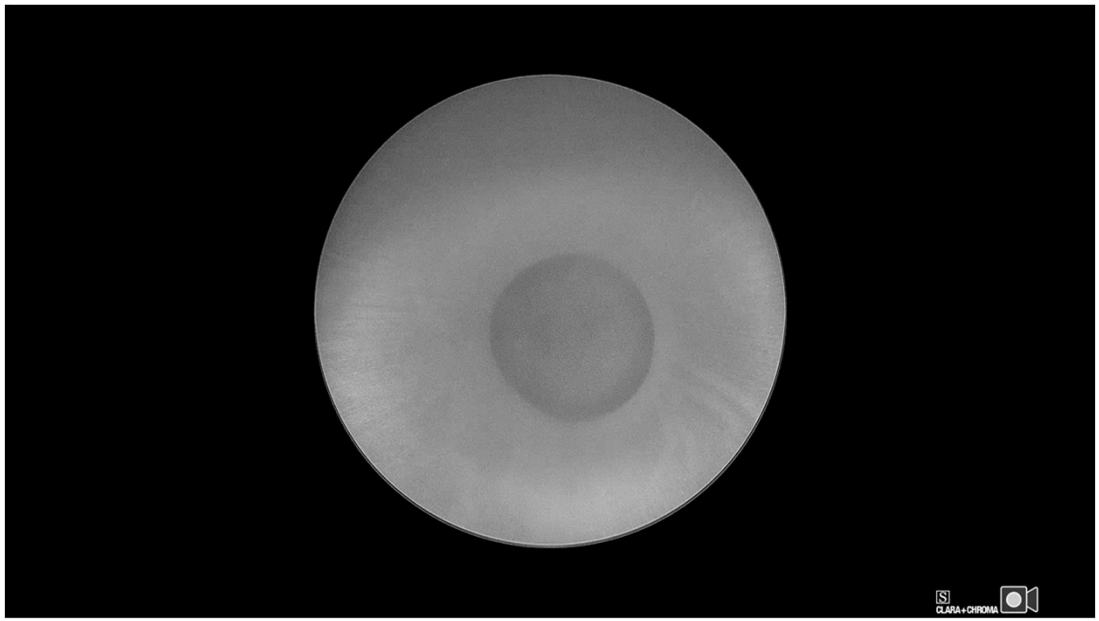
- Directly with separate entry into collecting system
- Through collecting system

# US ACCESS DONE THROUGH COLLECTING SYSTEM INTO CYST





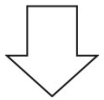
# ENTRY INTO THE CYST



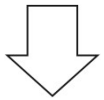

DR MANTU GUPTA UROLOGY
Right
Arrow
115 mm
MI:
1.66<1.80
TIS:

# NEXT STEPS

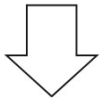
Where do you think the connection is to the collecting system?



What would you do next?

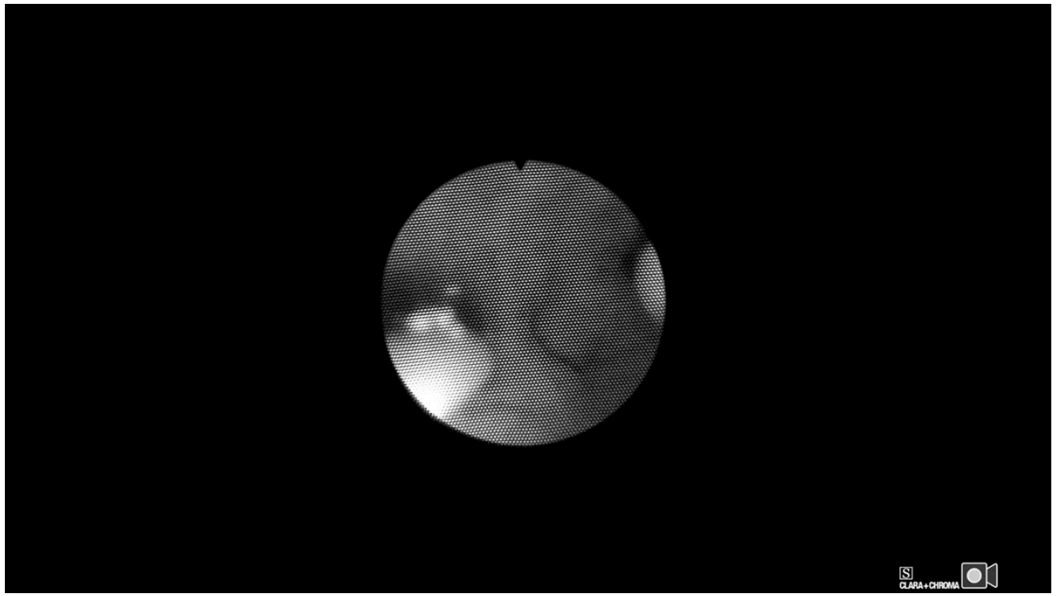


What instruments would you use?

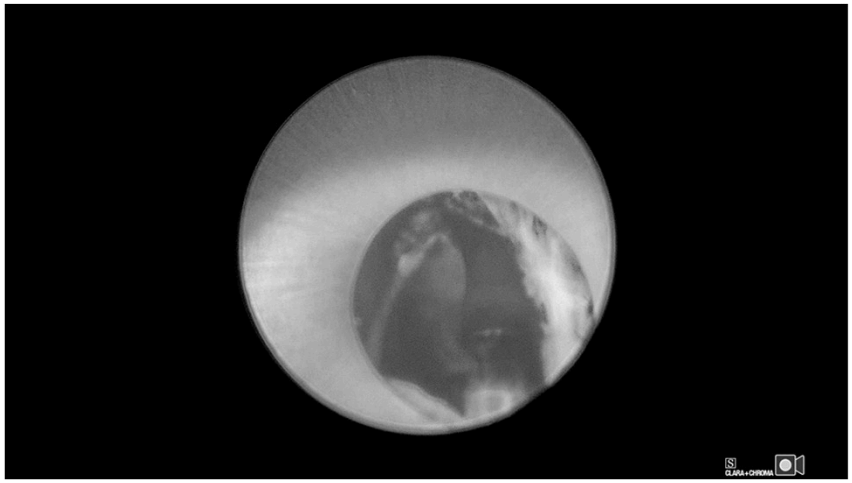


Would you consider a ureteroscope?

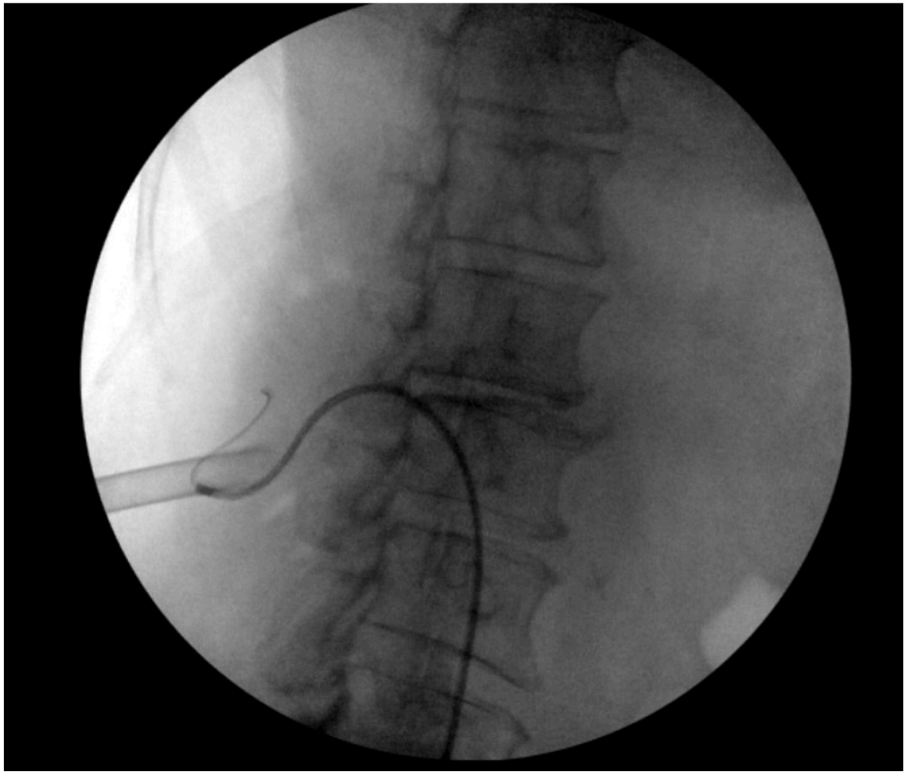
# WIRE THROUGH URETEROSCOPE



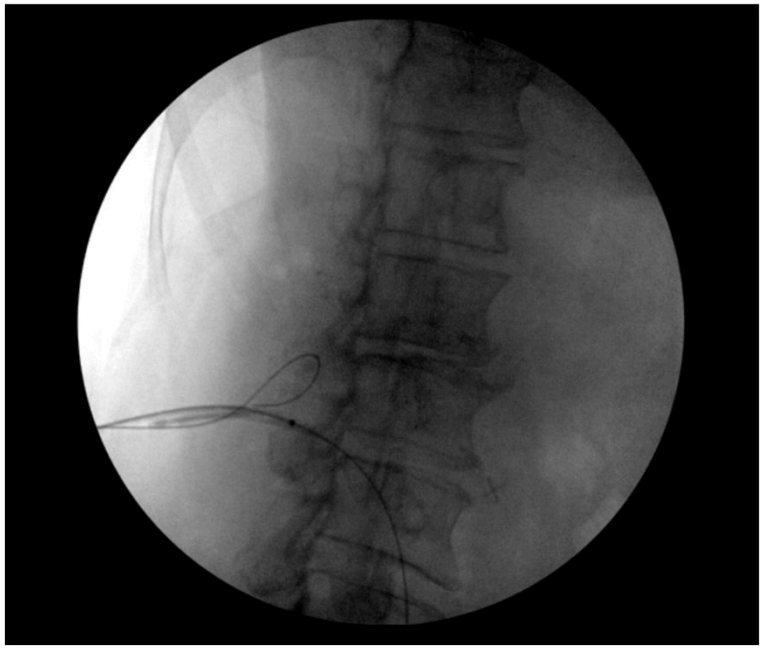
# WIRE THROUGH AND THROUGH

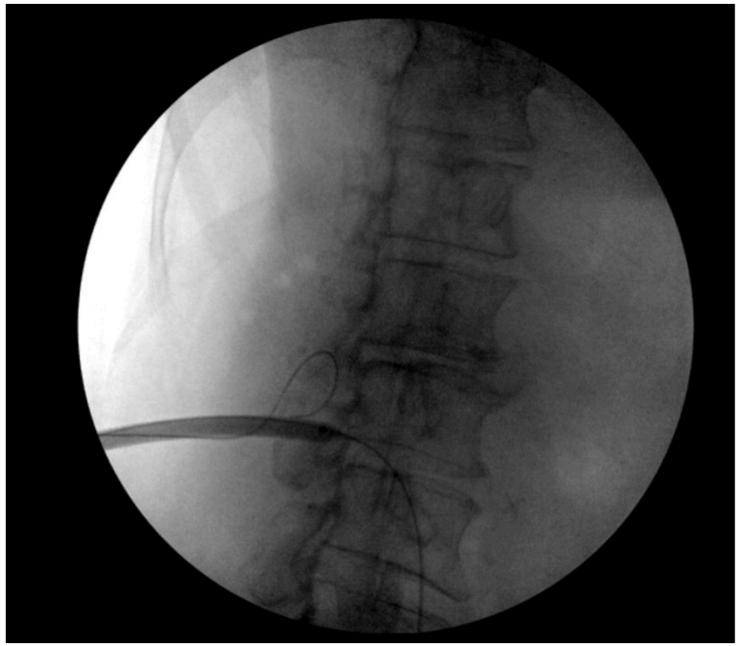


FLUORO COMBINED ACCESS

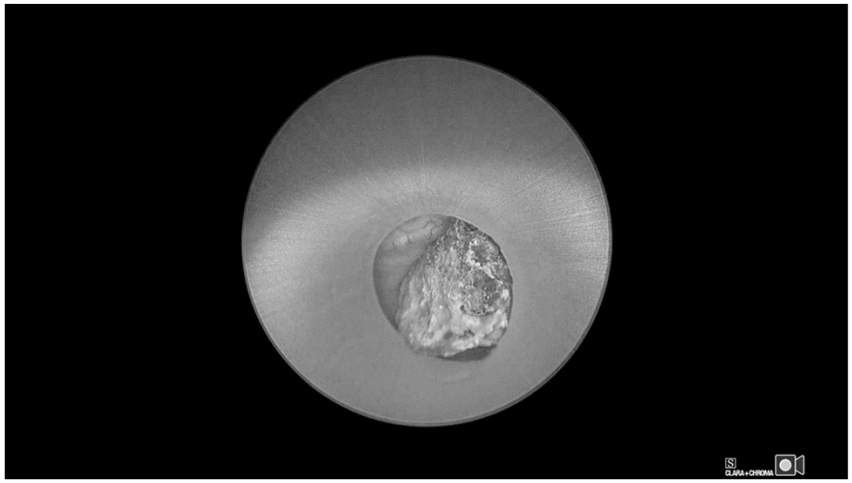


# DILATION

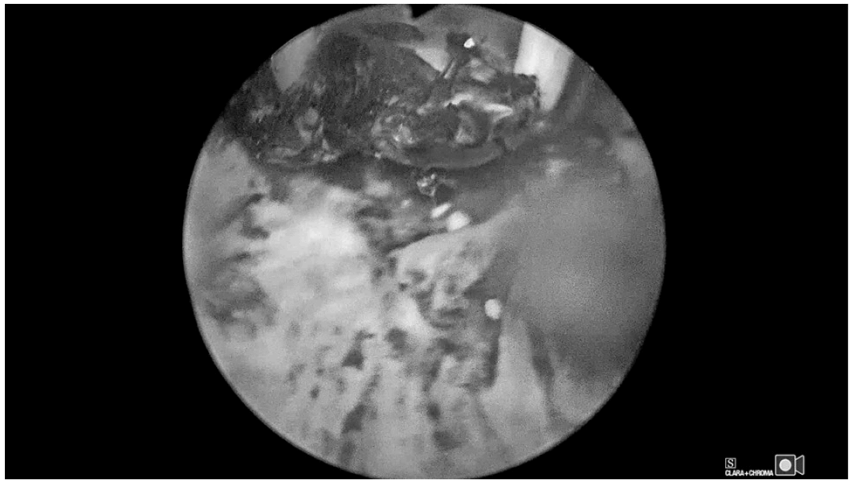




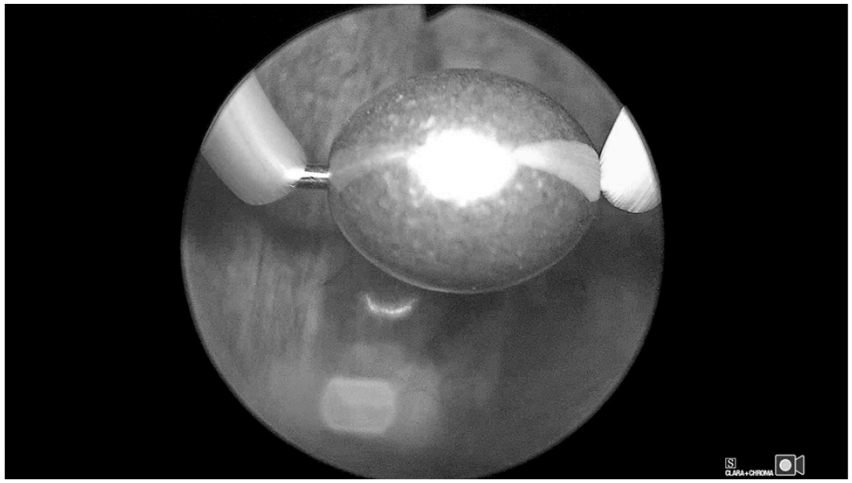
# TRILOGY IN COLLECTING SYSTEM



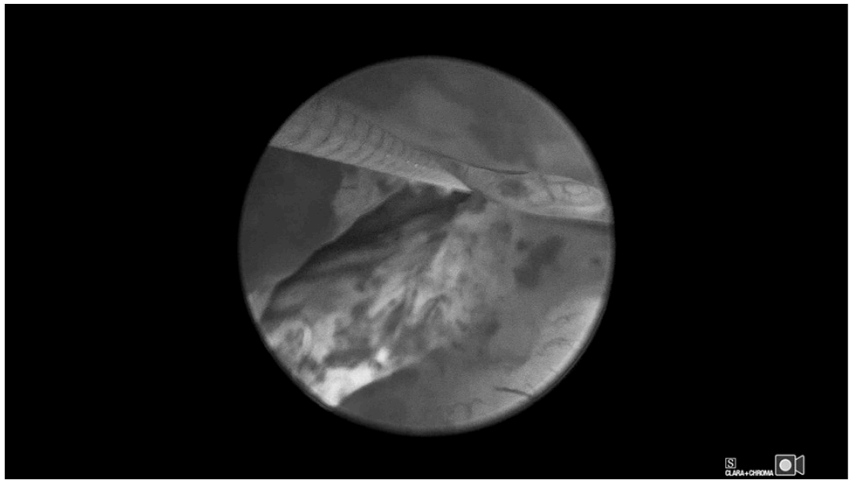
# SURGICAL VIDEO 7- CONNECTION OF THE TWO SYSTEMS



# CYST FULGURATION



# STENT PLACEMENT



Post op office visit:

- Ultrasonography:
  - No stones
  - No cyst cavity
  - No hydronephrosis
- KUB: No stones
- Clinical: On chlorthalidone
  - No UTI
  - No symptoms

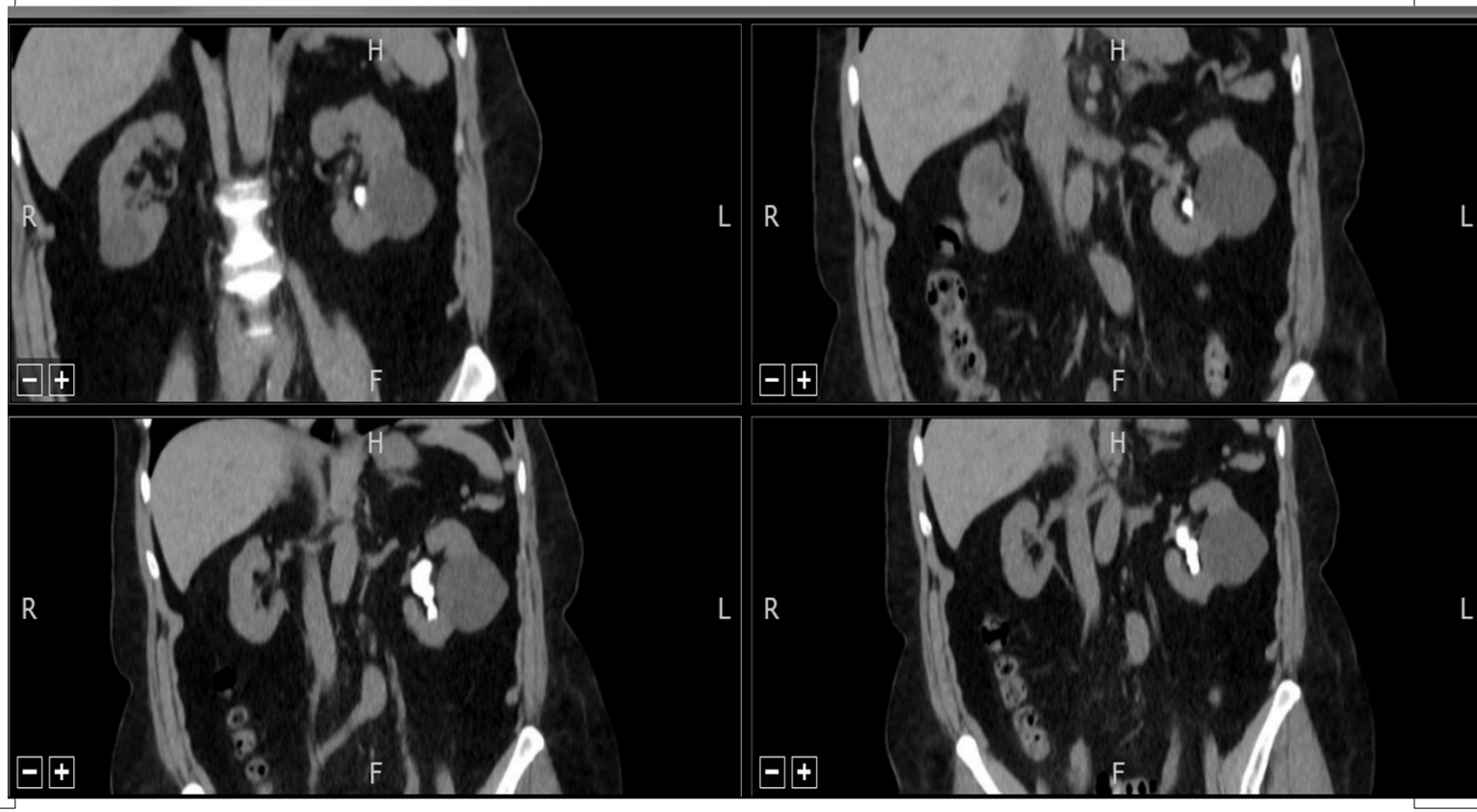
**Stone Risk Factors / Cystine Screening:** Negative (07/15/2021)

| DATE | SAMPLE ID | Vol 24 | SS CaOx | Ca 24 | Ox 24 | Cit 24 | SS CaP | pH | SS UA | UA 24 |
|---|---|---|---|---|---|---|---|---|---|---|
| 02/08/25 | S28198622 | 1.39 | 2.43 | 56 | 22 | 432 | 0.19 | 5.799 | 1.52 | 0.743 |
| 07/13/21 | S26628382 | 1.66 | 6.79 | 271 | 21 | 591 | 0.53 | 5.897 | 1.32 | 0.899 |
| REFERENCE RANGE | | 0.5 - 4L | 6 - 10 | male <250 female <200 | 20 - 40 | male >450 female >550 | 0.5 - 2 | 5.8 - 6.2 | 0 - 1 | male <0.800 female <0.750 |

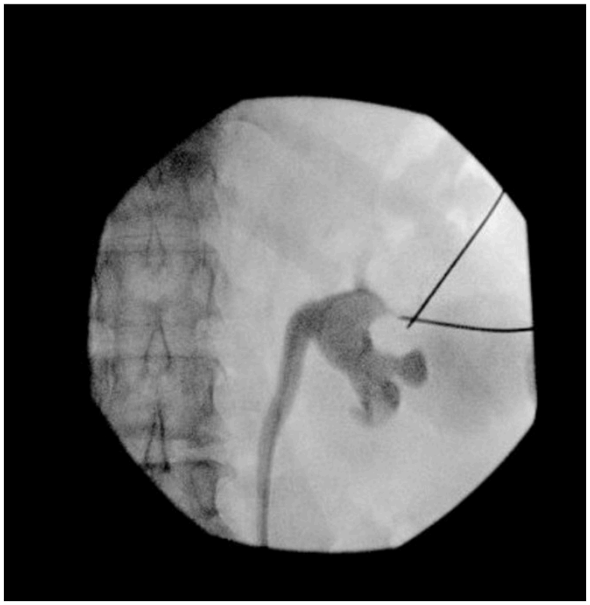
**Dietary Factors**

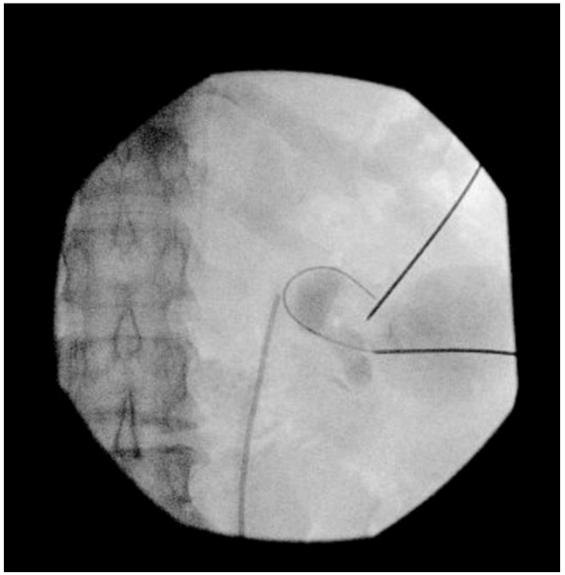
| DATE | SAMPLE ID | Na 24 | K 24 | Mg 24 | P 24 | Nh4 24 | Cl 24 | Sul 24 | UUN 24 | PCR |
|---|---|---|---|---|---|---|---|---|---|---|
| 02/08/25 | S28198622 | 211 | 38 | 18 | 0.565 | 23 | 210 | 13 | 6.89 | 0.7 |
| 07/13/21 | S26628382 | 157 | 36 | 40 | 0.351 | 35 | 162 | 35 | 8.82 | 0.9 |
| REFERENCE RANGE | | 50 - 150 | 20 - 100 | 30 - 120 | 0.6 - 1.2 | 15 - 60 | 70 - 250 | 20 - 80 | 6 - 14 | 0.8 - 1.4 |


Lost in Cyst



Lost in Cyst





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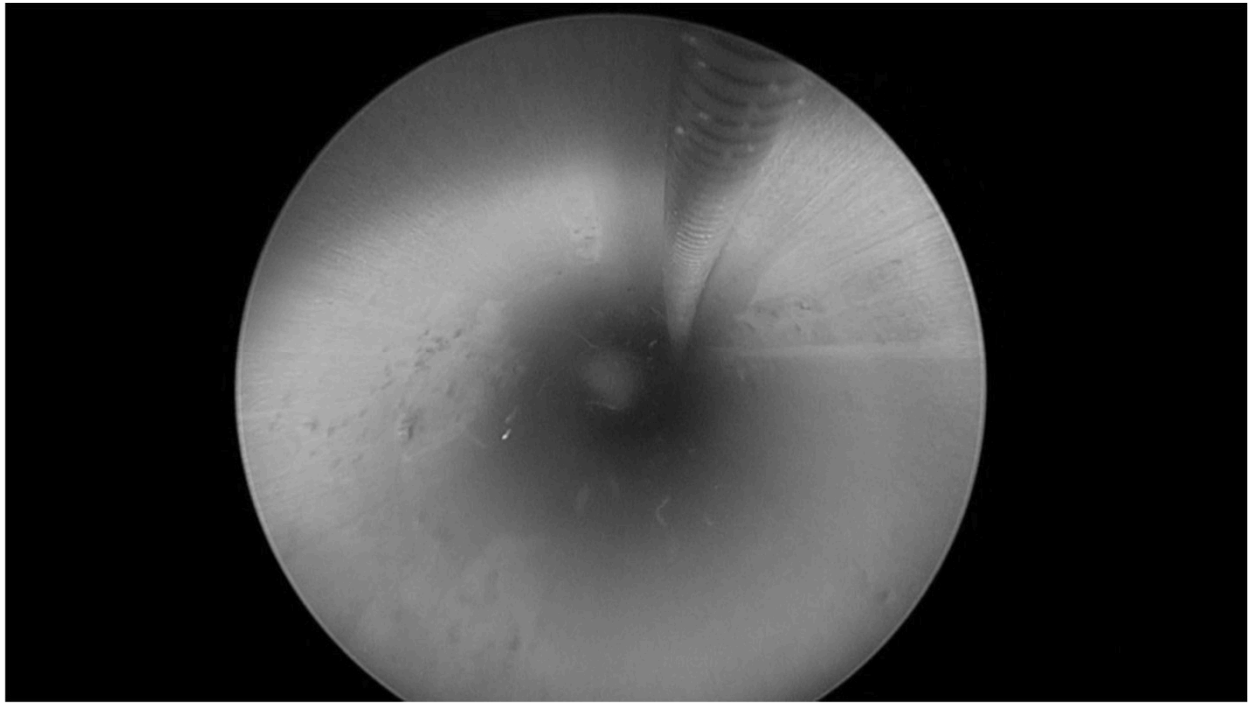
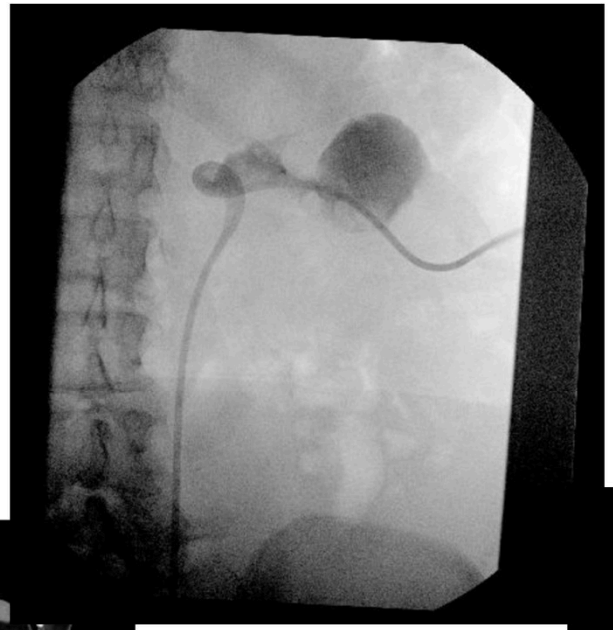


Lost in Cyst




- To Fulgurate or not?
- Stent duration or no stent?
- Separate cyst drain?

# KINKING OF GUIDE WIRE DURING DILATION

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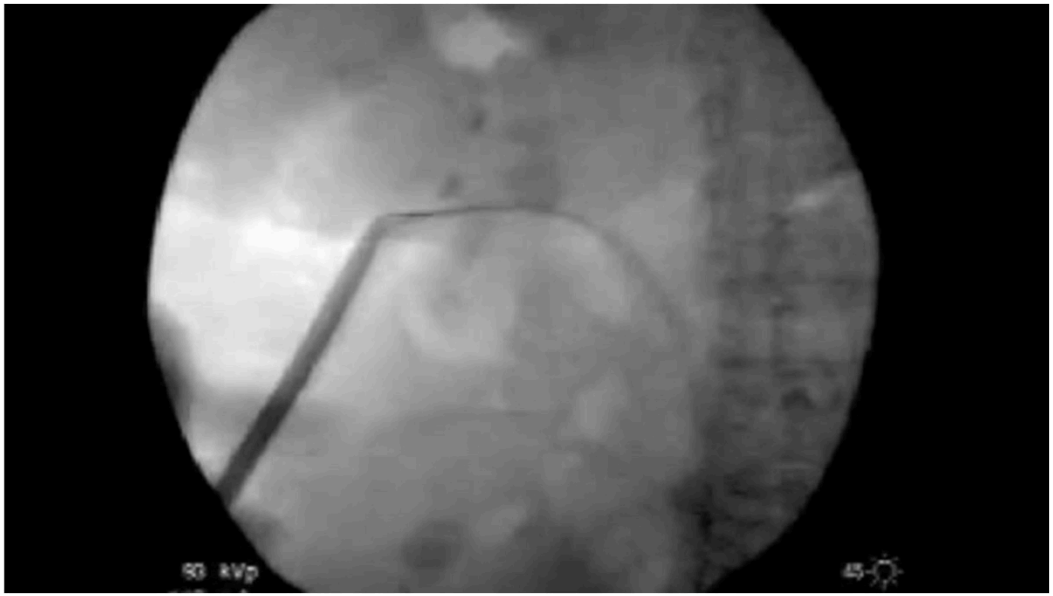
# Kinking of the Wire



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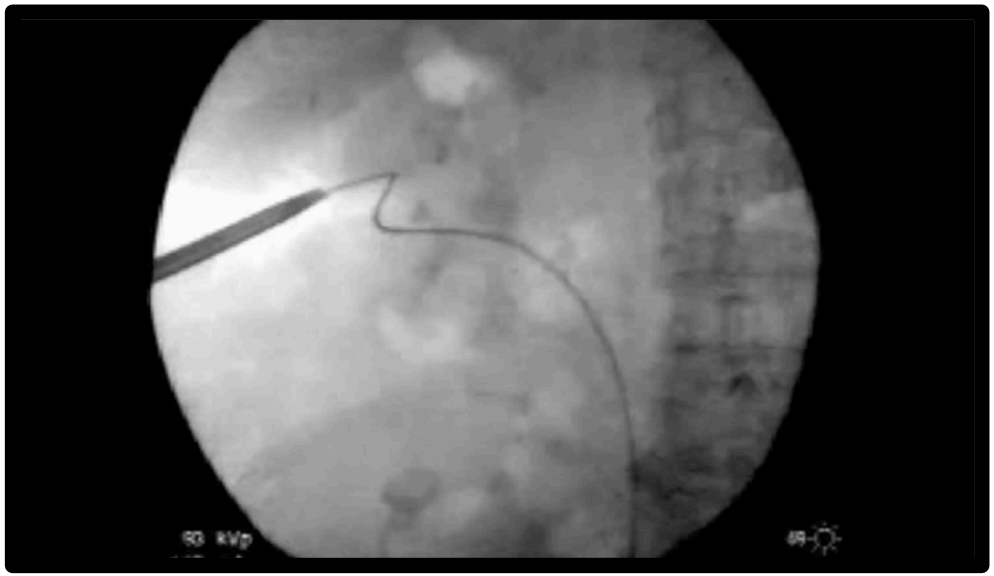
# Solution (1)
# Pull back guide-wire



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# BLEEDING

## Anti-coagulation

- Best defined by type
  - Anti-platelets:
    - Aspirin (ASA) inhibits production of thromboxane by inhibiting cyclooxygenase
    - Clopidogrel (Plavix) is an ADP-receptor antagonist
    - eptifibatide (Integrilin) GP IIb/IIIa receptor antagonist
    - tirofiban (Aggrastat ) GP IIb/IIIa receptor antagonist
  - Thrombin inhibitors:
    - Heparins, lepirudin
  - Inhibitors of clotting factor synthesis
    - Warfarin (coumadin)
  - NOACs:
    - Dabigatran (Pradaxa)
    - Rivaroxaban (Xarelto)
    - Apixaban (Eliquis)
    - Edoxaban (Savaysa)

## Anti-platelets

- Significant concern exists for cessation of therapy (peak at 5-10 days post last dose):
  - Odds ratio- CVA (3.4), cardiac (3.1), cardiac in patients with coronary stent (90)
- Must be stopped for ESWL
  - Risks of significant hematomas
- May be safely continued for majority of URS
- PCNL- Smith Insitute preliminary experience
  - 14 patients with imperative indications for continuous ASA, 16 separate PCNL procedures

## Smith Institute PCNL on Continuous ASA

- 12 on aspirin 81 mg, 2 on aspirin 325 mg
- 14 (100%) with significant CAD
- 12 (86%) with CAS (coronary stent)
- 3 (31%) with prior CVA
- 9 (64%) simultaneously rx'ed with clopidogrel
  - (held for mean 6 days, range 3-10, prior to PCNL)
- 15 pts w/ single tract, 1 pt with 3 tracts
- Results:
  - mean OR time 66 min,
  - mean EBL 161 ml
  - 3 pts (19%) transfused (includes pts with sig preop anemia)
  - No angioembolizations

Urology 2014 Nov;84(5):1034-8. doi: 10.1016/j.urology.2014.06.076. Epub 2014 Oct 24.

**Table 1. Guidelines in management of patients on anti-platelet agents requiring elective surgery according to risk level**

| Patient risk level | Surgical hemorrhagic risk | Suggestion |
|---|---|---|
| I) Low CVD risk:<br>• 6 months after MI, PCI, BMS, CABG, stroke<br>• 12 months if with complications | A) Low (superficial such as circumcision) | Proceed with elective surgery on ASA |
| | B) Intermediate (such as transurethral cases) | Proceed with elective surgery on ASA |
| | C) High (possible bleeding in a closed space such as SWL) | Proceed with elective surgery on statin; Withdraw ASA (maximum 7 days) |
| II) Intermediate CVD risk:<br>• 12 months after DES<br>• low ejection fraction<br>• diabetes mellitus<br>• high-risk stents (long, proximal, multiple, overlapping, small vessels, bifurcation | A) Low (superficial such as circumcision) | Proceed with elective surgery on ASA<br>Maintain clopidogrel (if prescribed) |
| | B) Intermediate (such as transurethral cases) | Postpone elective surgery<br>If surgery absolutely required: Maintain ASA and clopidogrel (if prescribed) |
| | C) High (possible bleeding in a closed space such as SWL) | Postpone elective surgery<br>If surgery absolutely required: Maintain ASA and stop clopidogrel |
| III) High CVD risk:<br>• 6 weeks after MI, PCI, BMS, CABG<br>• 6 months after same if complications<br>• 12 months after high-risk DES<br>• 2 weeks after stroke | A) Low (superficial such as circumcision) | Postpone elective surgery<br>If surgery absolutely required: Maintain ASA and clopidogrel |
| | B) Intermediate (such as transurethral cases) | Postpone elective surgery<br>If surgery absolutely required: Maintain ASA and clopidogrel |
| | C) High (possible bleeding in a closed space such as SWL) | Postpone elective surgery<br>If surgery absolutely required: maintain aspirin; bridge with tirofiban/eptifibatide and heparin |

MI: myocardial infarction; PCI: percutaneous coronary intervention; BMS: bare-metal stent; CABG: coronary artery bypass graft; ASA: acetylsalicylic acid; CVD: cardiovascular disease; DES: drug-eluting stent; SWL: shock wave lithotripsy.
Adapted from Di Minno et al., 2009.[24]

Heparin/
Warfarin

- Warfarin should be held 3 to 5 days
  - Bridging therapy with LMW heparin for moderate- to high-risk patients
- Timing of restart of AC post PCNL of issue:
  - Anecdotal experience- increased bleed and embolization rates with early resumption of heparin, and with bolus heparin vs. no-bolus
    - Optimal timing appears after 48 hours post-op

- **<u>Imperative to balance of risk of bleeding or angioembolization vs. 'permanent' and 'severe' risks of CVA or Cardiac event</u>**

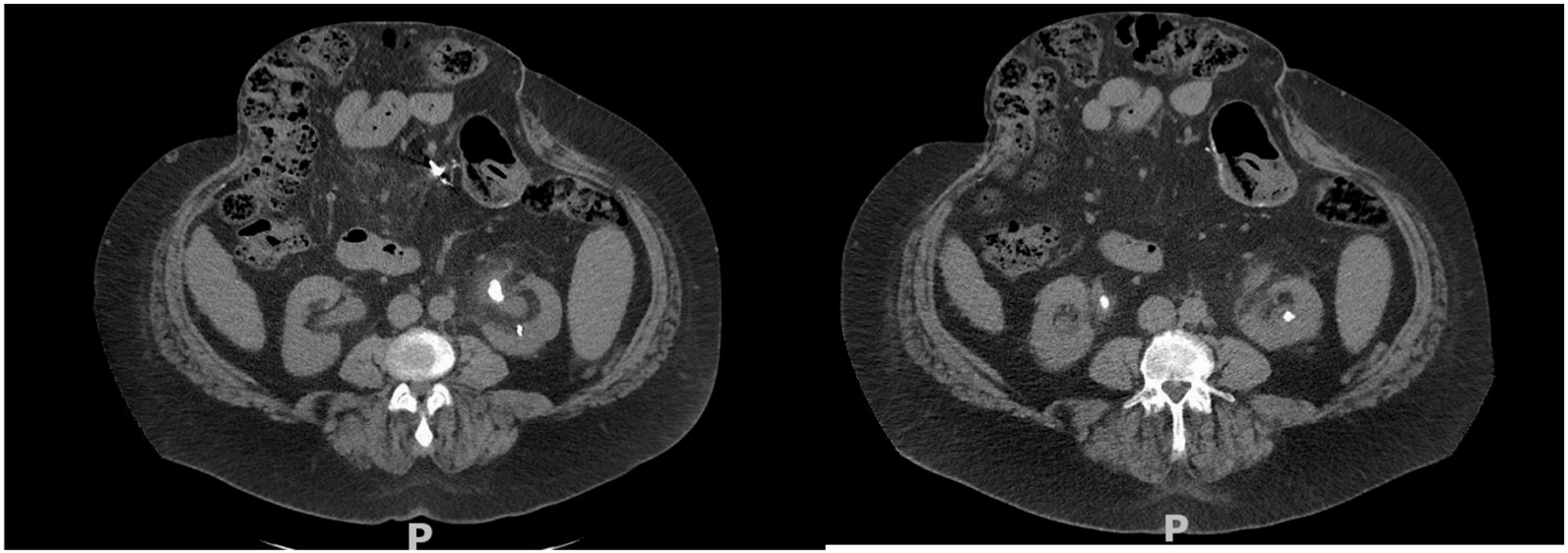
- Indication: Nephrolithiasis
- Procedure: Left supine PCNL
- Complication: Postoperative hematoma
- Outcome: Home

- Clavien II

# Course of Events

- 62 y/o F h/o nephrolithiasis s/p PCNL in 2012 and 2014, one of which complicated by delayed bleed requiring angioembolization, p/w gross hematuria and found to have B/L stones

- PMHx: chronic pain on fentanyl patch and medical marijuana, large ventral hernia, DM, Factor XI deficiency, Sweet syndrome on prednisone and dapsone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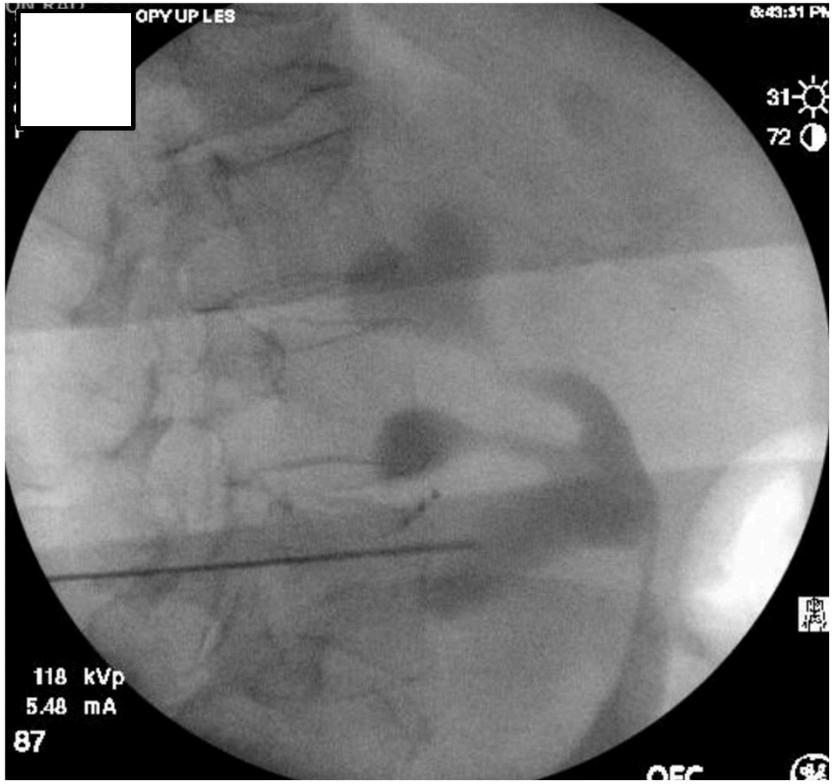
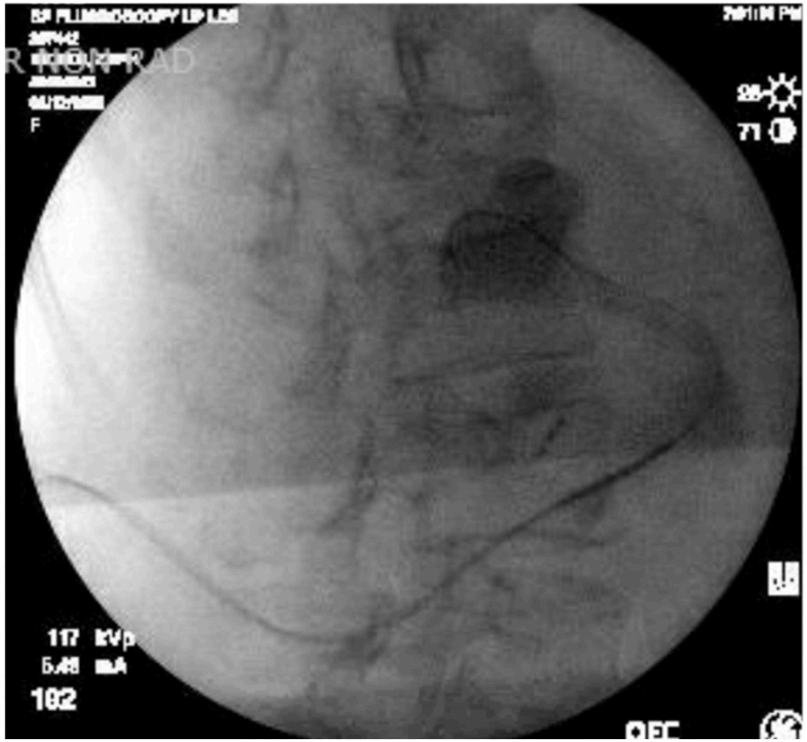
# Course of Events

- Intraop
  - Given 2 units FFP preop and intraop
  - Multiple sticks as kidney was hypermobile, 1 dilation, EBL 100
- POD #0-1
  - Noted to have large degree of ecchymosis on L flank on postop check, placed on sandbag for compression
  - Hematology consulted -> give more FFP and transfuse as needed, also requested addn labs b/c coags were not consistent with Factor XI deficiency
  - CT shows large subcutaneous hematoma


OPY UP LES
8:43:31 PM
31
72
118 kVp
5.48 mA
87

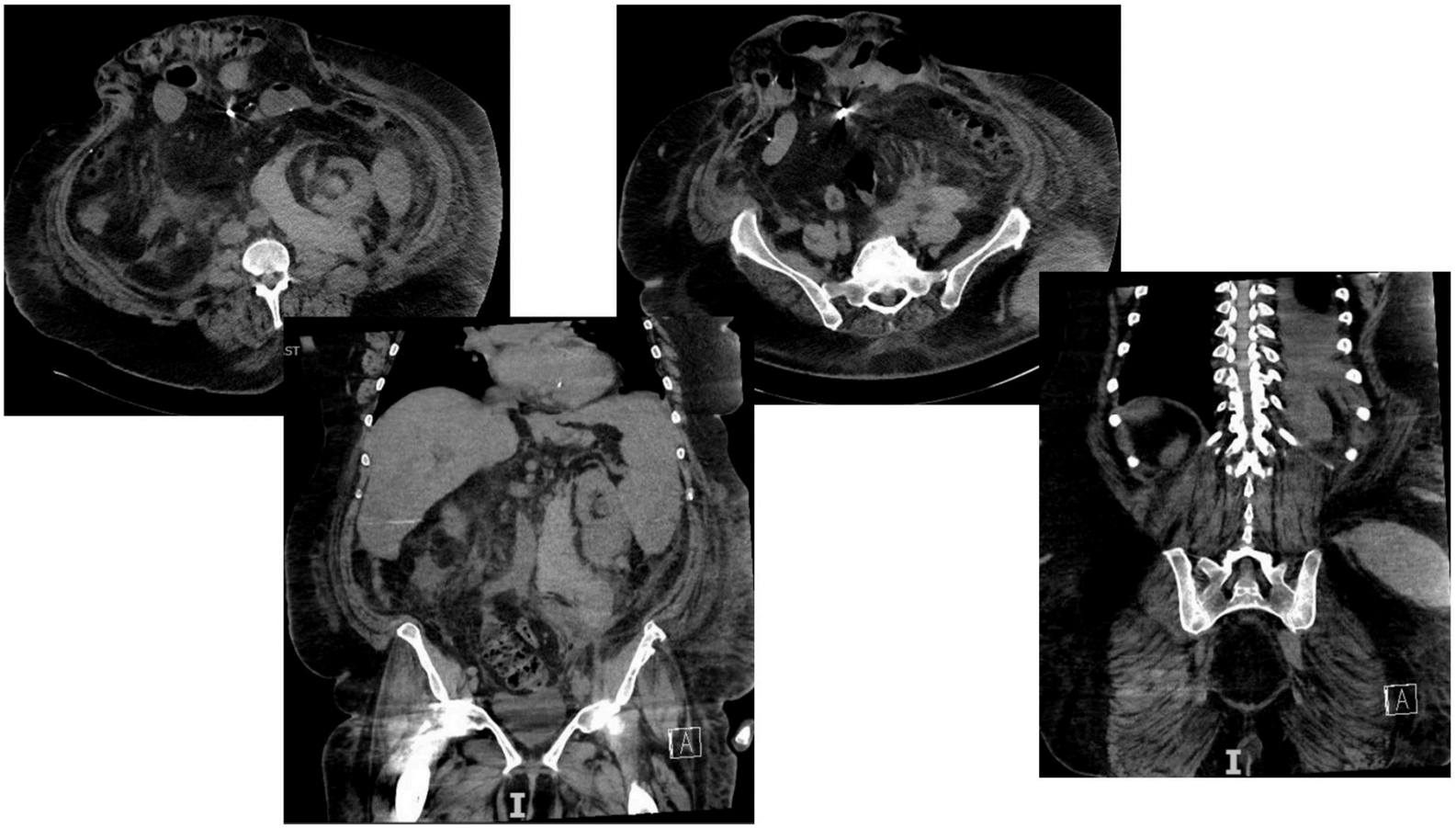

F
117 kVp
102

# Course of Events

- POD#2 – 5
  - Continued to trend H/H q12 per heme recs, transfused pRBC as needed and 2 FFP daily
  - 4units FFP given before NT removal on POD# 4 when Hct stable at 23
  - She developed ongoing bleeding from her flank, repeat Hct showed Hct to 20.3 -> transfused but failed to respond appropriately
  - SICU consulted on POD#5 for monitoring and rapid tranfusion

# Course of Events

- POD#6 – 11
  - SICU for POD#6 -7, repeat CT showed now RP hematoma and subcutaneous hematoma, H/H stabilized w/ transfusion, transferred back to floor on POD#8
  - Heme recommended hepatology eval b/c of cirrhotic appearing liver on CT
  - Extensive labs by heme and hepatology ultimately concluded anemia was from blood loss w/o clear cut coagulopathy, may may have been dysfibrinogemia
  - H/H remained stable for several days, D/C home w/ home PT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# Course of Events

- POD#11 – 17
  - Returned POD# 13 with gross hematuria requiring cbi and developed acute blood loss anemia requiring blood transfusions.
  - Heme recommended daily Vit K.
  - POD# 15 underwent successful embolization of renal pseudoaneurysm.
  - POD#16 - Fever
  - POD#17 - home with course of intravenous antibiotics.
  - H/H remained stable for several days, D/C home POD# 17.

# Action Item

- Consider staged ureteroscopy

- Pathology: 80% calcium oxalate monohydrate, 20% calcium oxalate dihydrate

# Hypermobile kidney

# Dilation

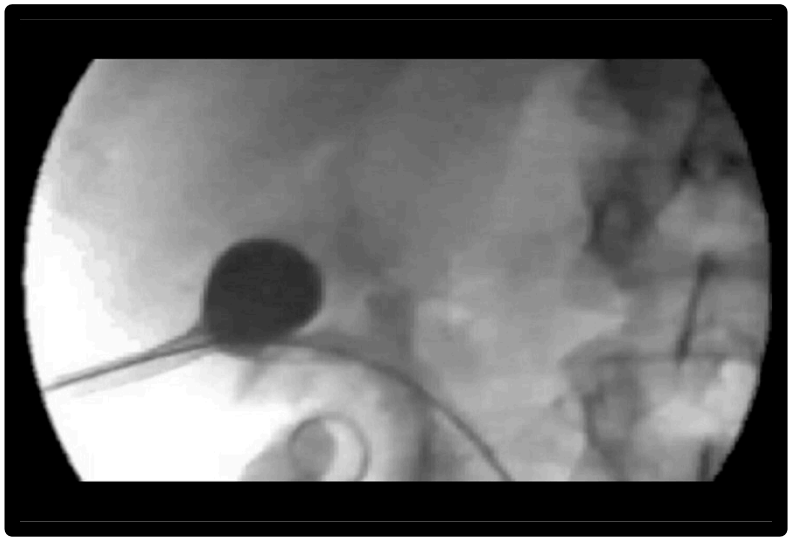
- **Hypermobile kidney**

  •Direct puncture to middle calyx
  •Insert Council tip nephrostomy catheter
  •Fix kidney with balloon

  Then...

  •Access desired calyx
  •Use shortest possible tract

# Hypermobile Kidney



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# Hypermobile Kidney

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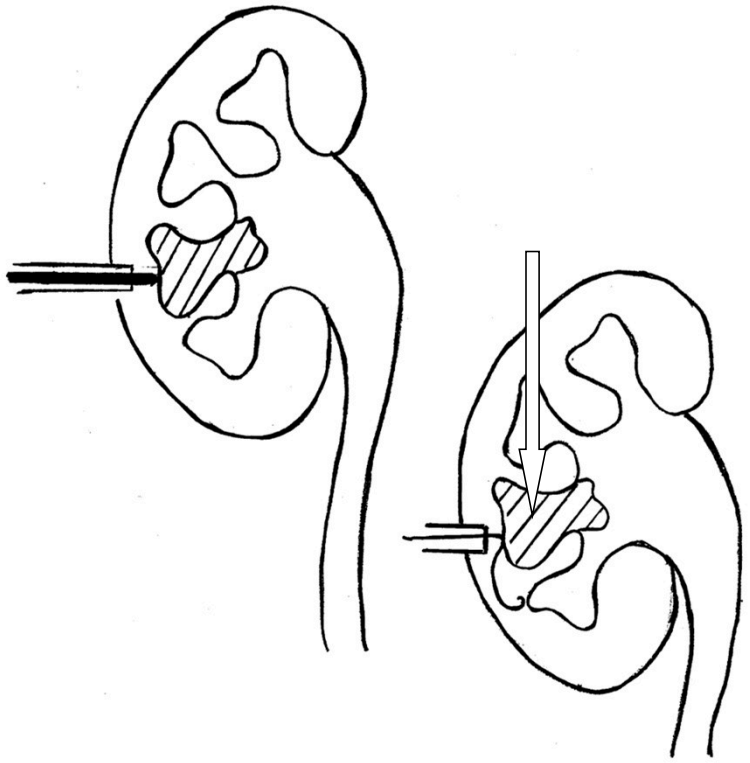
# Full Staghorn Calculus—

## CANNOT INSERT GUIDE-WIRE INTO COLLECTING SYSTEM

# Stone May Impede Antegrade Guide wire Advancement



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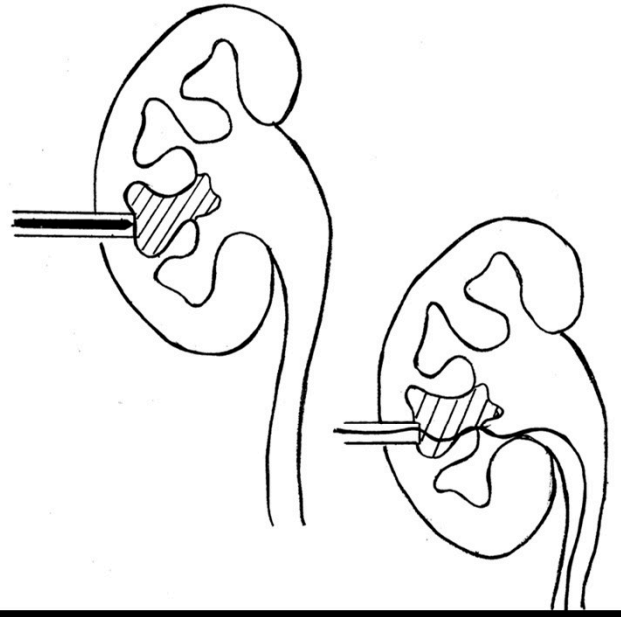
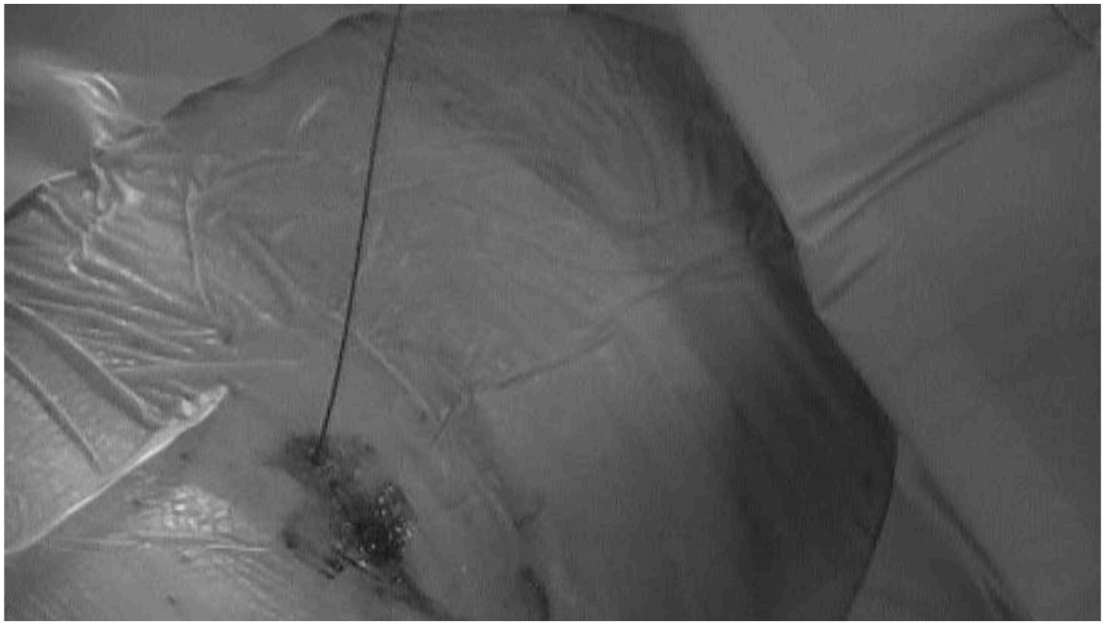
# Secret is to advance trocar before withdrawing needle stylet

- Use Tip of Access Needle to rock stone
- Wire will pass antegrade down ureter  or into the collecting system



# Maintaining Access in Obese Patients



Access sheath lost in subcutaneous tissue

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# Securing Sheath with Sutures as Draw Strings

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# Forceps to Retract Sheath

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# “Landlocked”

**Courtesy of**
**Ralph V. Clayman, MD**
**Professor of Urology**

UC Irvine Health

# Presentation:

- 65 year old woman with a functionally solitary left kidney with bilateral nephrolithiasis. Now with recurrent UTI.

  Urine culture: sterile
- CT scan: Left kidney: lower pole infundibular stone: 9 x 7 x 9 mm; a second lower pole bilobed stone: 23 x 20 x 19 mm with noted thinning of the overlying parenchyma; Hounsfield units = 1100.
  Right kidney: atrophic with multiple stones.
- Renal scan: 94% left / 6% right


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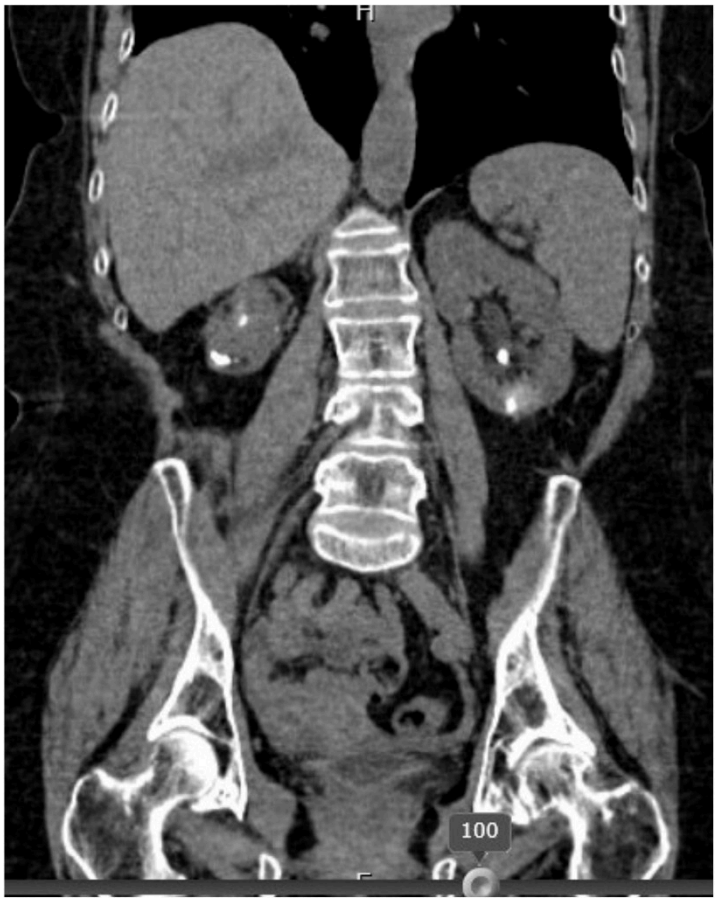


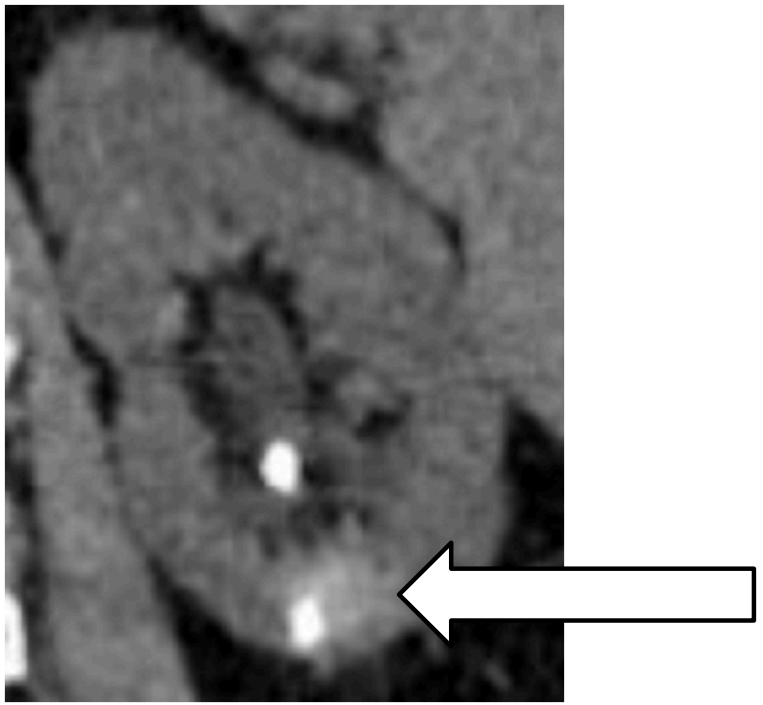

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# ?? ACCESS

Upper calyx……?

Middle calyx……?

Lower calyx……?

# Surgical Procedure: PCNL

- A 14F ureteral access sheath placed.
- Supracostal 12$^{th}$ rib access obtained with a single stick into superior posterior calyx under direct ureteroscopic vision; through-and-through guidewire placed.
- 24F balloon dilation and 24F Amplatz sheath placed.
- Two stones were identified in lower pole with rigid and flexible nephroscopy and removed.
- The larger stone was fragmented medially and then led to a more lateral calyx, serviced by a narrow infundibulum which would just admit the tip of the flexible nephroscope revealing the stone within a blown-out calyx.

## Surgical course

- During basketing of stone fragments in the lower pole blown out calyx, the patient suddenly developed severe hypotension which responded poorly to pressors.

# What is the problem?

- Sepsis
- Hemorrhage
- Pleural effusion
- Abdominal compartment syndrome

# Gram-negative sepsis

- 15-30% have post-op fever
- 1-2% will have sepsis

•Preoperative urine culture and pre-op antibiotics
•For positive urine culture and all staghorn stones
•Maintain low-pressure system;
•Amplatz sheath or continuous-flow sheath

WHAT ELSE ???

Supportive therapy; antibiotics

*If purulent material aspirated upon puncture, safest option is to abort procedure and insert nephrostomy

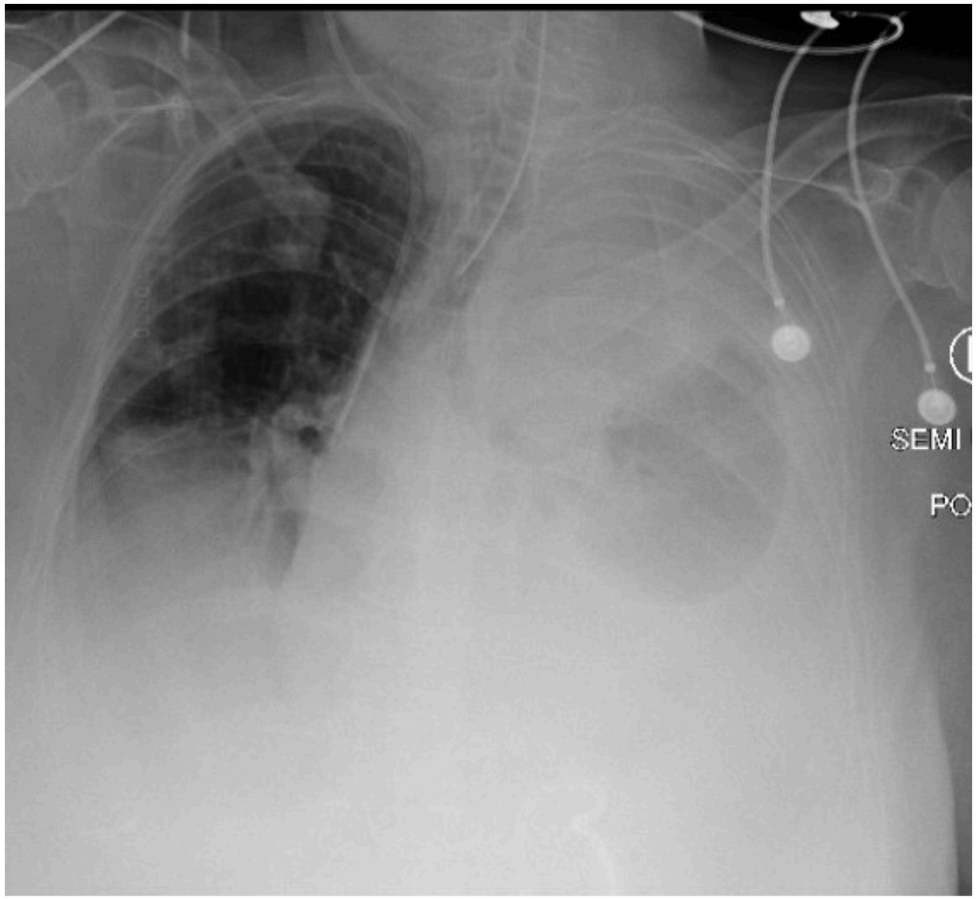
How do you check for blood loss ??

# What was done:

10F Cope loop nephrostomy tube placed.

Case terminated.

In the ICU, patient with poor oxygenation parameters.




**N.B.: During the case, there was no difficulty ventilating the patient or problems with oxygenation.**

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# CONCLUSIONS

What else could have been done:

a. Fluoroscopy of the diaphragm or ultrasound of the chest.

b. Chest tube placed in the operating room

Avoiding pleural effusion:

a. Puncture with patient in full exhalation

b. Infracostal puncture when possible.

# Perforation of renal pelvis by Nephrostomy tube

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# THERE'S A HOLE" IN THE BUCKET!"

**Courtesy of**
**Ralph V. Clayman, MD**
**Professor of Urology**

UC Irvine Health

# Presentation

- 61 year old woman complained of chronic right flank pain..
- Urine culture: Proteus.
- CT scan: right lower pole branched calculus; HU: 95-1100 Size: 3.7x 1.3 x 1.5 cm.

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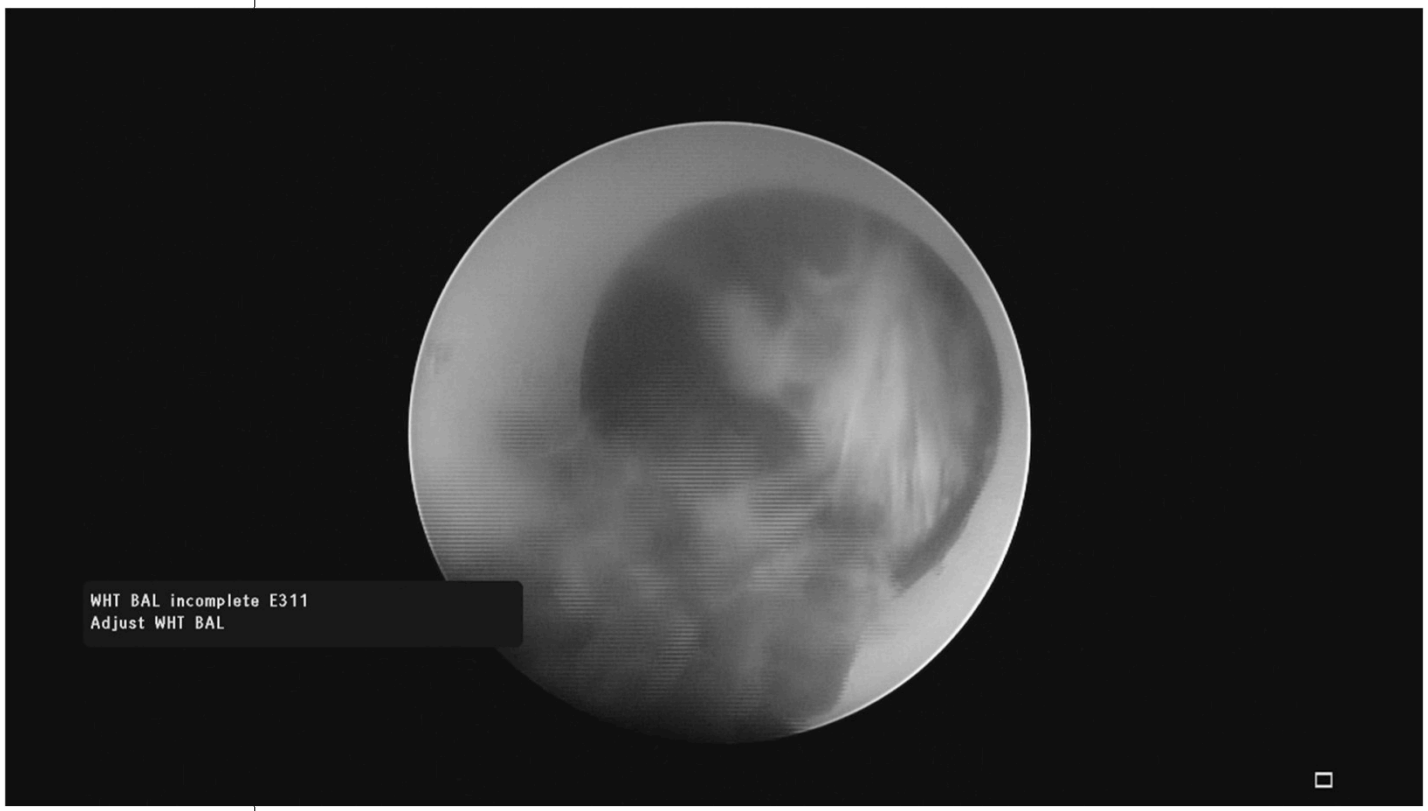
# Treatment

PCNL details:

- A 16F ureteral access sheath was placed and a flexible ureteroscope was passed to an upper pole posterior calyx.
- Percutaneous access under ureteroscopic control via upper pole posterior calyx.
- Tract dilated with 10mm balloon dilator and 30F Amplatz sheath advanced.
- Problem: 30F sheath advanced beyond balloon with perforation noted in the renal pelvis.


WHT BAL incomplete E311
Adjust WHT BAL


www.laparoscopy-endourology.com

# What was done:

- Proceeded with stone removal given excellent drainage via the 16F ureteral access sheath and the 30F Amplatz nephrostomy sheath.
- Holmium laser lithotripsy was initially uneventful.
- Approximately 45 minutes into the procedure, peak airway pressures rose to 40mm Hg with precipitous drop in blood pressure.

# What is the problem?

- Sepsis
- Hemorrhage
- Pleural effusion
- Abdominal compartment syndrome

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# What was done:

- Procedure immediately terminated.
- A 7.1F pigtail nephroureteral stent advanced to the bladder, through a 22F Council nephrostomy tube.
- Lasix and mannitol given to mobilize fluid.
- When patient turned supine, abdominal pressures rose to 42mm Hg; tense abdomen and hypotensive.

# What to do?

# What was done:

- Abdominal ultrasound done in the operating room – large pocket of fluid in **left** lower quadrant.
- Under ultrasound guidance, nephrostomy needle passed into collection followed by a guidewire and a 10F Cope loop
- 1L clear irrigation fluid drained with resolution of hypotension and return of abdominal pressure to normal limits. Cope loop removed.

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# Postoperative course

- Patient was kept intubated and transferred to SICU.
- Patient was discharged on POD4 with nephrostomy tube and ureteral stent in place.
- Second look PCNL three weeks later to clear the kidney.

**Yes, it can be worse**

67 y/o man

Massive prostate enlargement

Unable to access distal ureteral stones retrograde

Antegrade ureteroscopy

ureteral access sheath placed

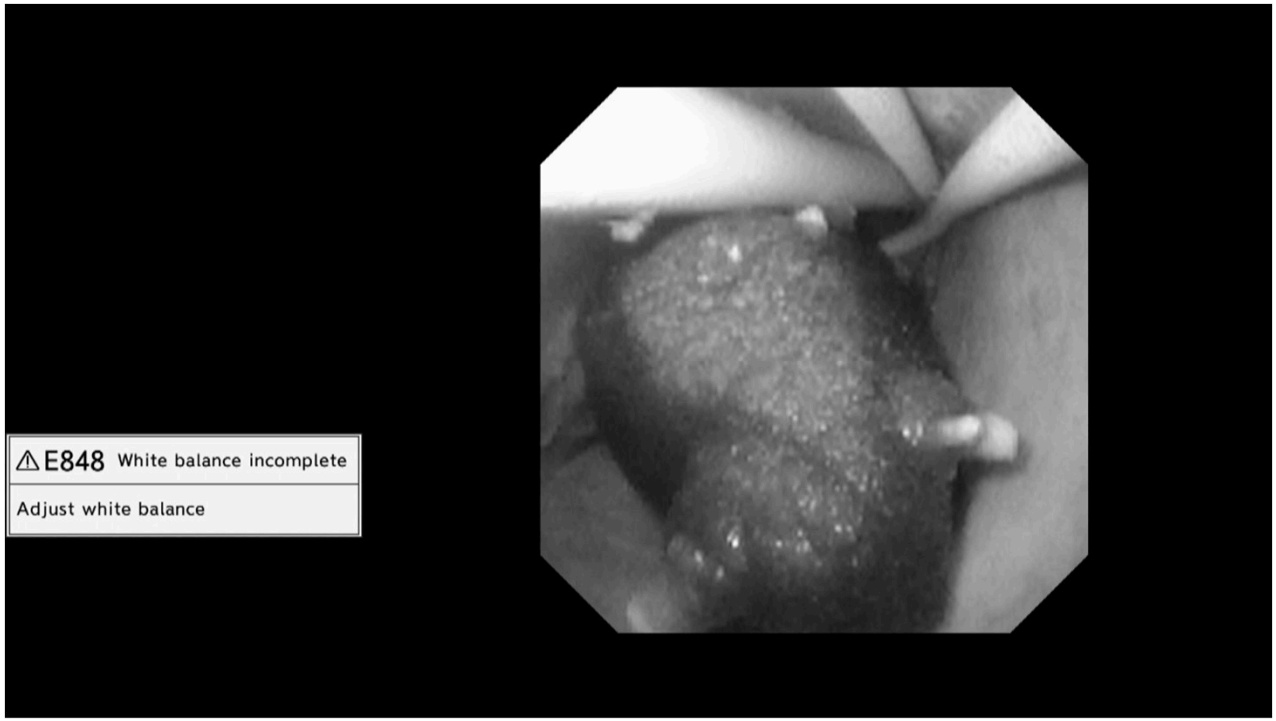
Converted to 18 French neph peel away sheath

- Collecting System Perforations and tears

# Yes, it can be worse

67 y/o man
Massive prostate enlargement
Unable to access distal ureteral stones retrograde

Antegrade ureteroscopy
ureteral access sheath placed
Converted to 18 French neph peel away sheath


⚠E848 White balance incomplete
Adjust white balance

Stent placed

Council tip neph tube with ureteral catheter extension placed

Foley placed

Council tip and ureteral catheter removed after 3 days

Stent x 4 weeks

# Retrospectoscope: What to do Next Time?

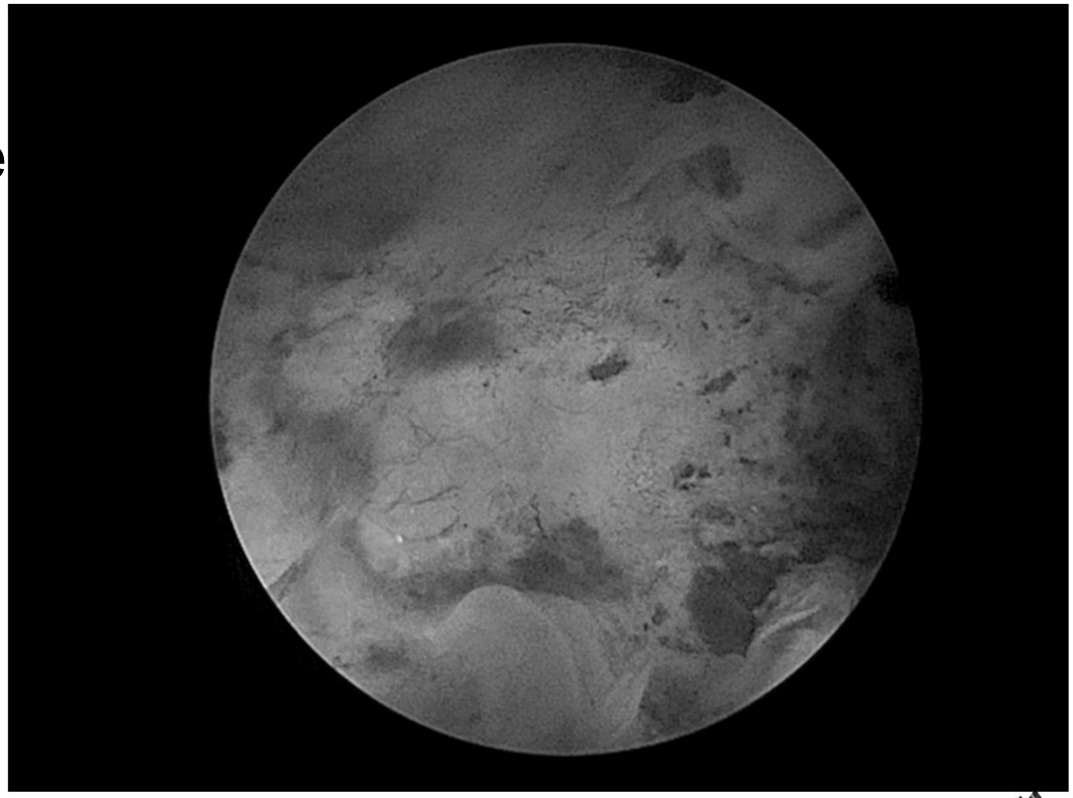
Renal pelvis perforation:

In the face of a significant renal pelvis perforation (especially in a patient with a prior abdominoplasty), place the nephrostomy tube and come back in 2-3 weeks when the “fenestration” has healed and the nephrostomy tract is mature.

- TRAPPED OR BROKEN INSTRUMENTS

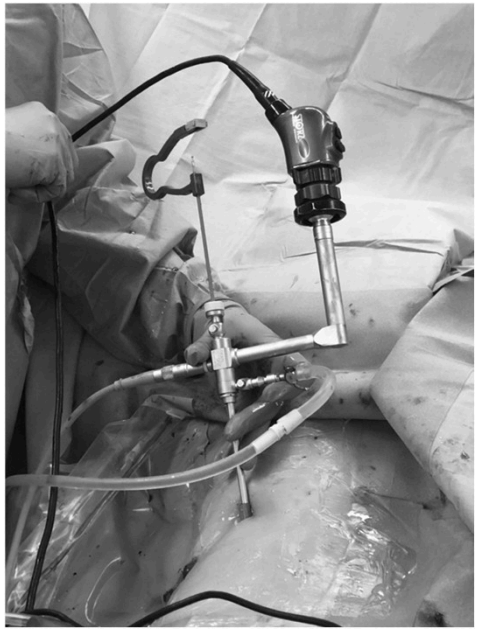
Trapped

Perc N-Circle

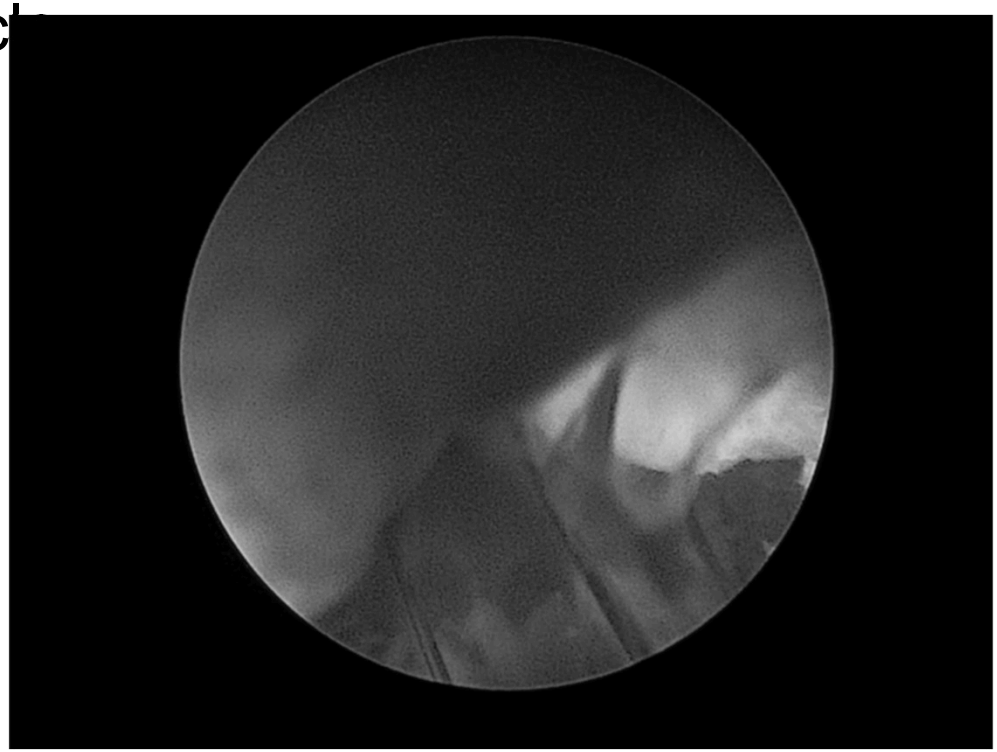


Mount Sinai

# Disassembling Perc N-Circle



# Fragmenting Stone Inside Trapped Perc N-Circ



Mount Sinai

# Discussion

- If you could not reach the stone with the Shockpulse , what other options could be employed?

Mount Sinai

# PART 3

## DISASTERS IN ENDOUROLOGY & HOW TO AVOID THEM

**ZEPH OKEKE, M.D.**
**Course Director**

**Mantu Gupta**…….Professor and Director, Endourology Mount Sinai Health
Editor in Chief, Videourology

**Arun Rai**……..Assistant Professor, Johns Hopkins University, Brady Urological
Director Surgical Innovation

**Kymora Scotland**…..Assistant Professor of Urology UCLA
Director of Endourology Research
Associate Director of Endourology Fellowship Program

**Gregory Mullen**……Director of Endourology, Cooperman Barnabas Medical Center

# POSTOPERATIVE COMPLICATIONS

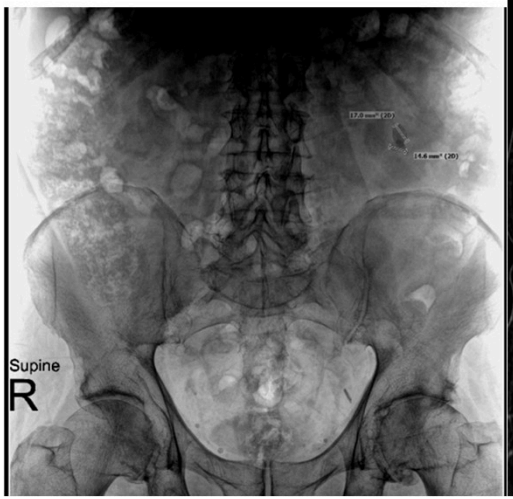
: “MAYHEM AND MANAGEMENT”

# Retroperitoneal Hematoma

Dec

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

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

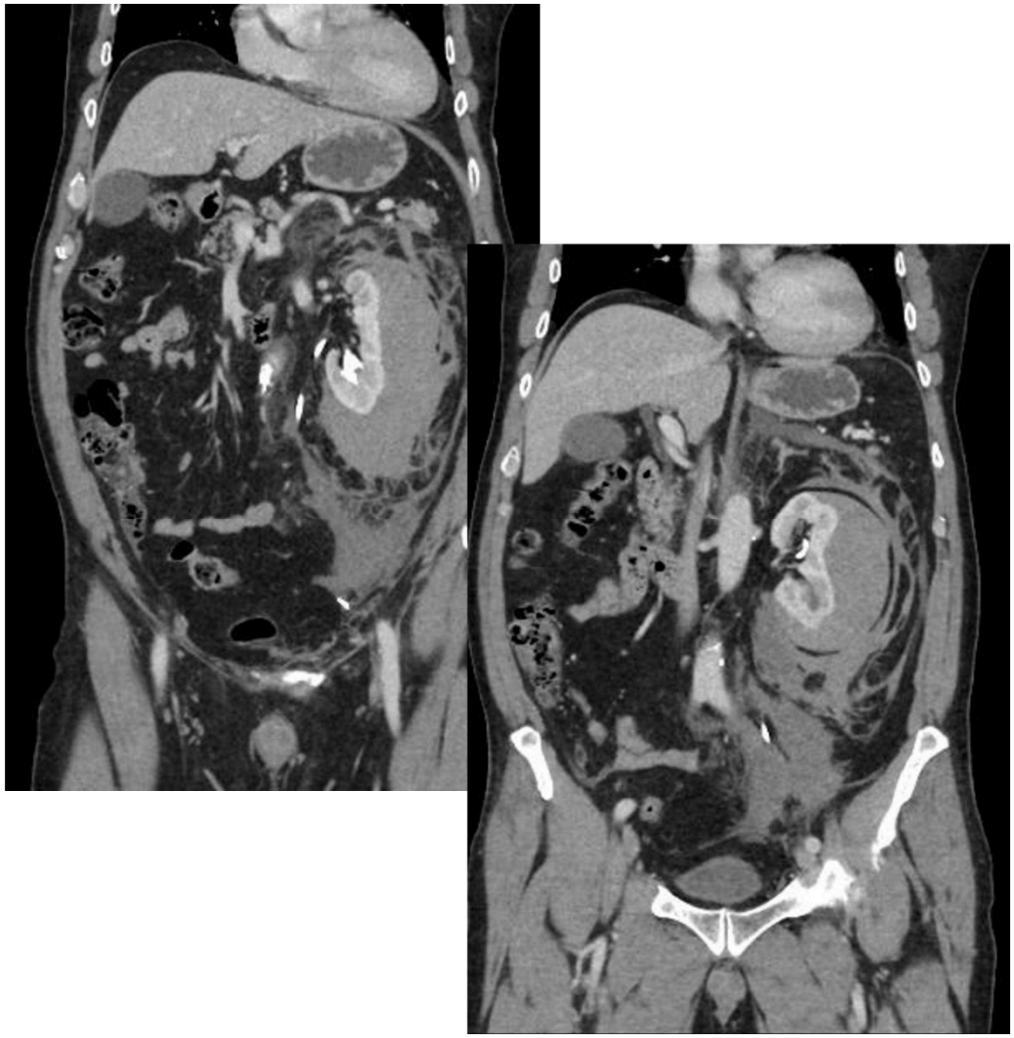


RPH
December

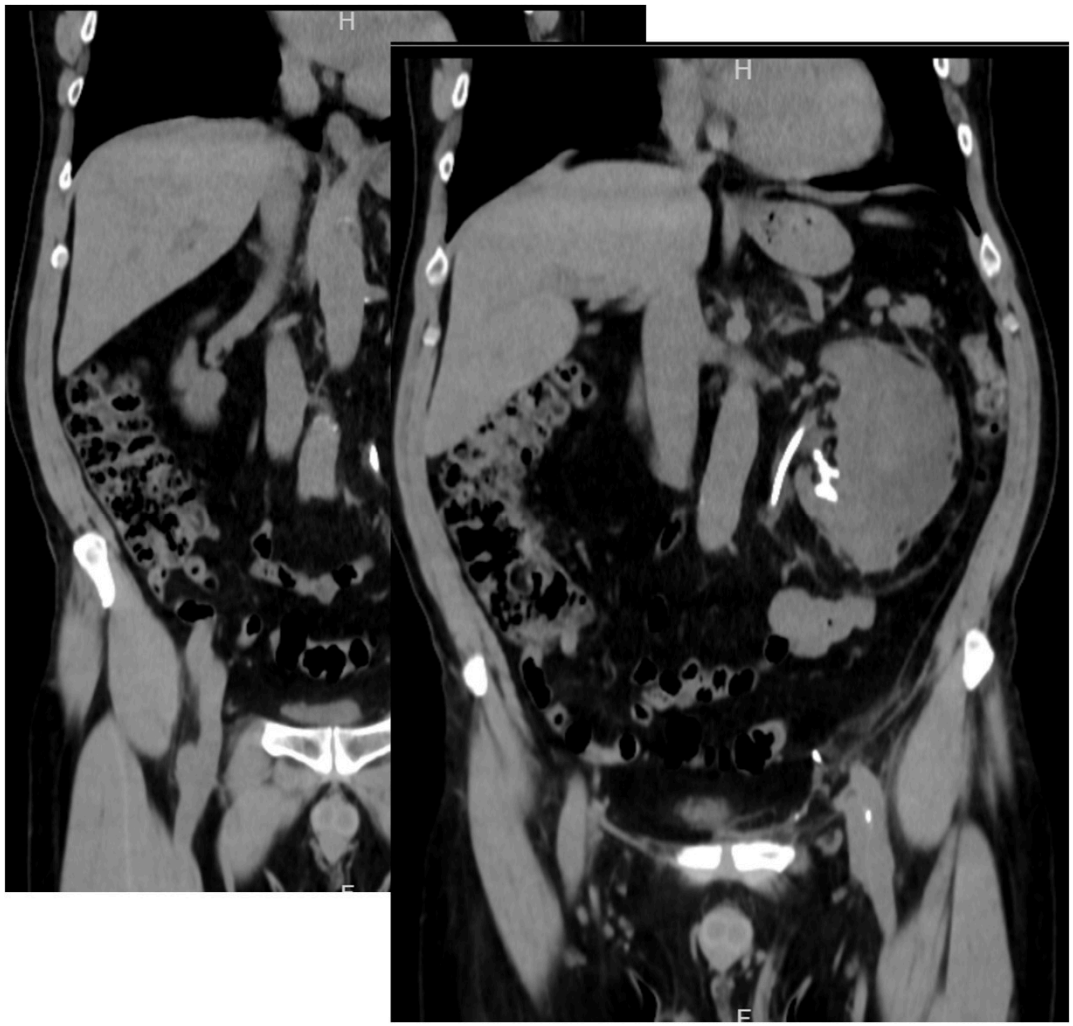
- Severe flank pain post op
- Diaphoretic
- Hg/HCT drop

- What next.....

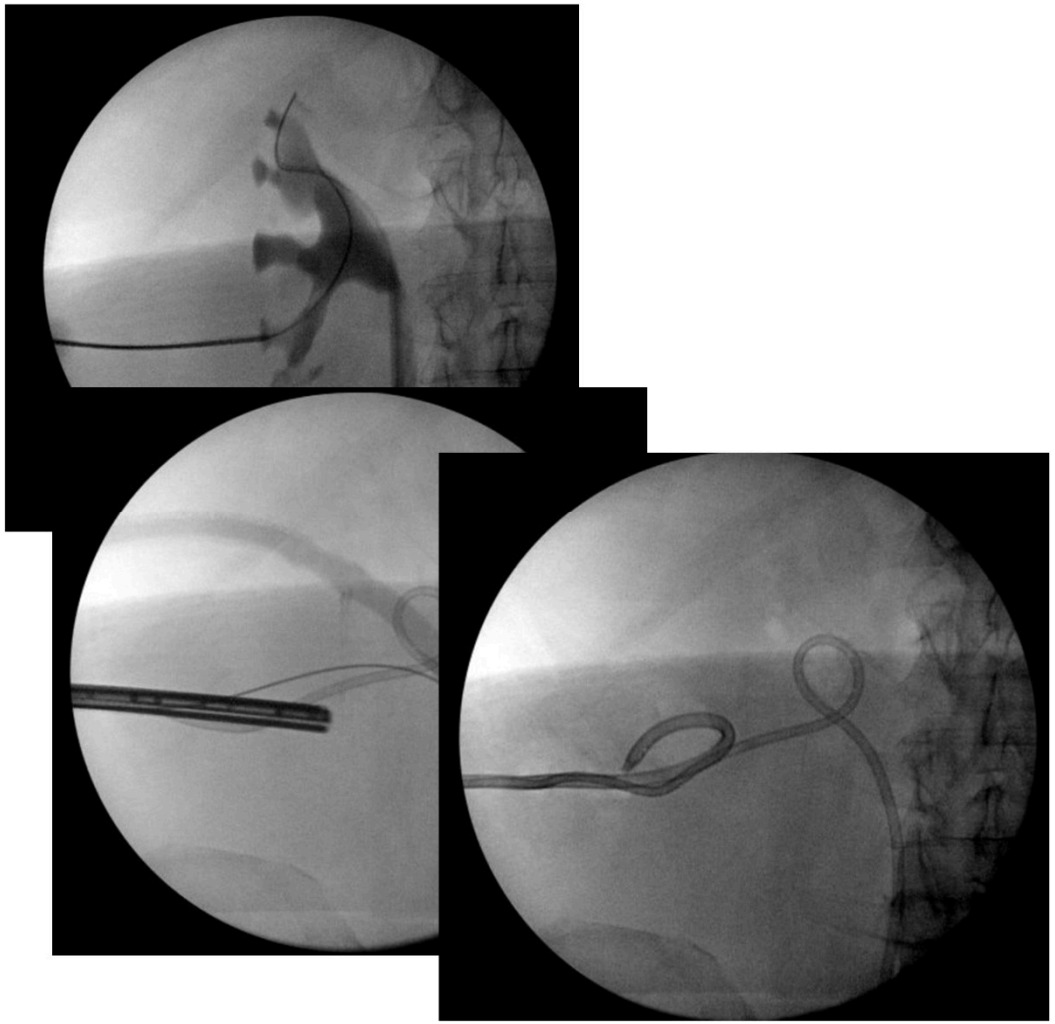
RPH
December



RPH
January



RPH
March



RPH

May

# BOWEL INJURY

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


THE SMITH INSTITUTE
FOR UROLOGY

# Case 1

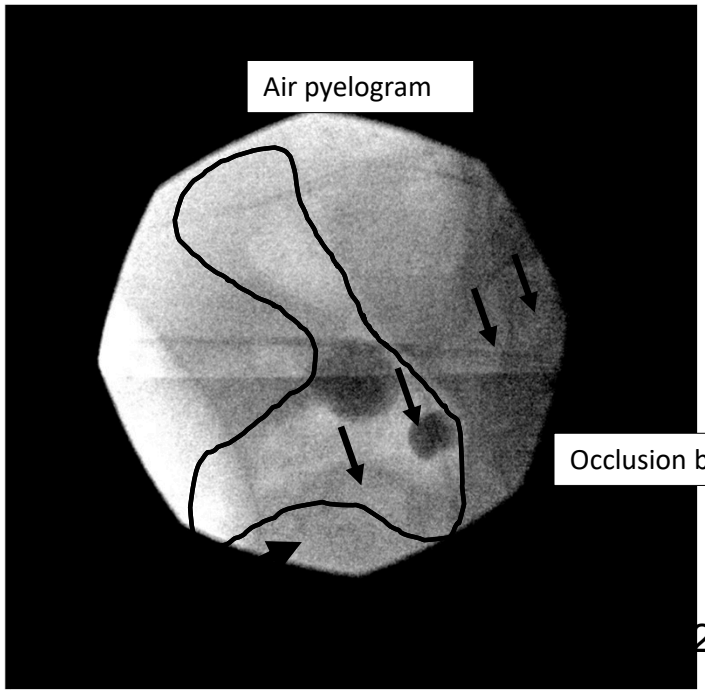
- 82-year old man with newly diagnosed metastatic prostate cancer was incidentally noted on CT obtained after a fall to have bilateral renal pelvic stones

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

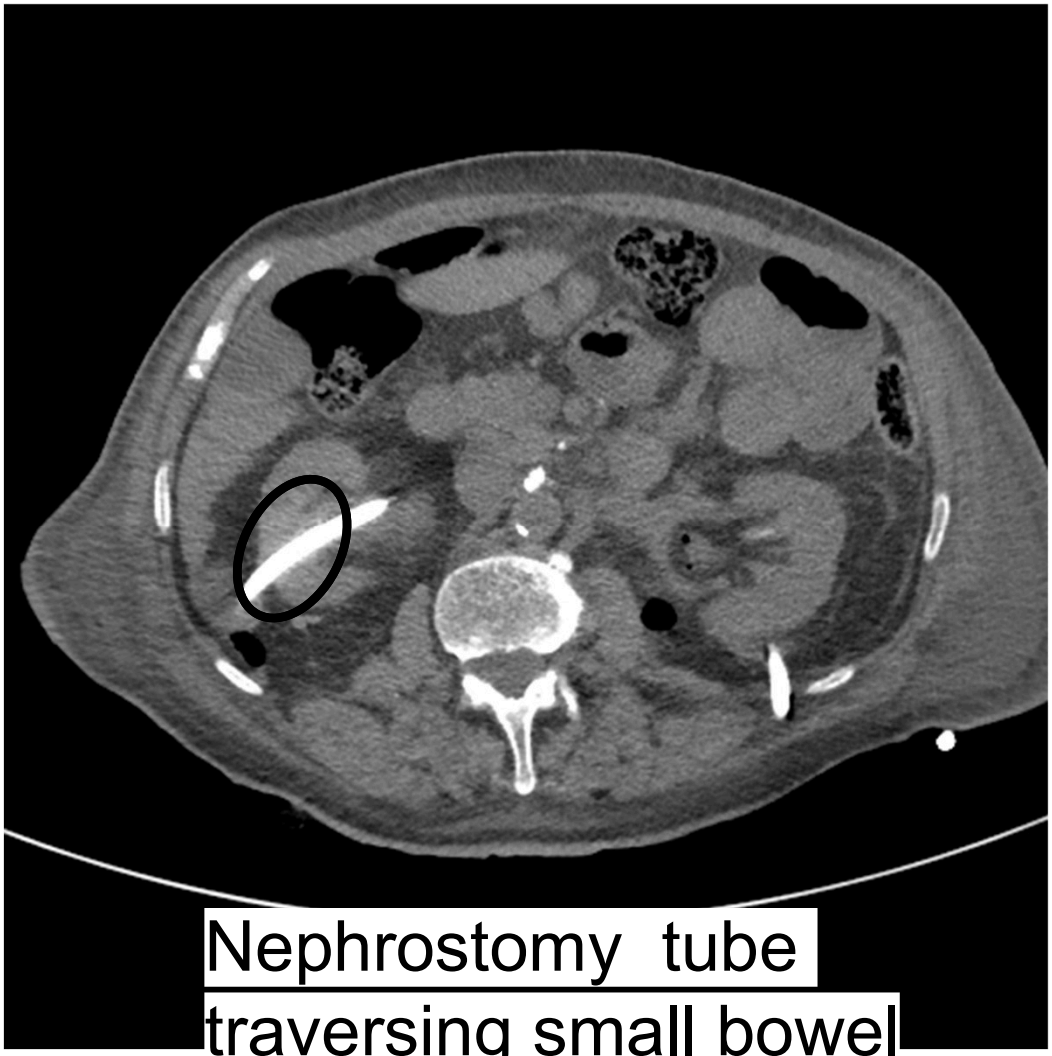

18 x 17.6 mm

# Access via right lower pole above 12th rib

Right Pcnl



# Routine Postoperative CT Imaging


Nephrostomy tube
traversing small bowel

# OPTIONS

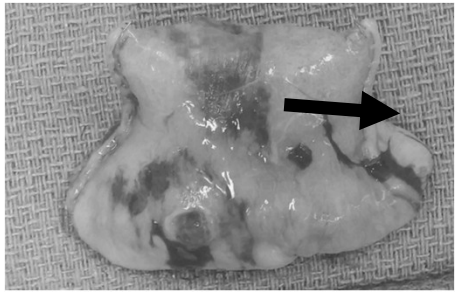
- 1) Urgent exploration by general surgeons ?

- 2) Conservative treatment with nephrostomy drainage and nasogastric suction

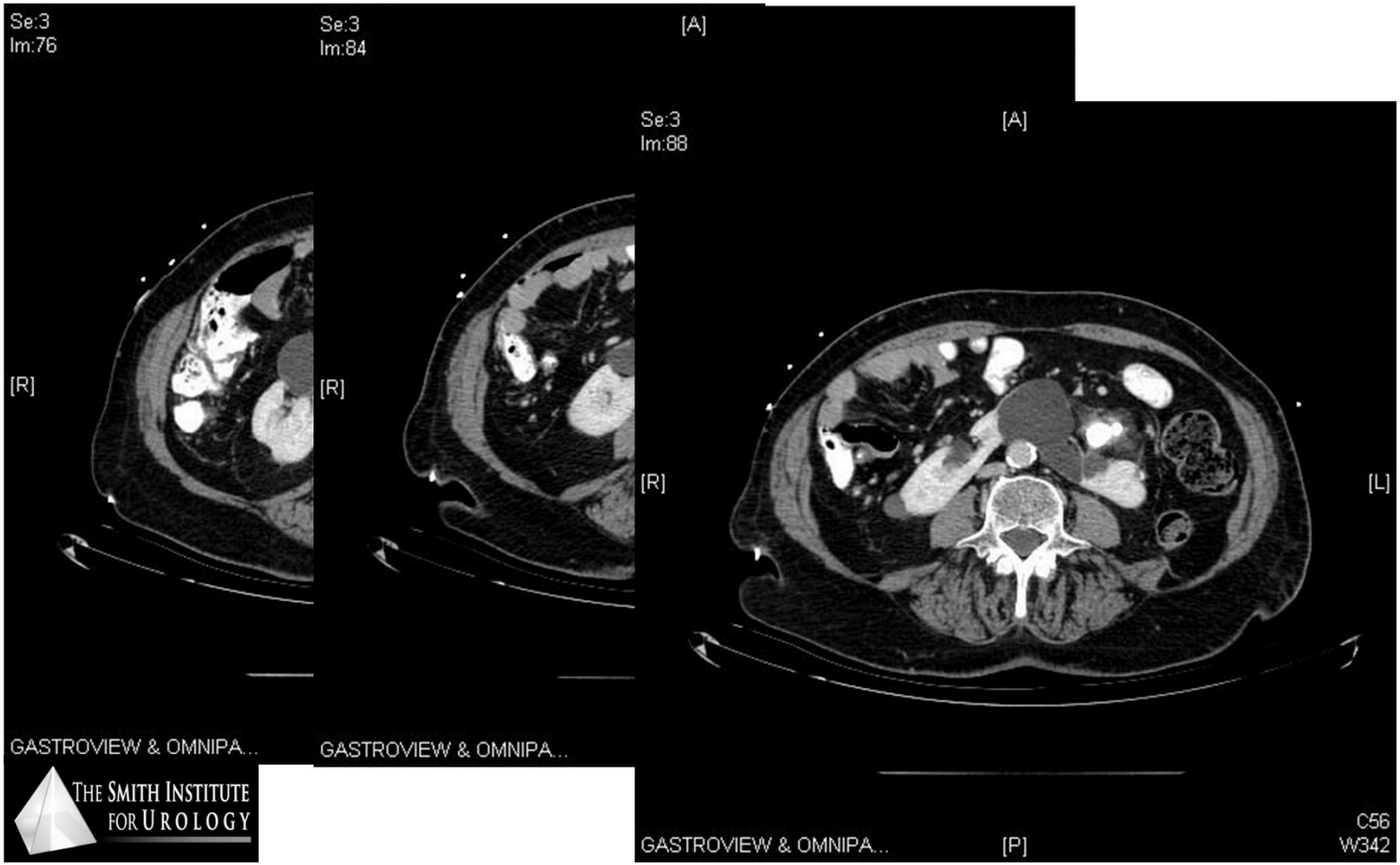
# Case 1 – management

- 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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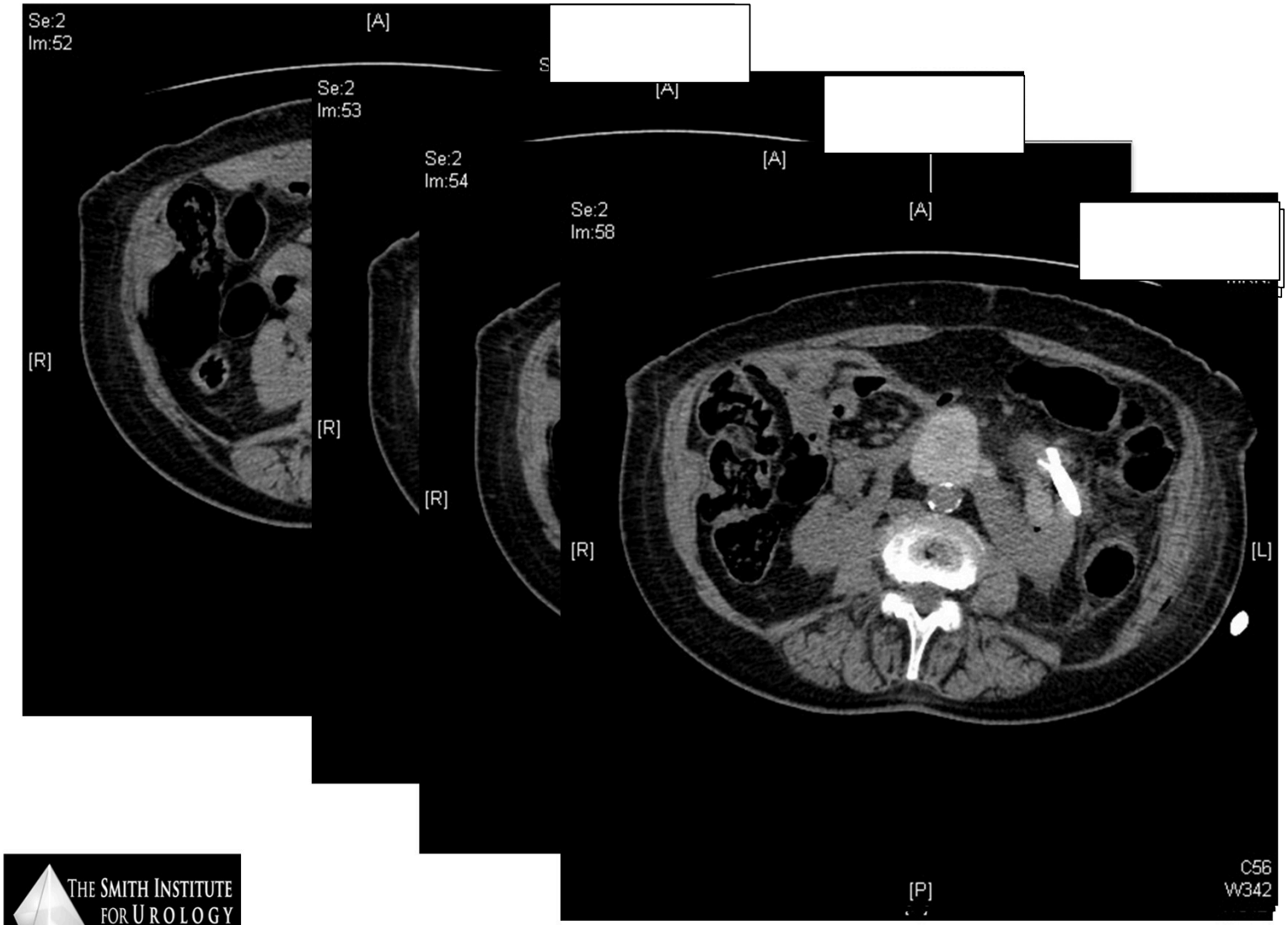
# Course of Events

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

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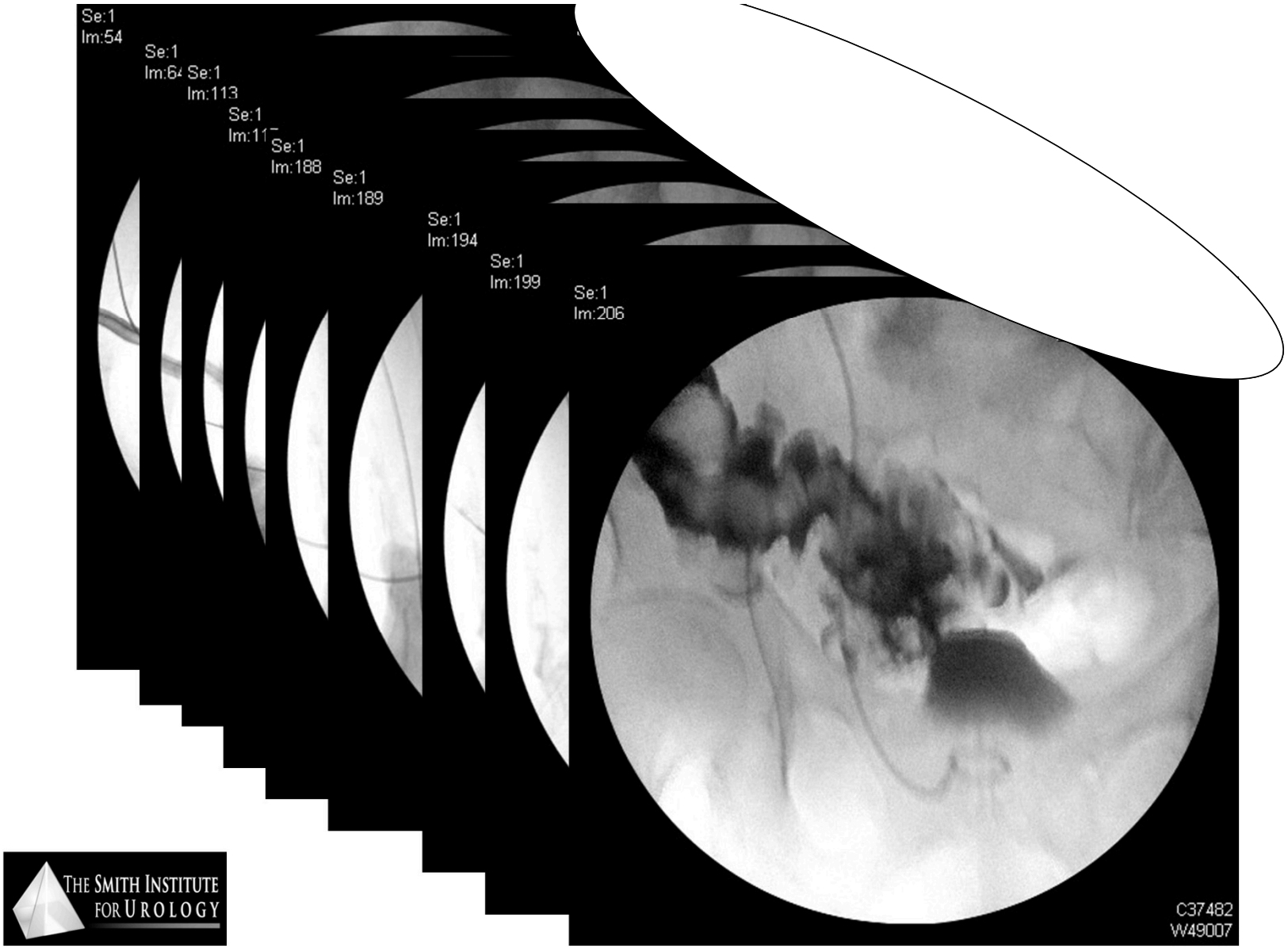
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# SOMETIMES YOU DON'T GET AWAY WITH IT

- 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

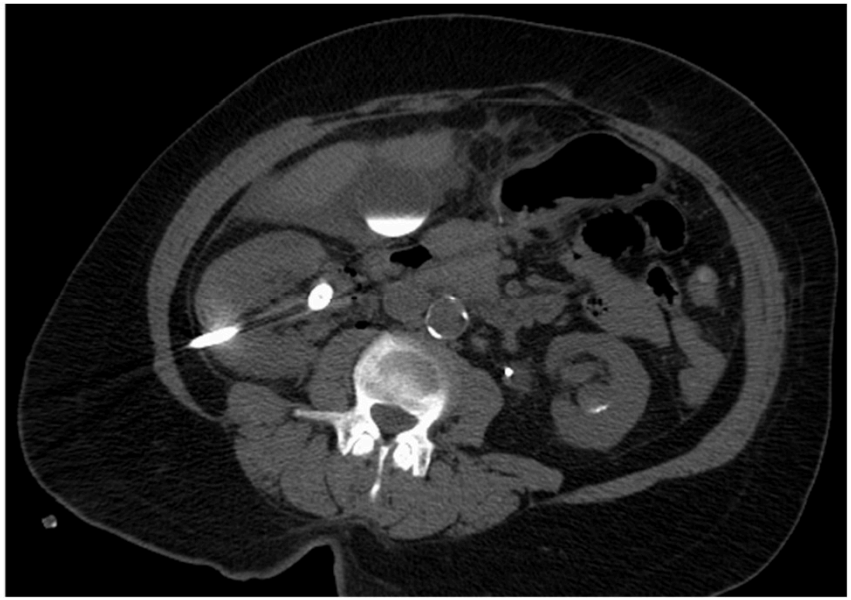
# Case 2- 55 y.o. female with right 10 cm stone burden

University of Wisconsin SCHOOL OF MEDICINE AND PUBLIC HEALTH

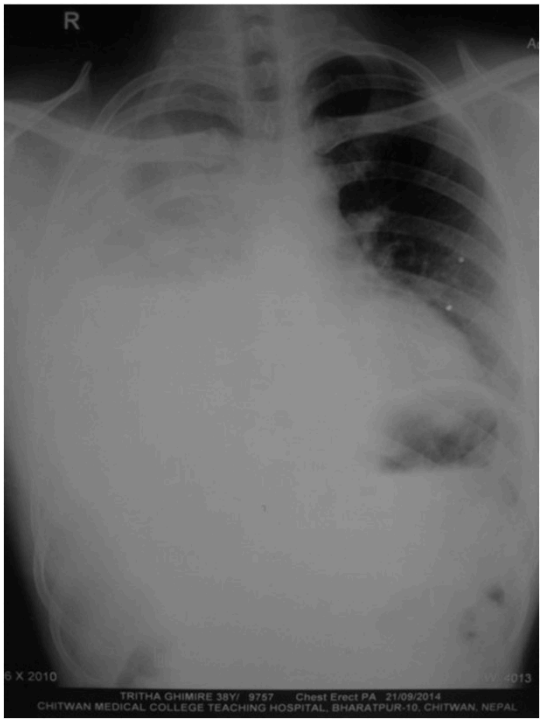
- Nephrostomy in place prior to procedure from outside institution
- Upper pole access placed by interventional radiology – during access attempts the gallbladder was inadvertently punctured and filled with contrast
- 20 ml of bile was aspirated from the gallbladder and the needle was removed
- Upper 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



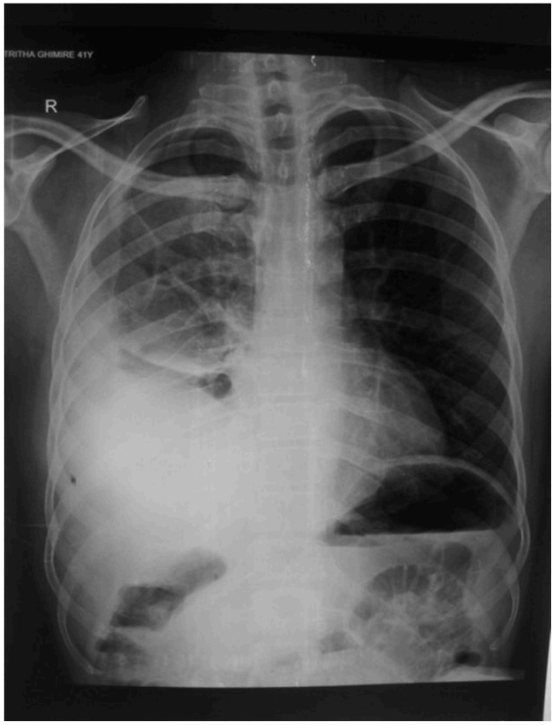

- 41y/o man
- Mini PCNL
- upper pole and renal pelvis
- Post op day 1
- CXR
- Large right pleural effusion

(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)



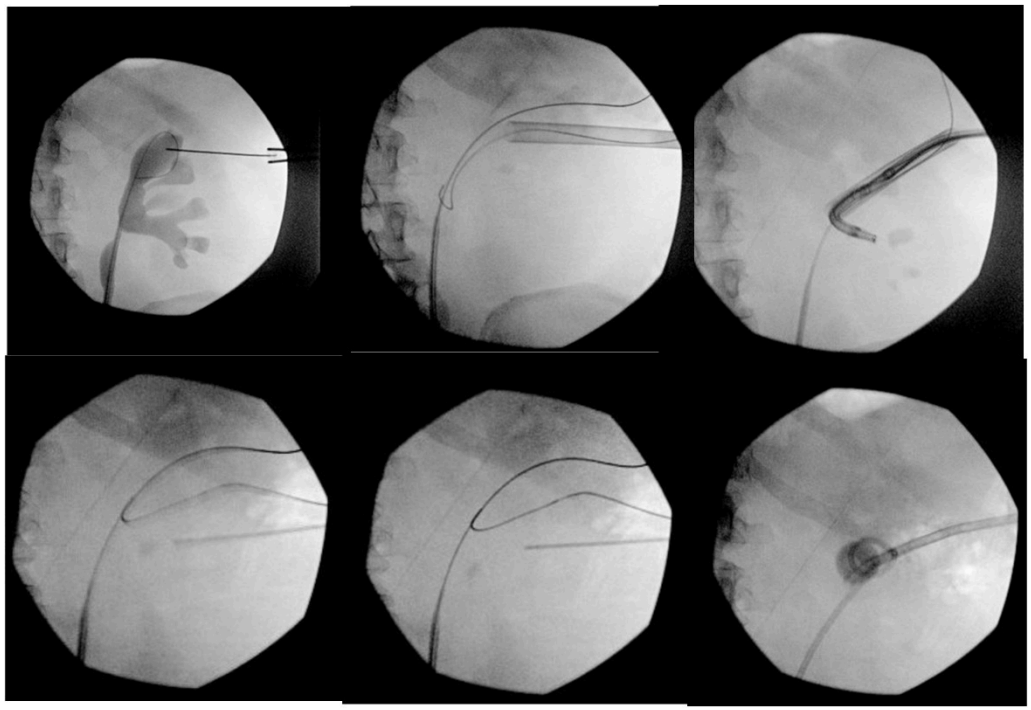
- **WHAT'S THE WORST THAT CAN HAPPEN?**

## Hemothorax

- 54 y/o man
- Recurrent left staghorn stone

# Hemothorax

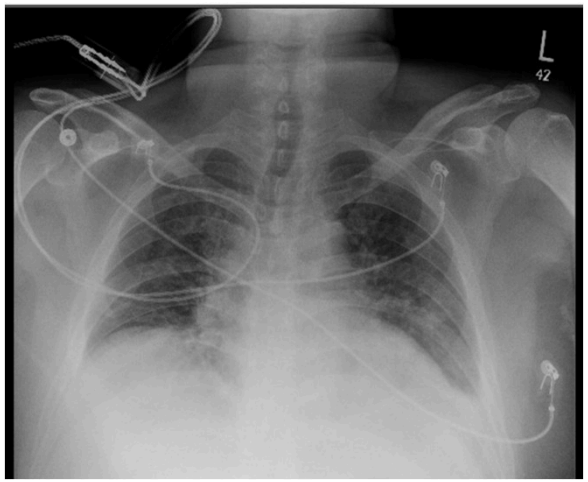
- PCNL
- Single stage
- 3 punctures, 2 dilations
- 1 upper pole between $11^{th}$ and $12^{th}$ ribs
- Stent plus Council nephrostomy tube
- Discharged without event POD#1



# 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

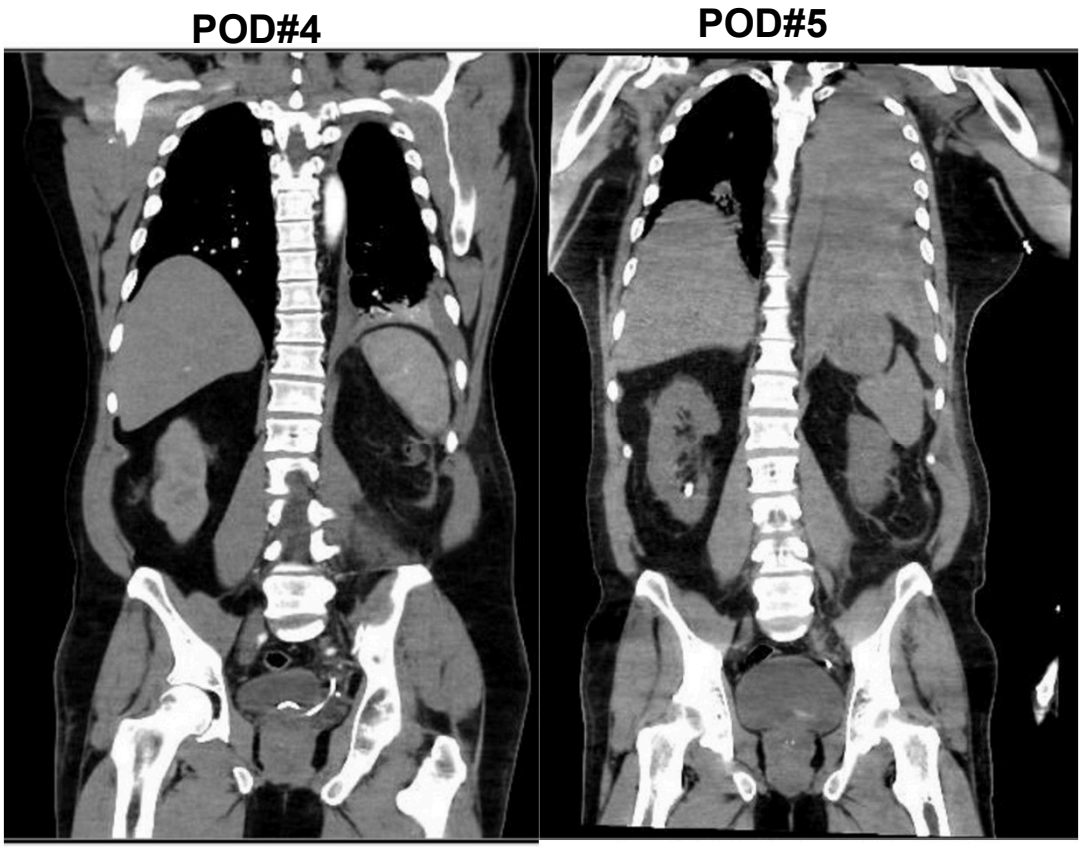



# Hemothorax

- Sudden severe chest pain POD#5

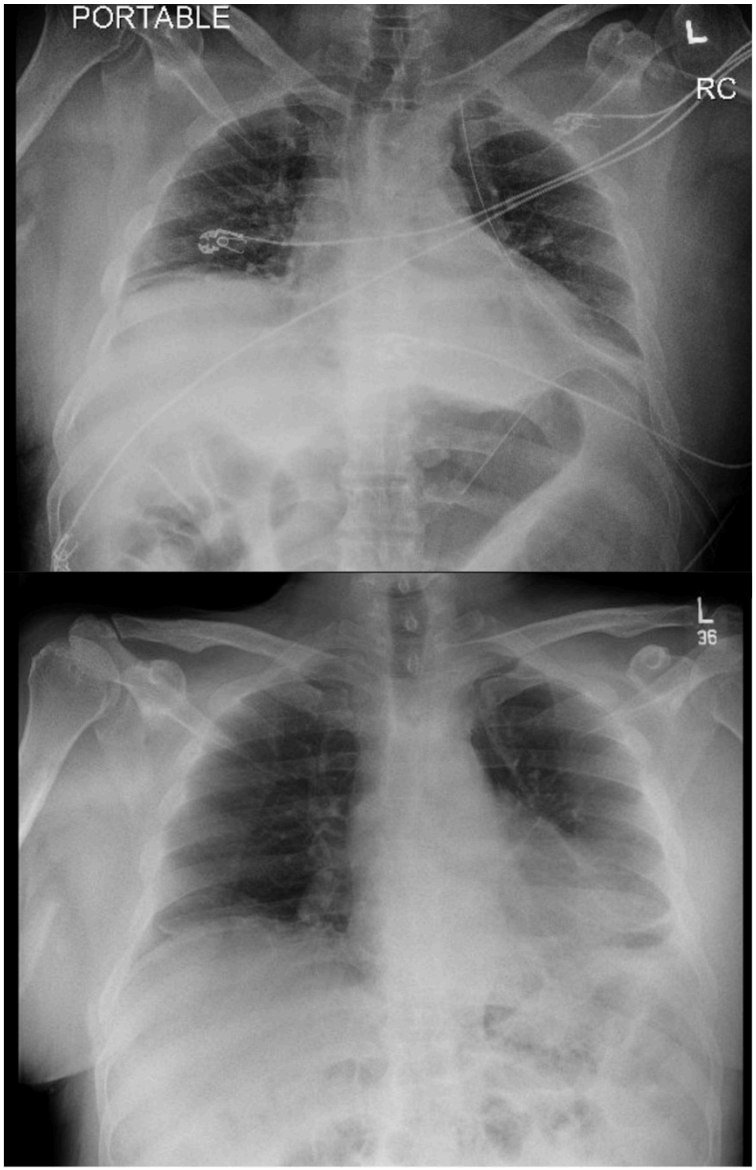
- Transient drop in BP
- Cardiac enzymes normal
- Hg/HCT stable
- Hematuria not worse

- 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



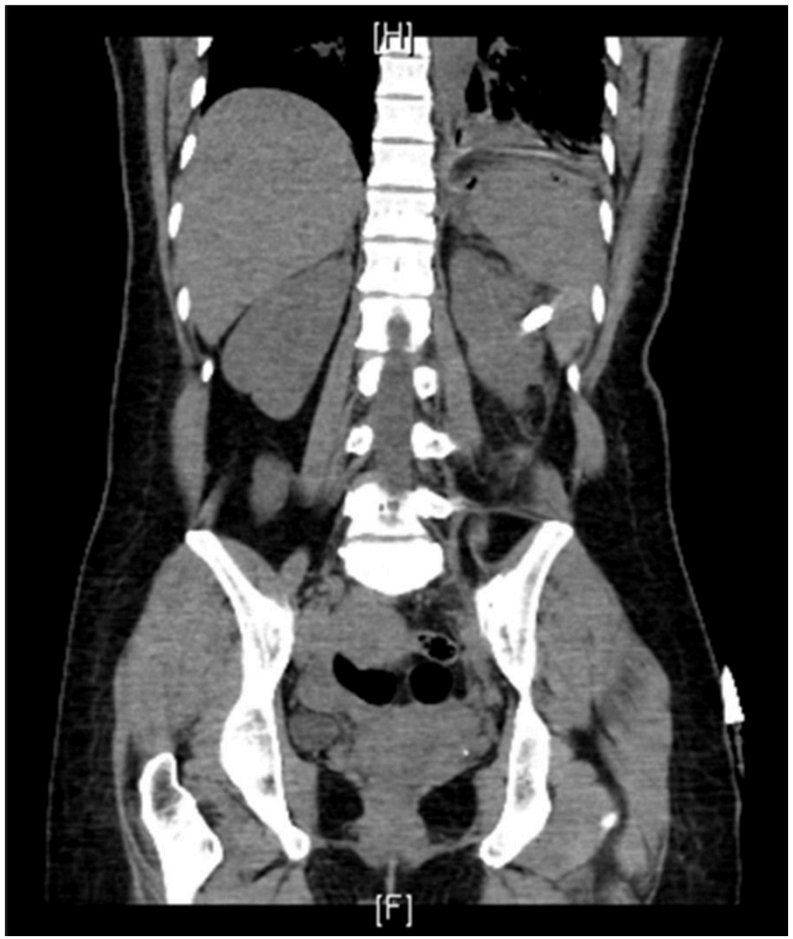
# Routine Upper Pole Stone Case

- 45y F underwent L PNCL
- Initial access was above 12$^{th}$ 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

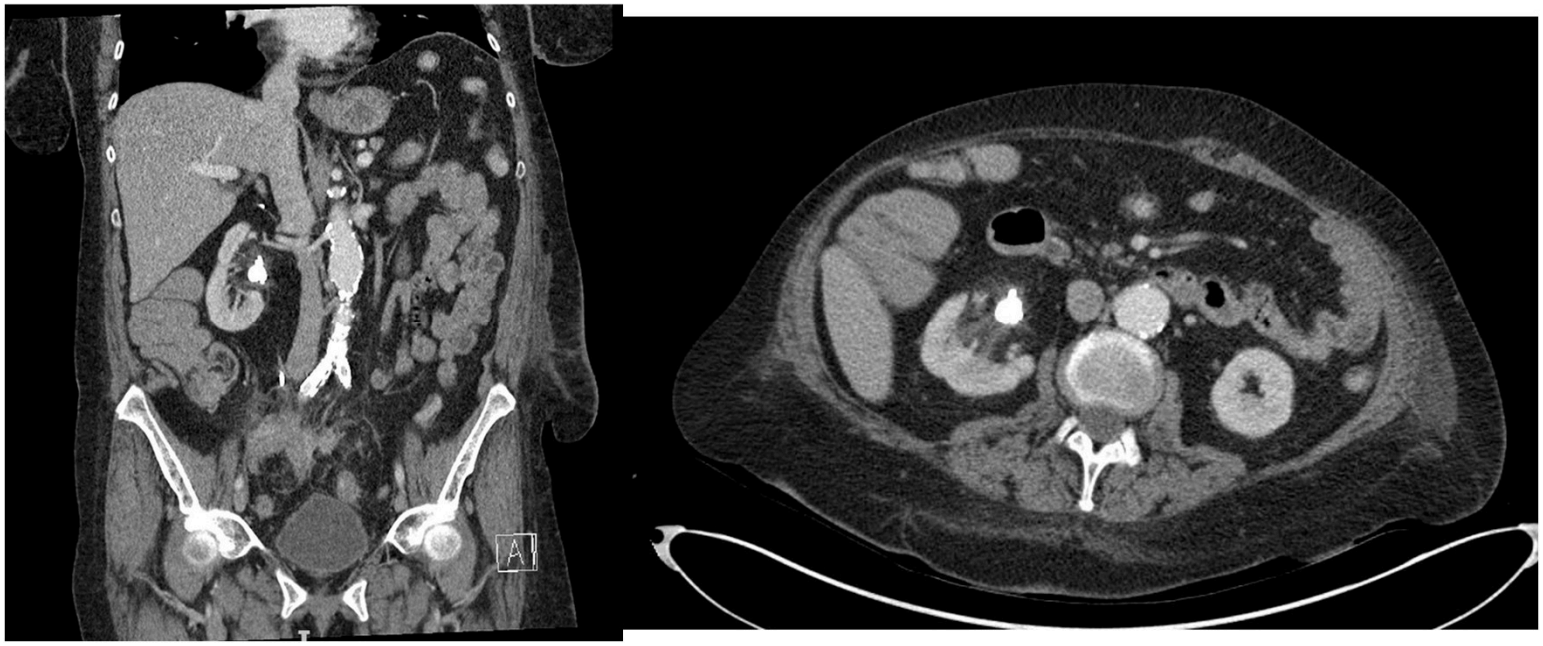
- POD # 6 Nephrostomy tube removed
- POD#7 chest tube removed, also with no issues
- POD#8 repeat CXR showed no pneumo-peritoneum or –thorax and pt. was discharged home ambulating, tolerating diet, pain controlled, no resp difficulty.

# 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

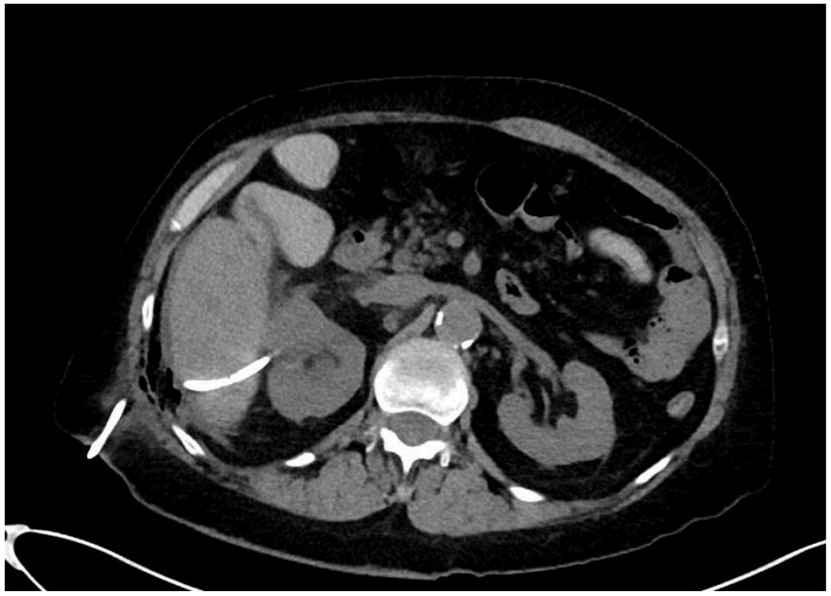


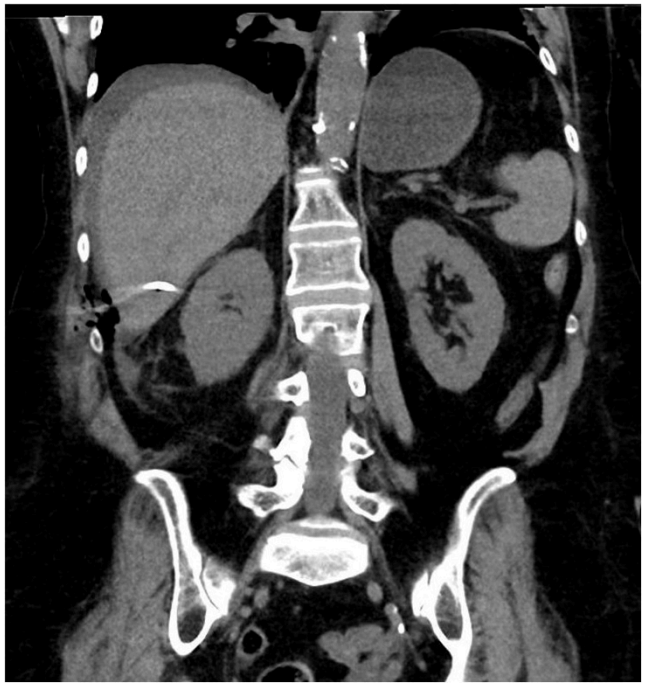
# Intraoperative and Hospital Course

- 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



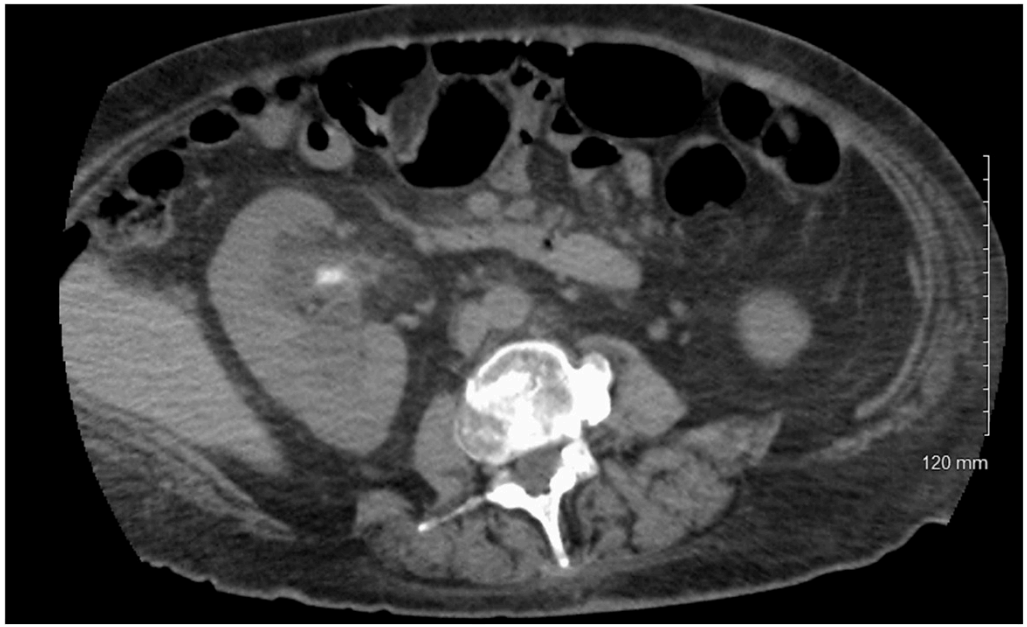
Courtesy of
Professor Margaret Pearle, MD PhD
UT Southwestern Medical Center
Dallas, TX

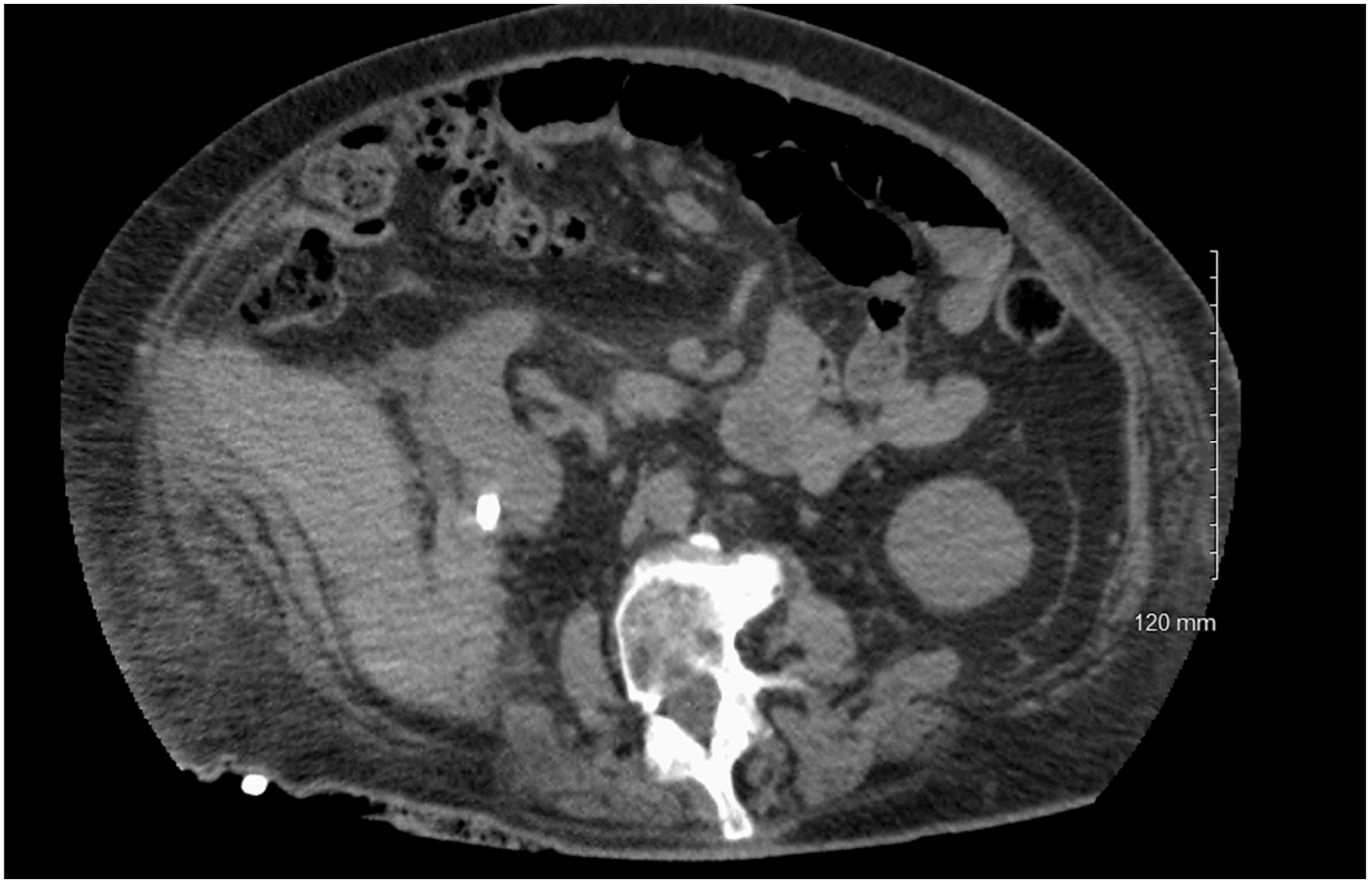

120 mm

# 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

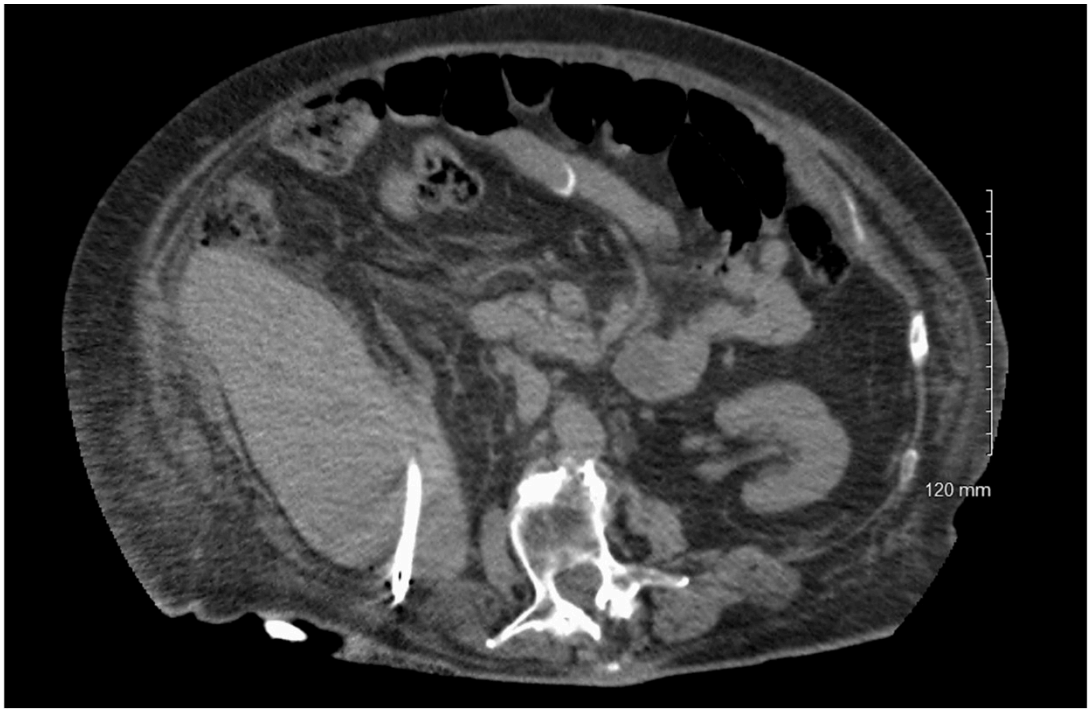

57


120 mm




PERI-HEPATIC HEMATOMA

Nephrostomy tube through liver with significant peri-hepatic hematoma

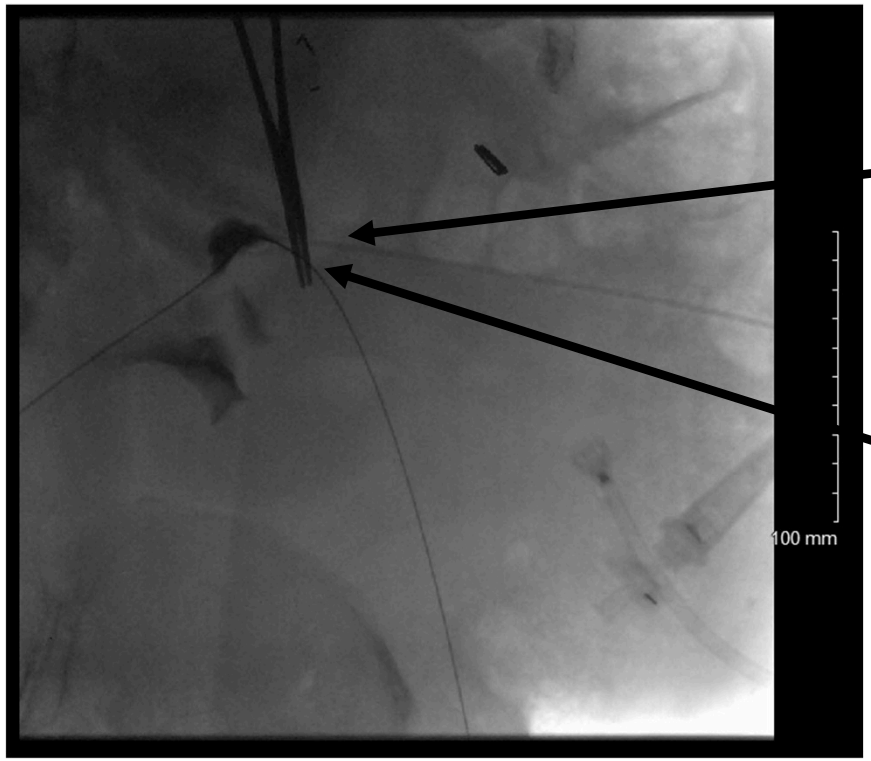



NOW  WHAT ??

# 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

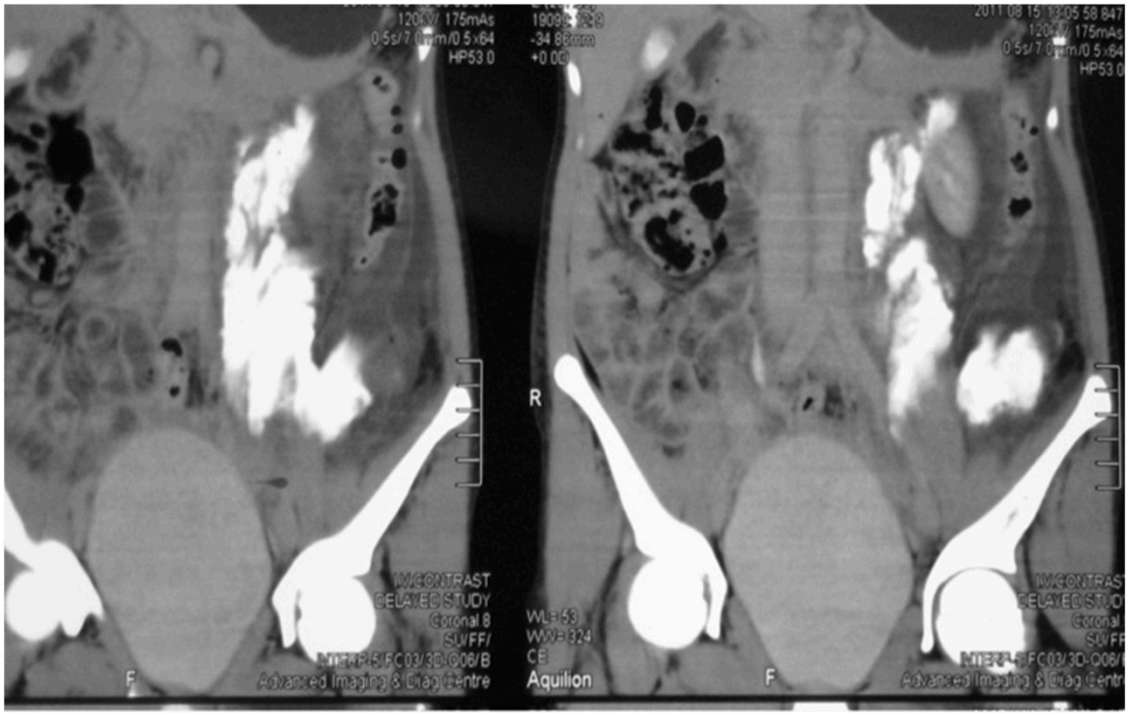
# Conclusion

- 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

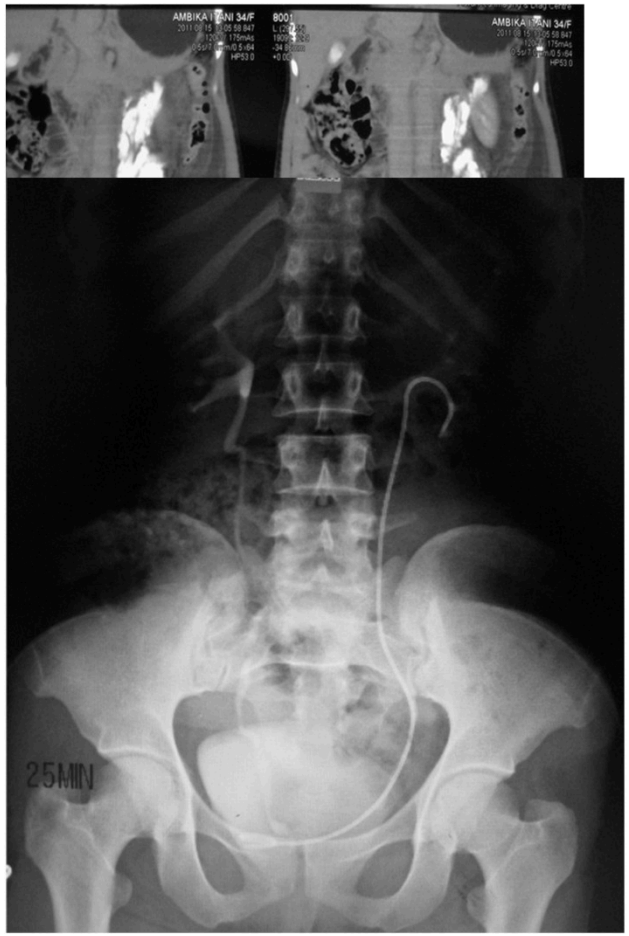
PERIRENAL URINOMA/ URINE EXTRAVASATION

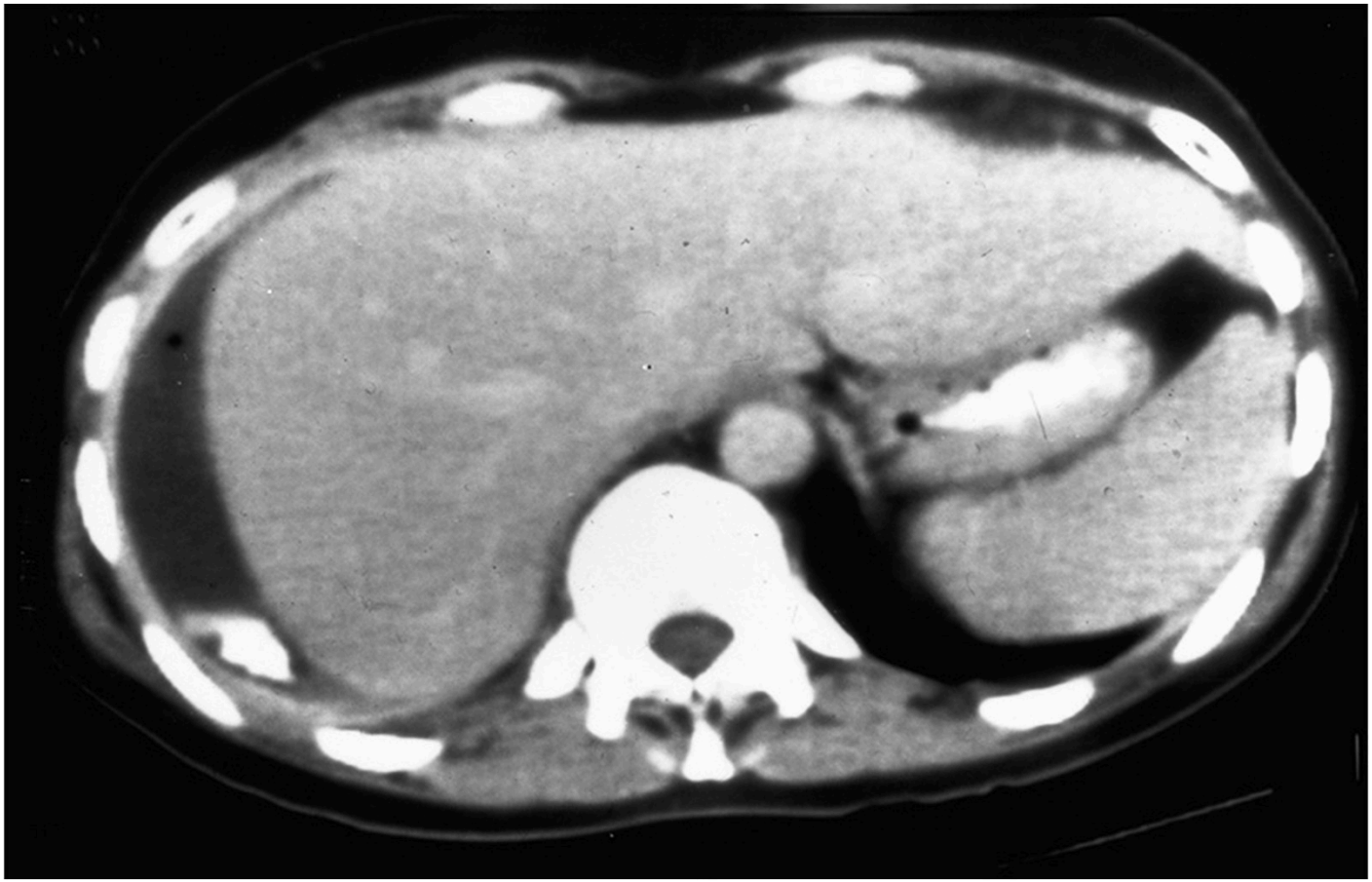
- 34Y/O
- Tubeless miniPCNL
- POD#2 developed fever and abdominal pain
  - Ultrasound and CT Urogram



# 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



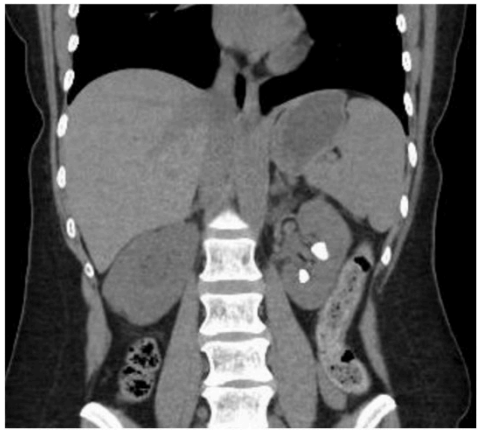


Perirenal Urinoma

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

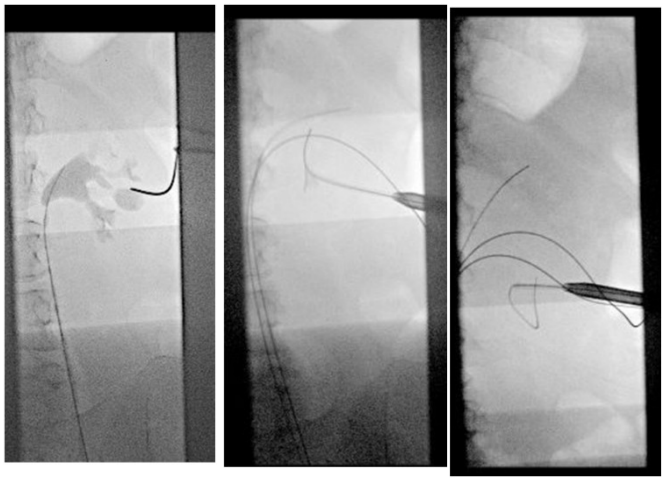
# Nephrocutaneous fistula

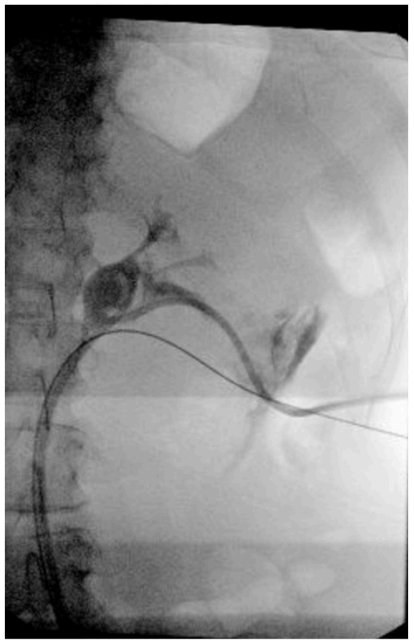
- 48 y/o woman
- Failed Ureteroscopy
- Multiple LEFT renal stones



# Nephrocutaneous fistula

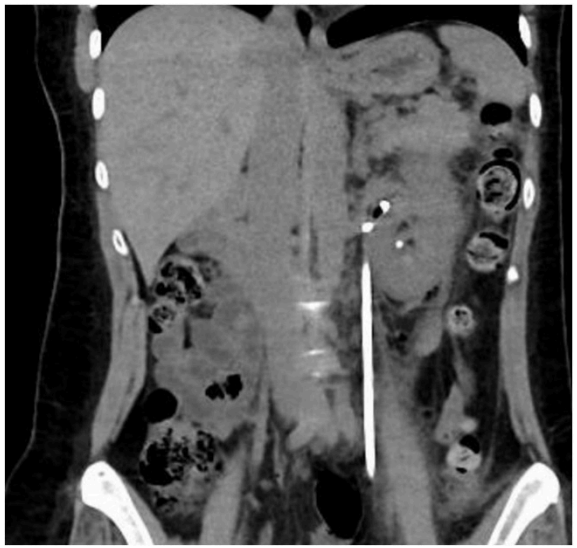
- 3 punctures
- 3 dilations, including obstructed infundibulum
- One nephroureteral tube





# 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

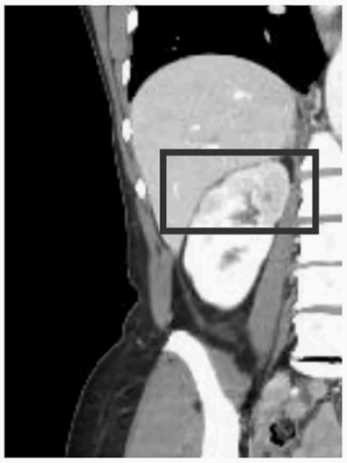
# THE URETER IS NOT YOUR FRIEND

# 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

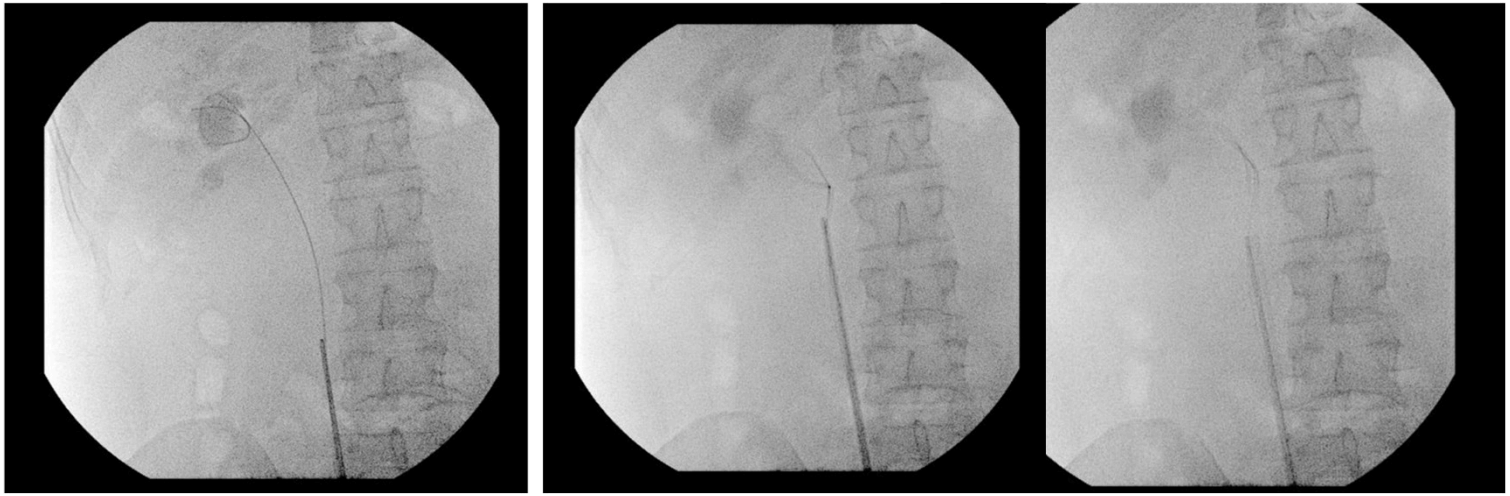
- 42 yo M with no significant PMHx who presented to ER with incidentally diagnosed 4 mm proximal to mid ureteral stone with symptomatic pain and discomfort with +UTI, treated with antibiotics and discharged home for MET
- He had continued pain, scheduled for URS and treated with abx
- PMHx: obesity, 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

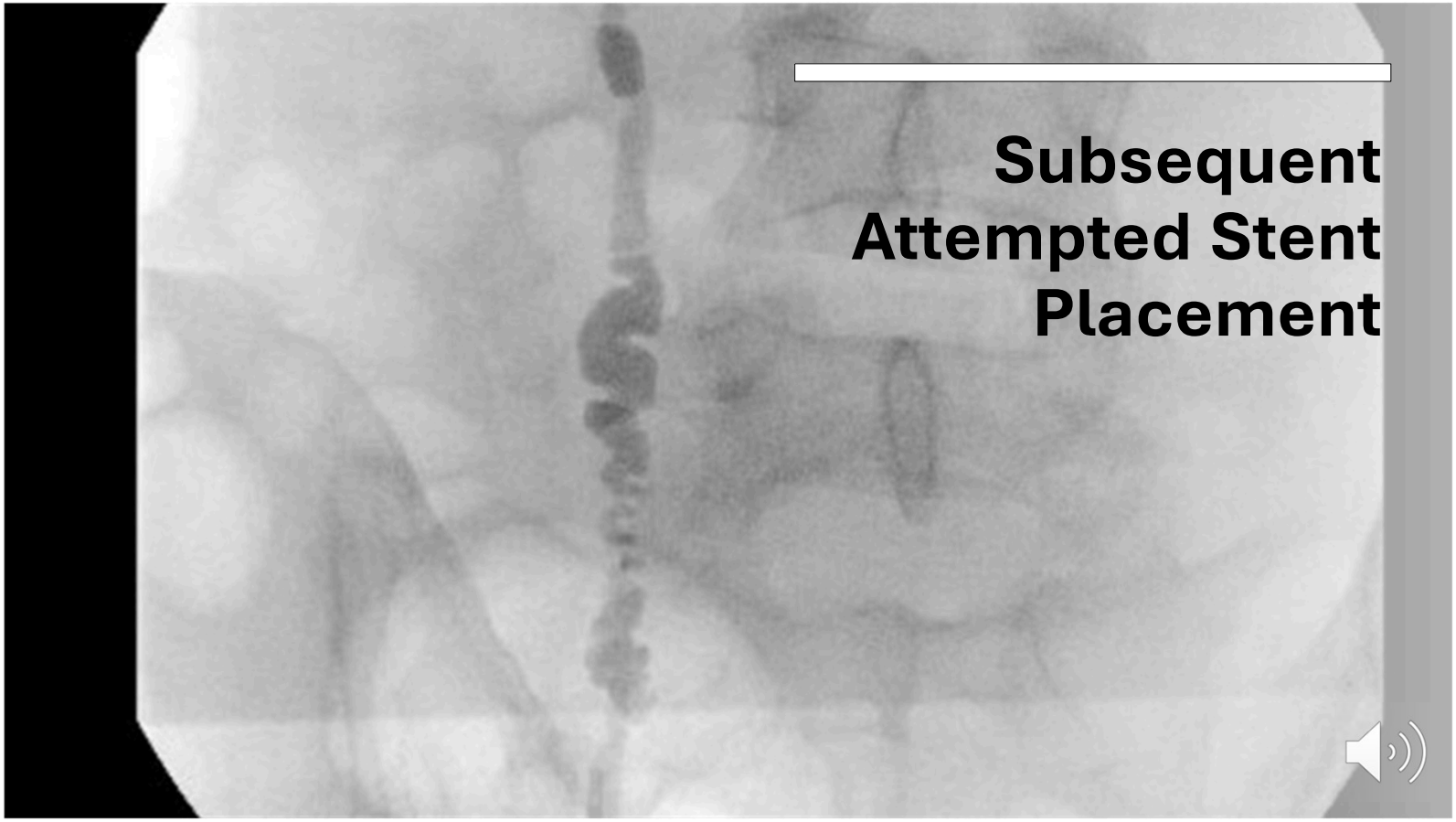
Minimal perinephric fat stranding

# 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

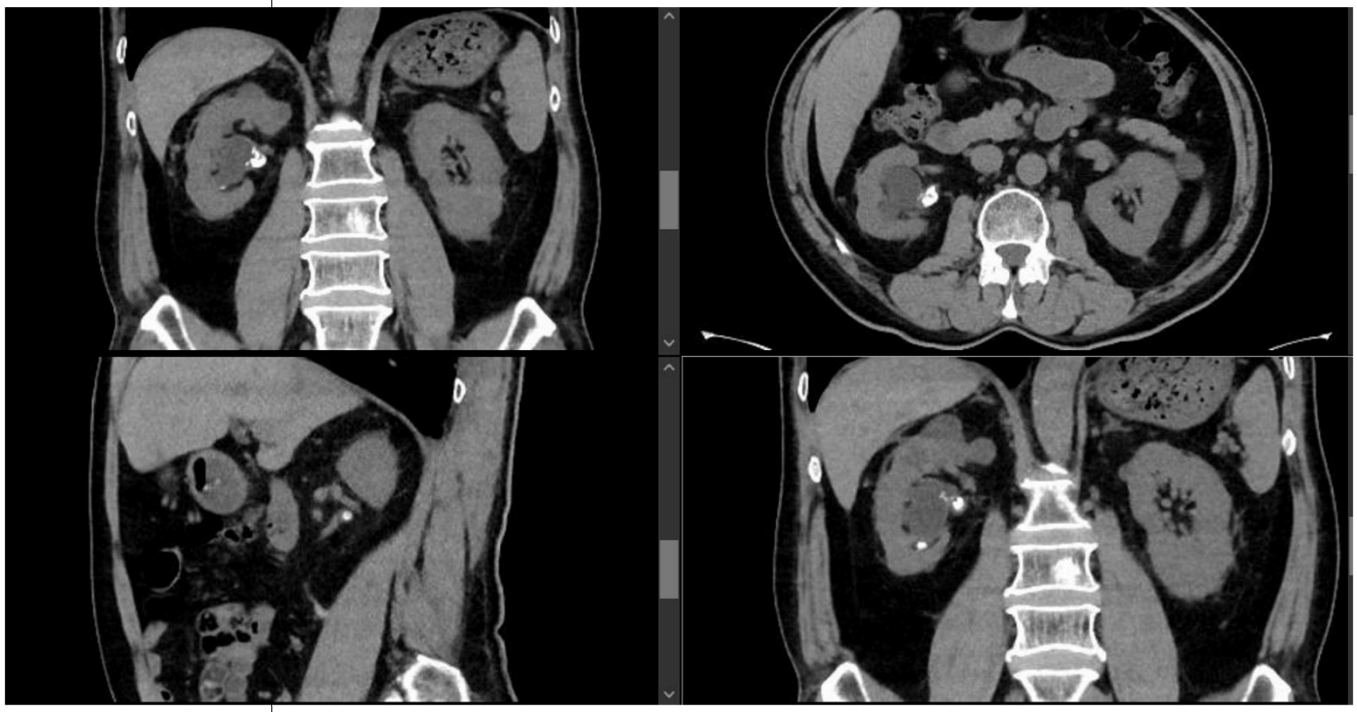
# Ureteropelvic junction problems

# 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

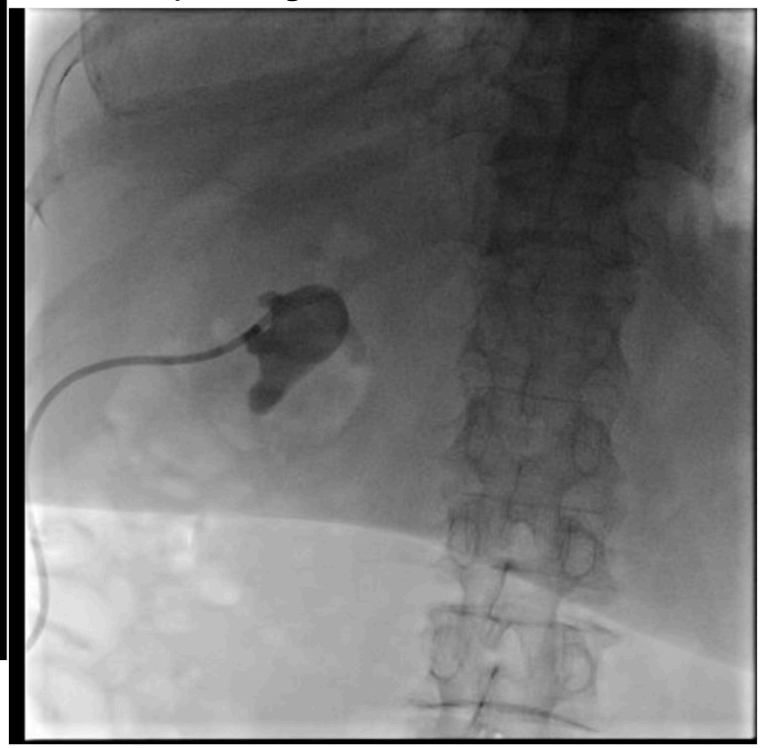
**UPJ stone, treated with ureteroscopy**

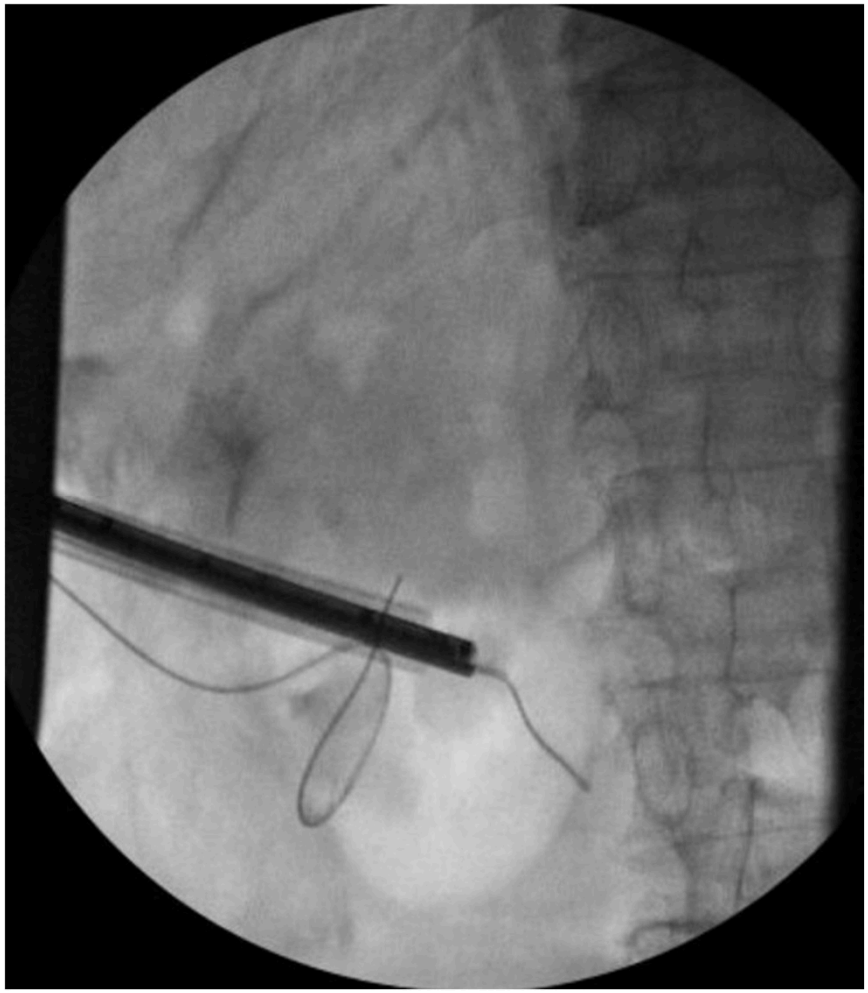


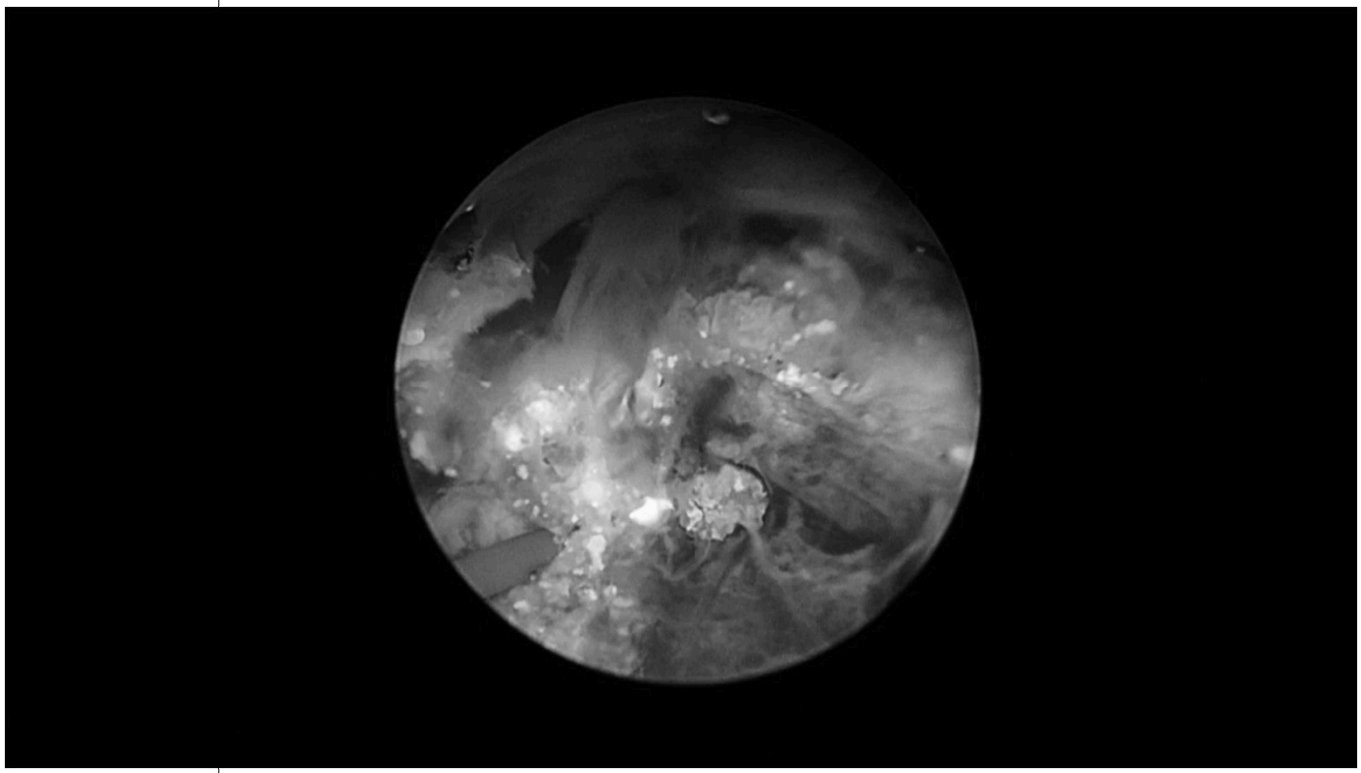
**CT after first stage ureteroscopy**

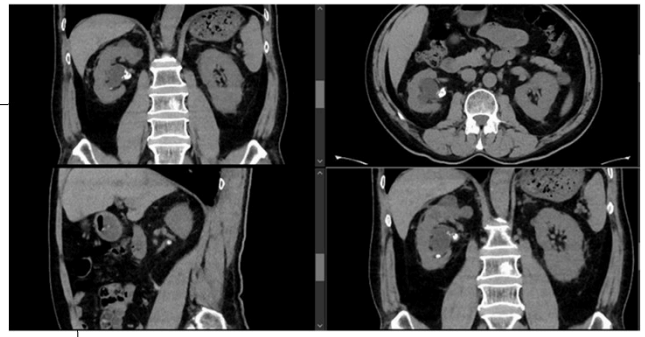
2nd stage ureteroscopy

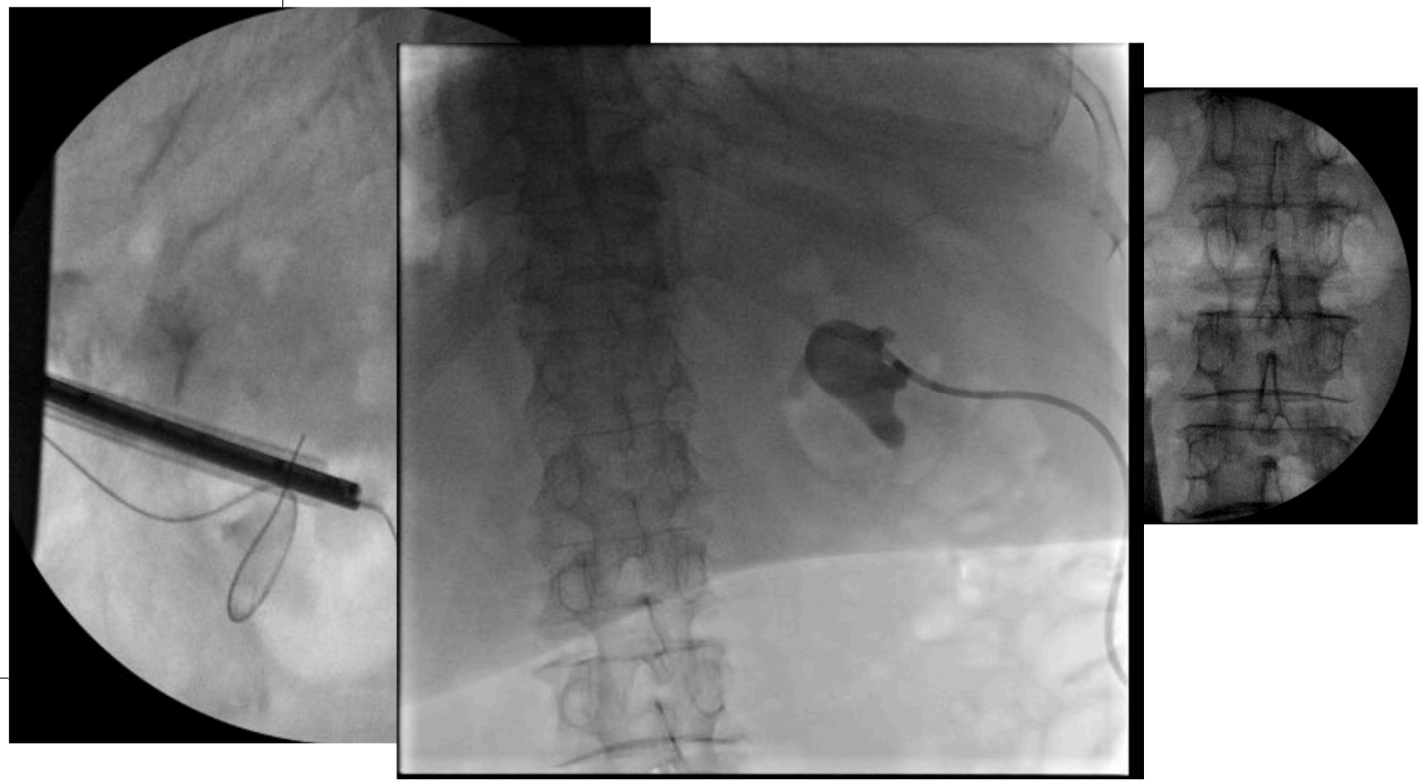
Nephrostogram





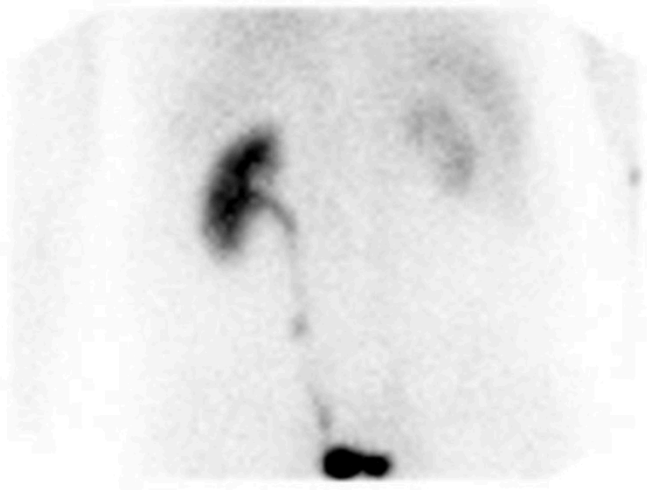






# Case Presentation

- 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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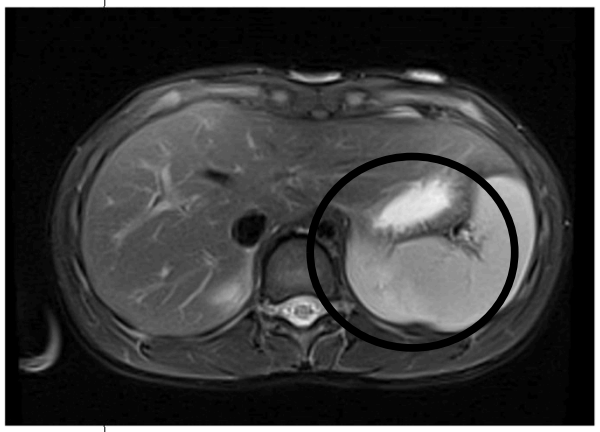

# Case Presentation

- 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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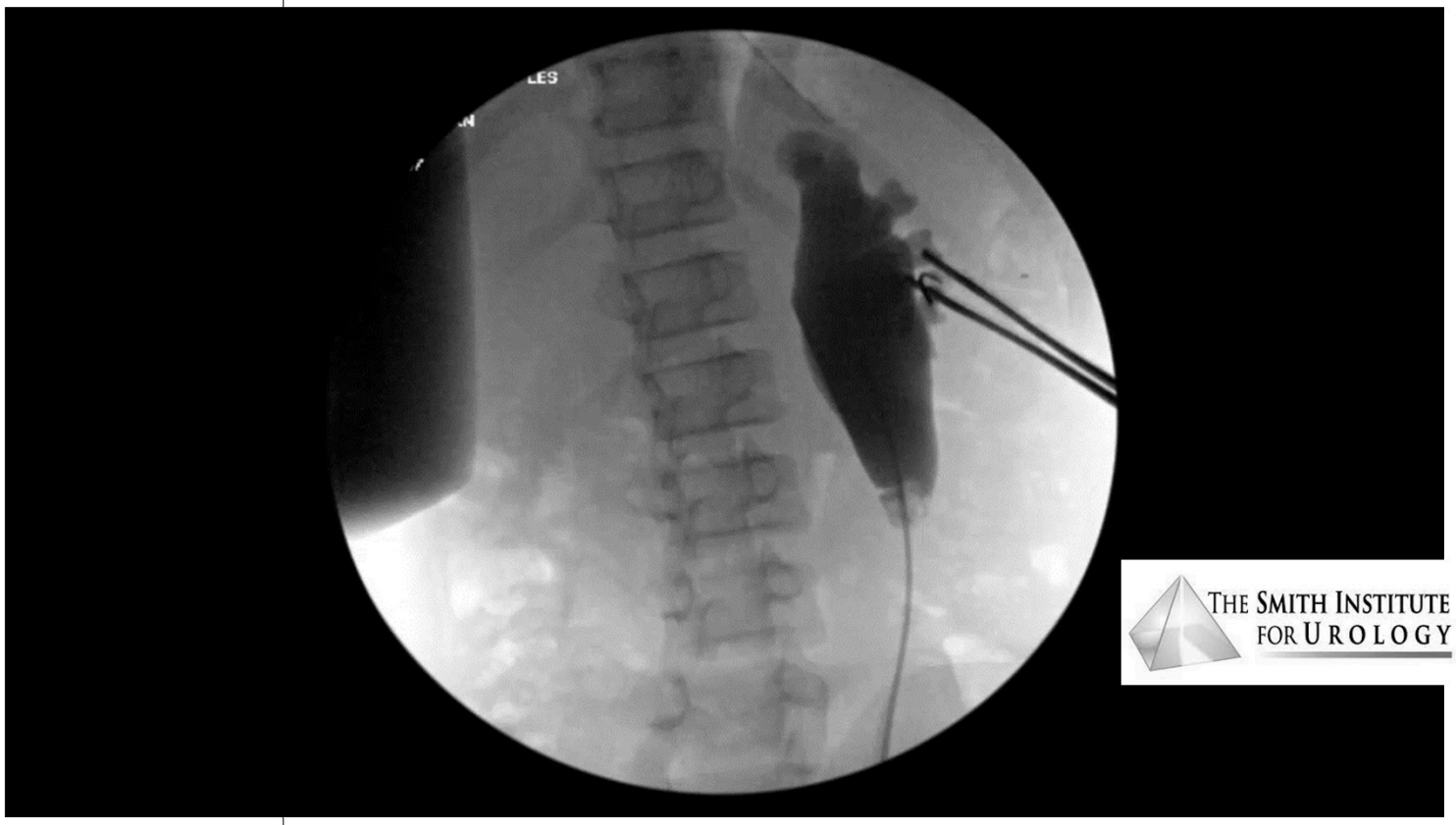
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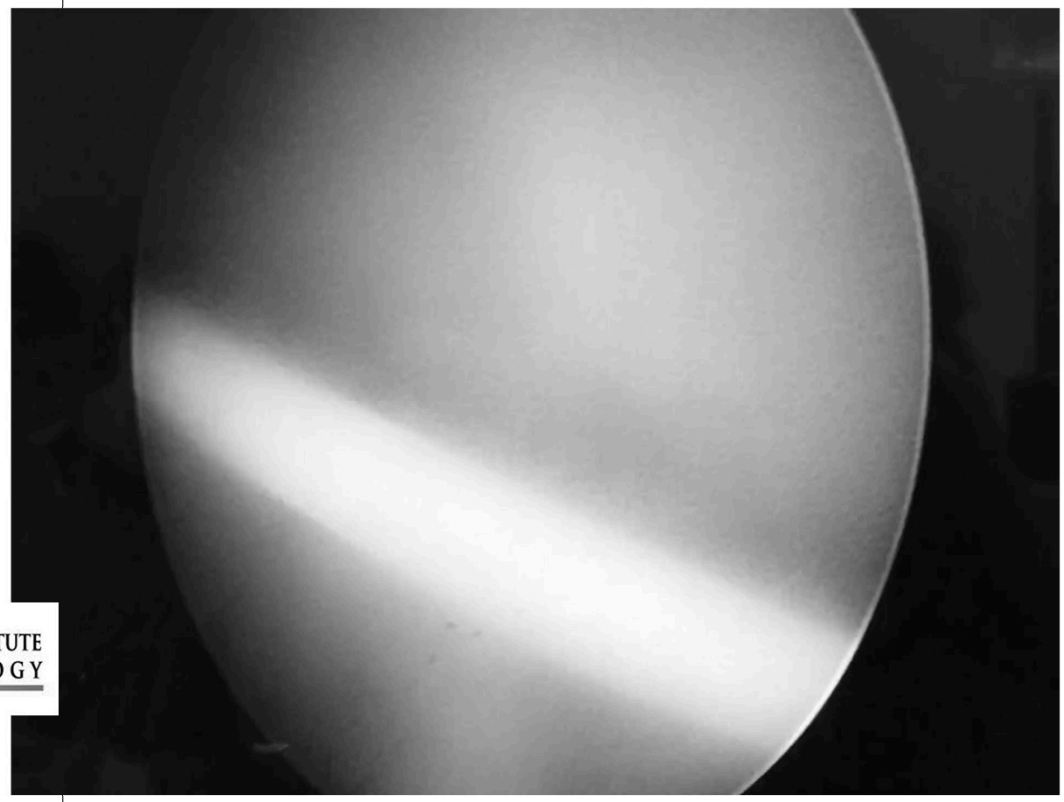

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# Post Operative Course

- 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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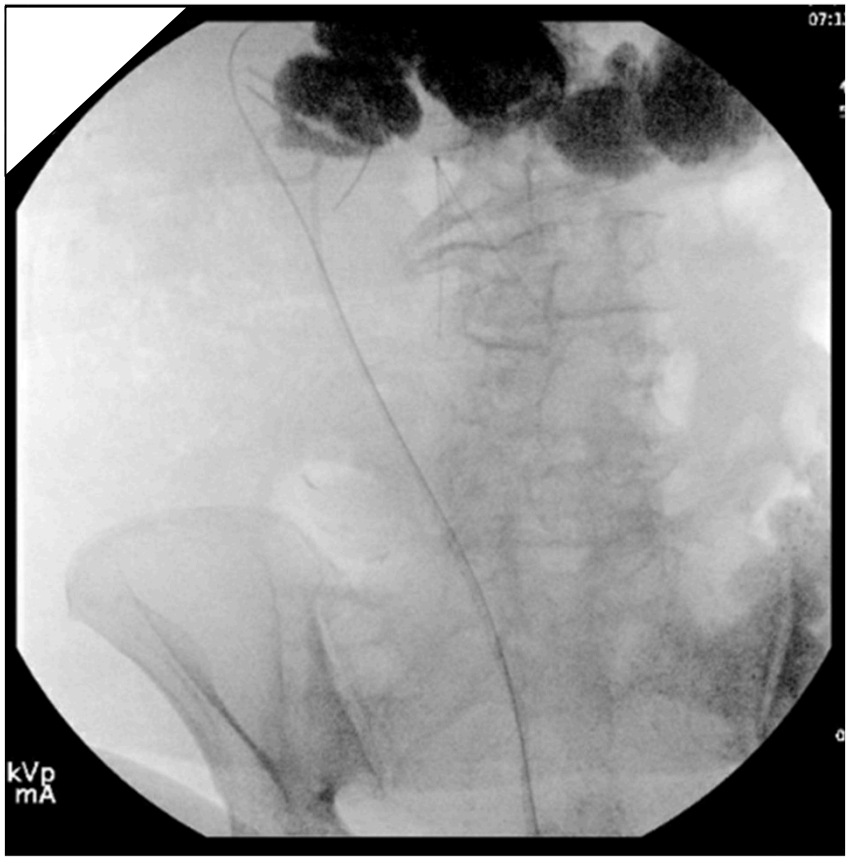


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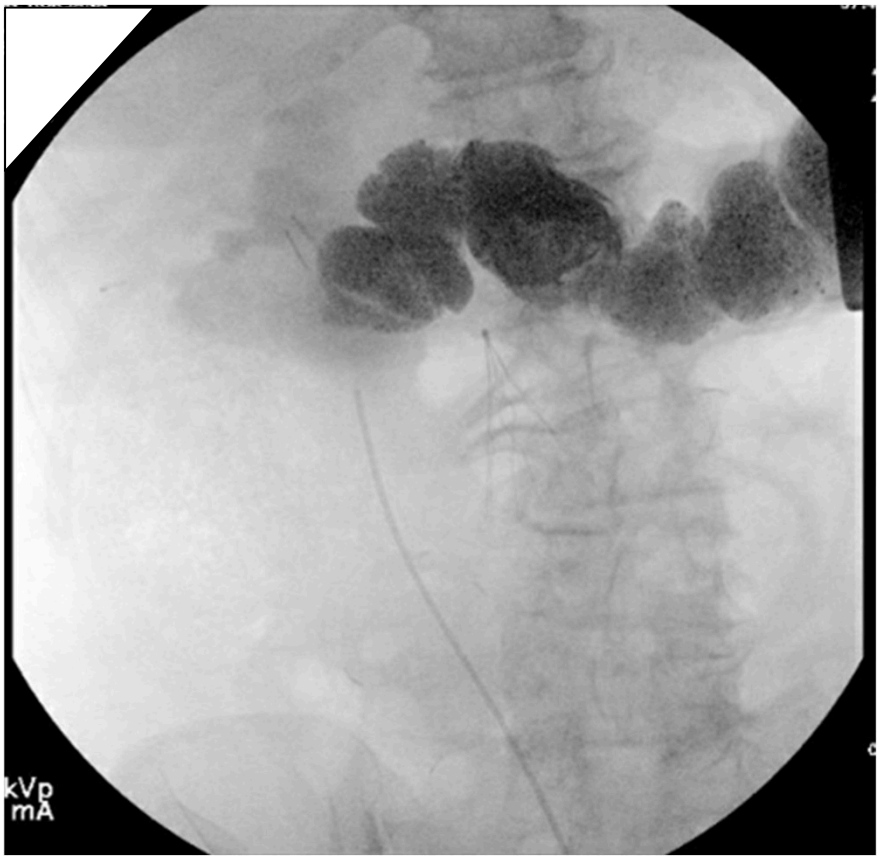


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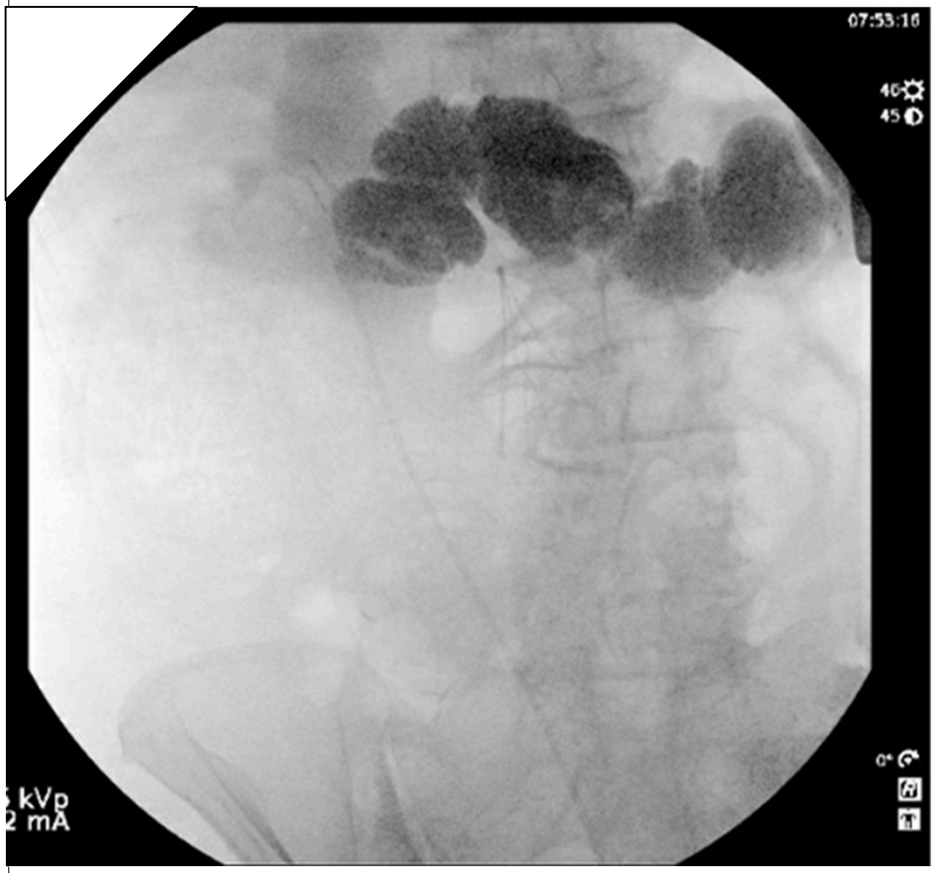


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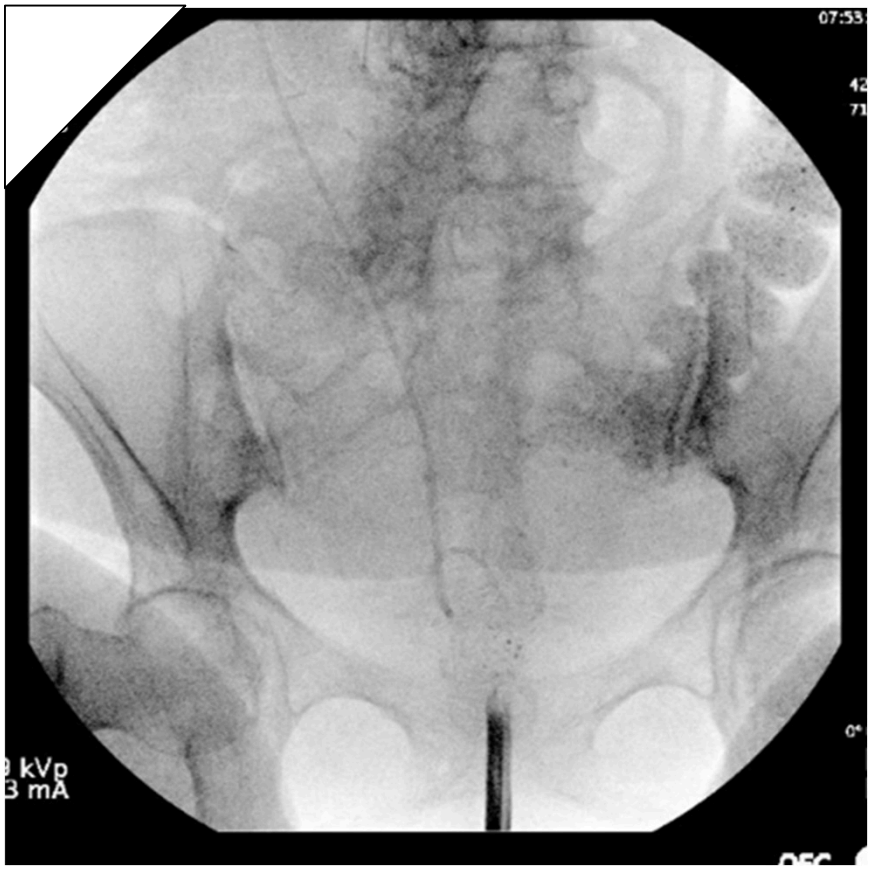


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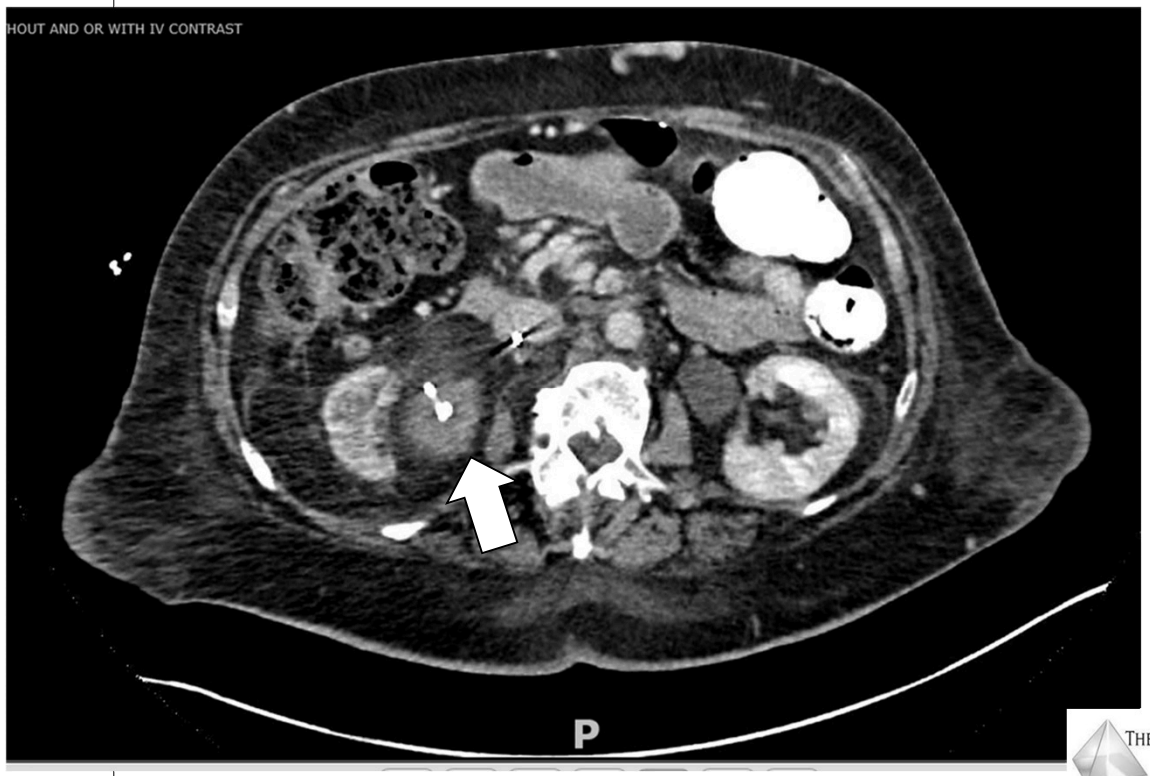


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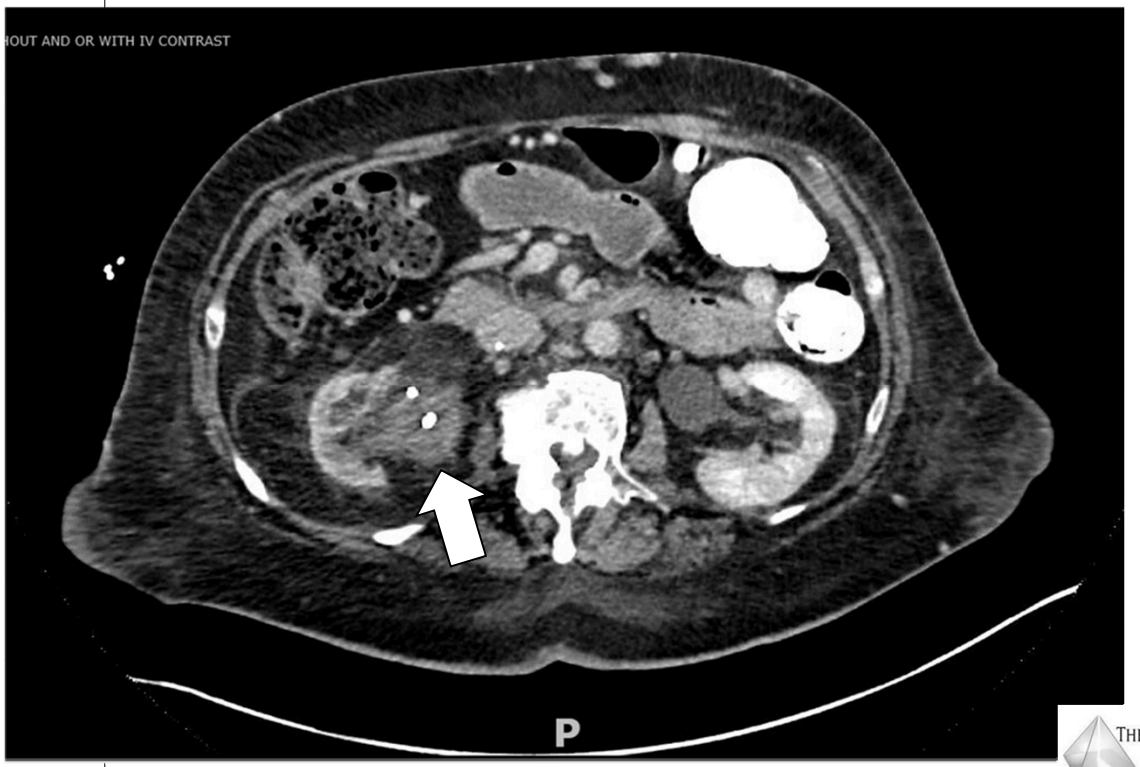


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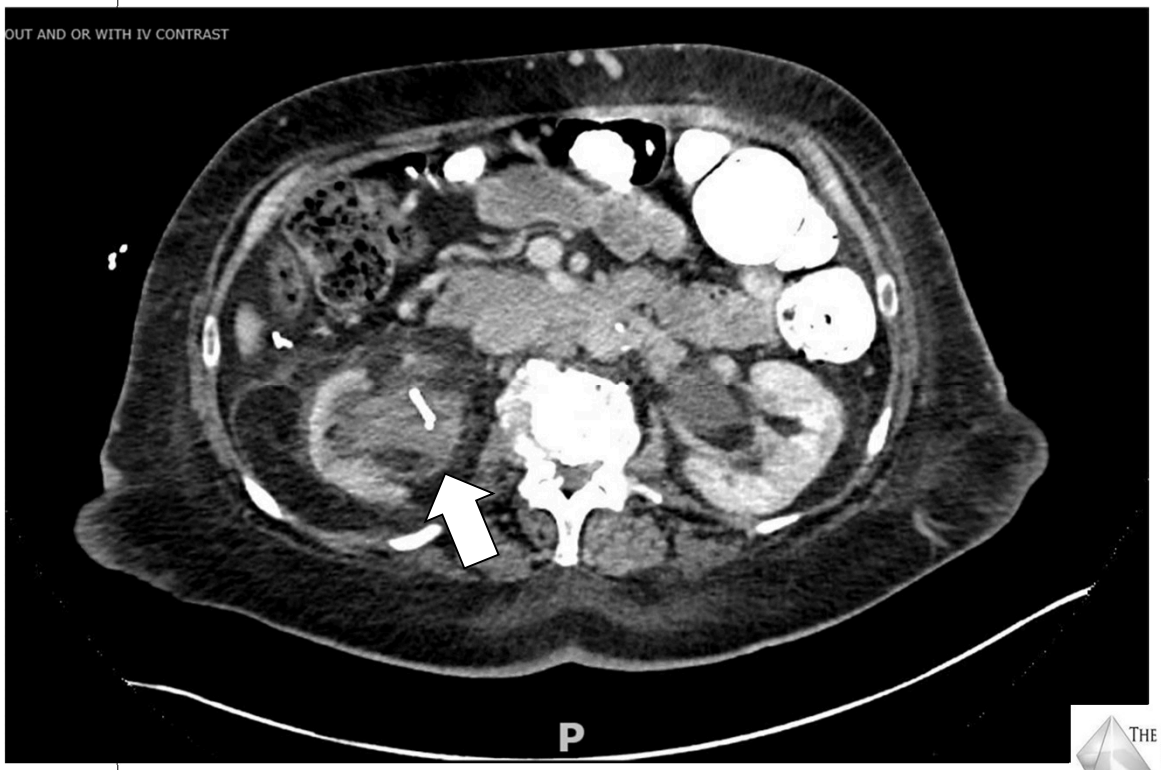


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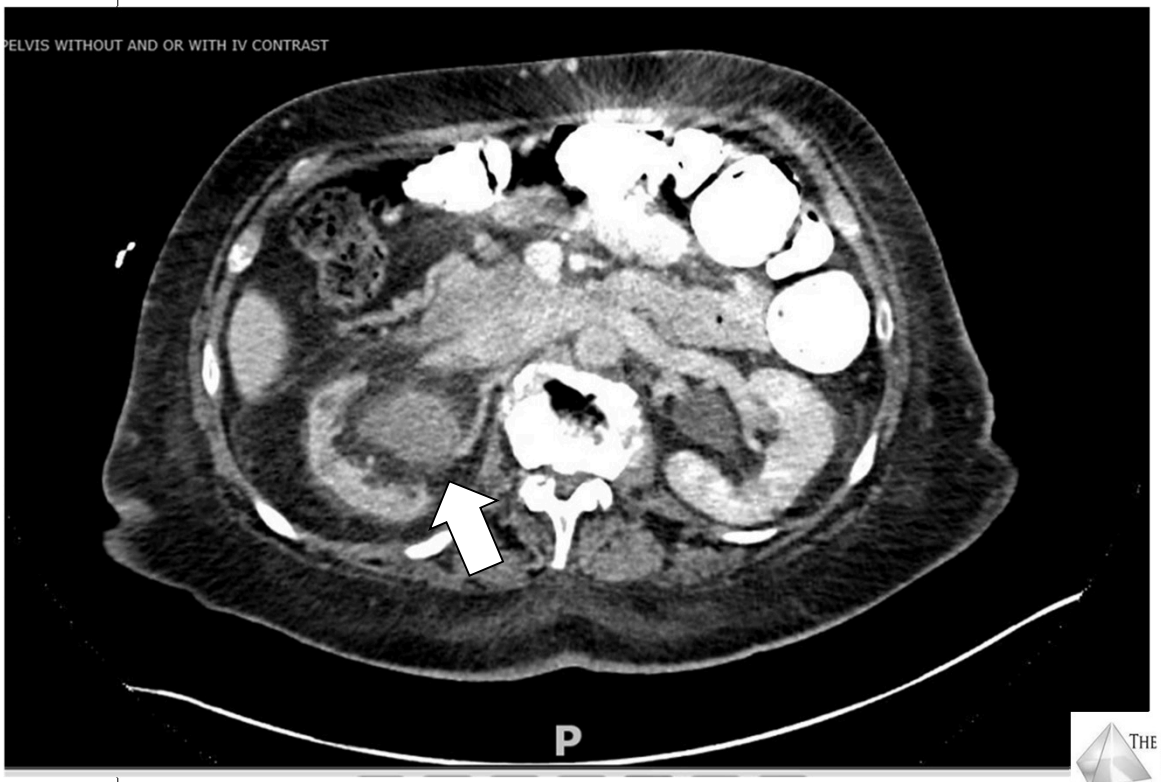


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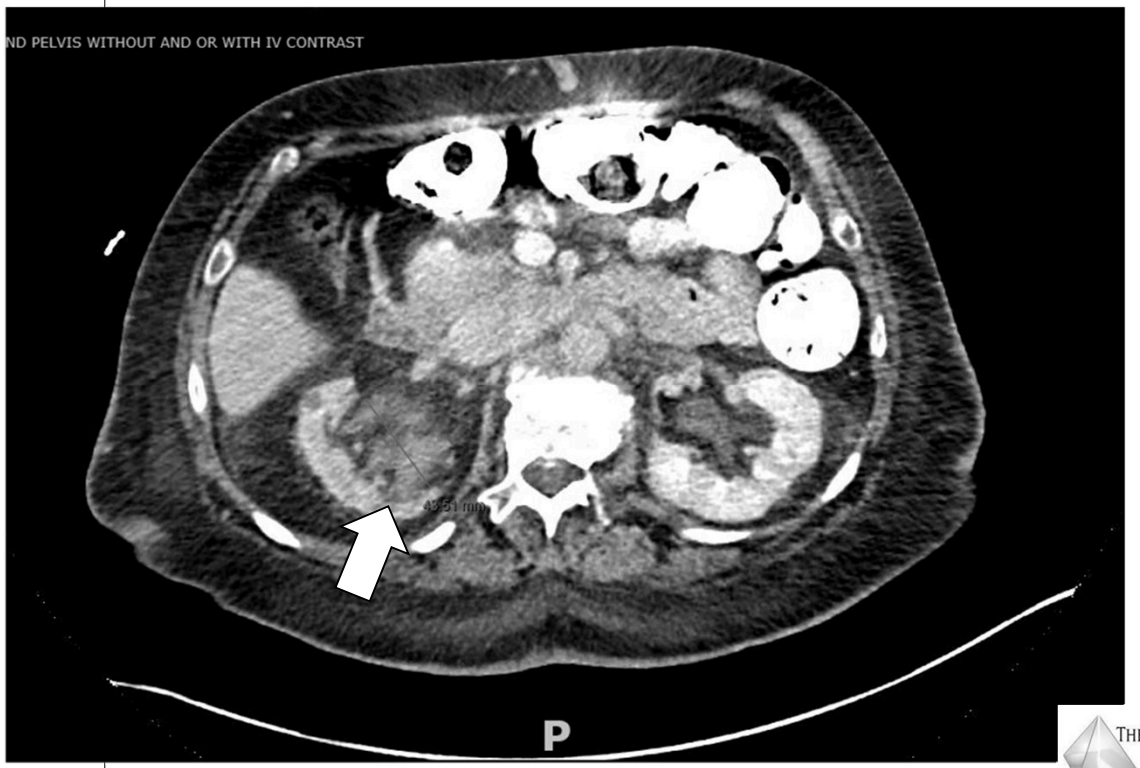


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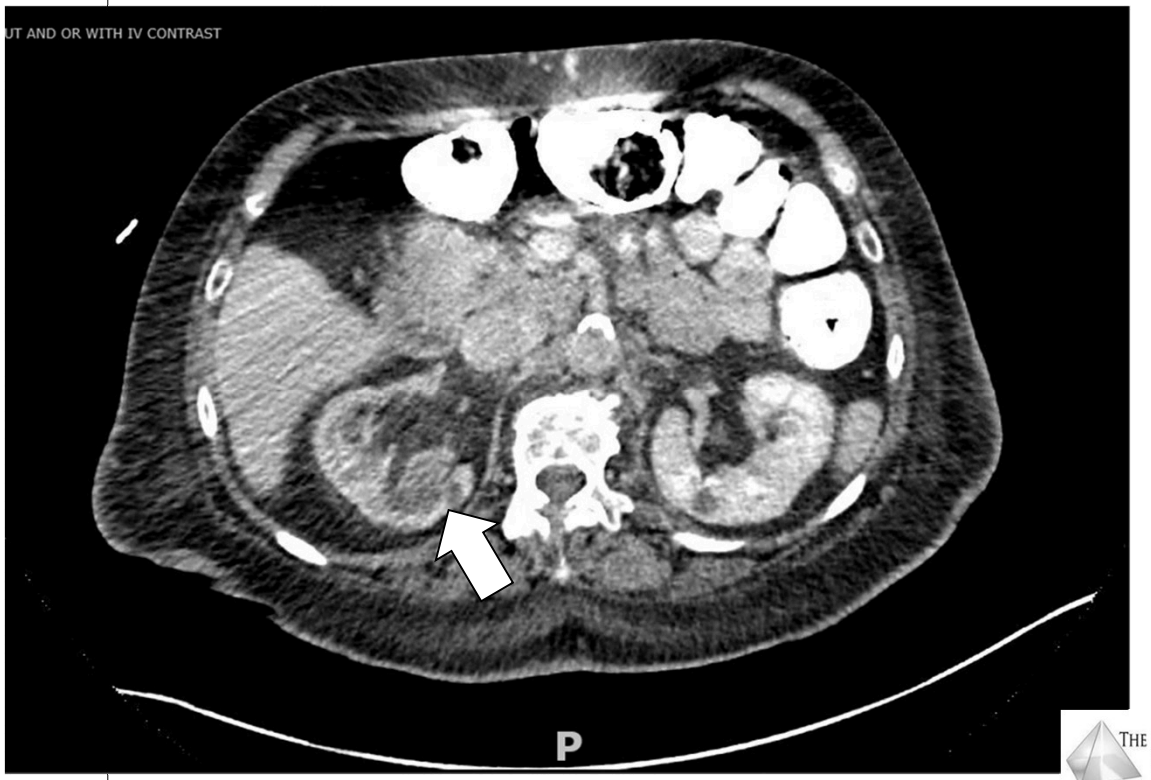


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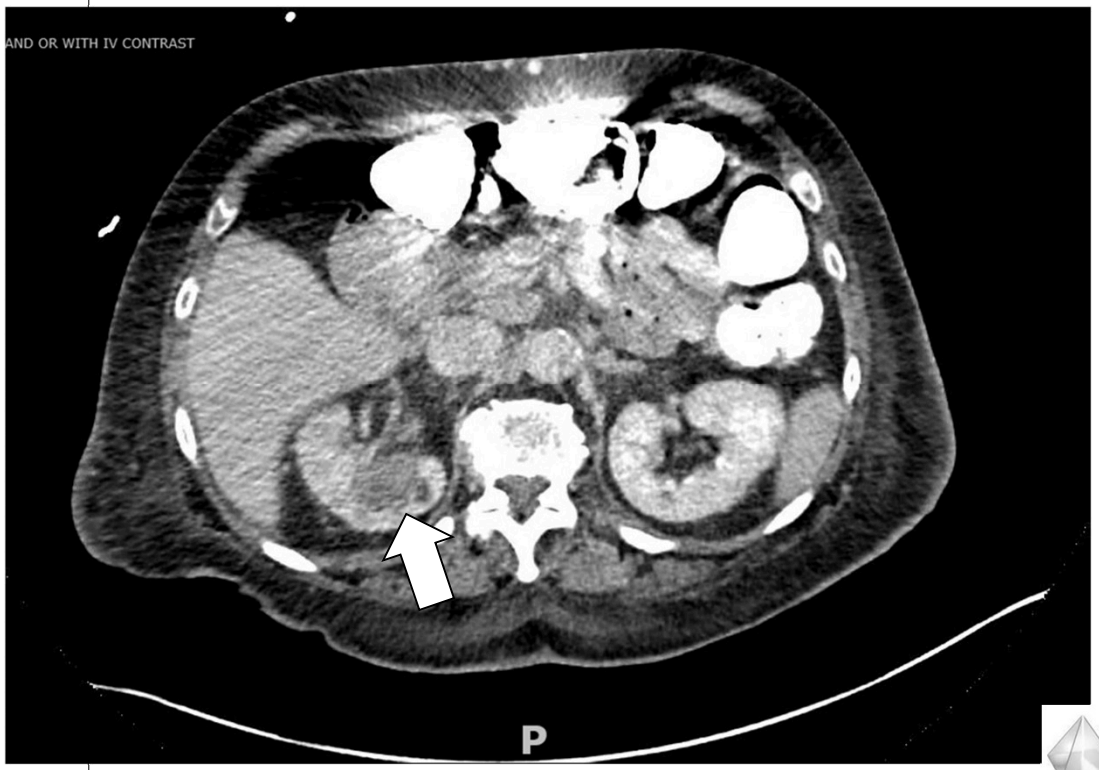


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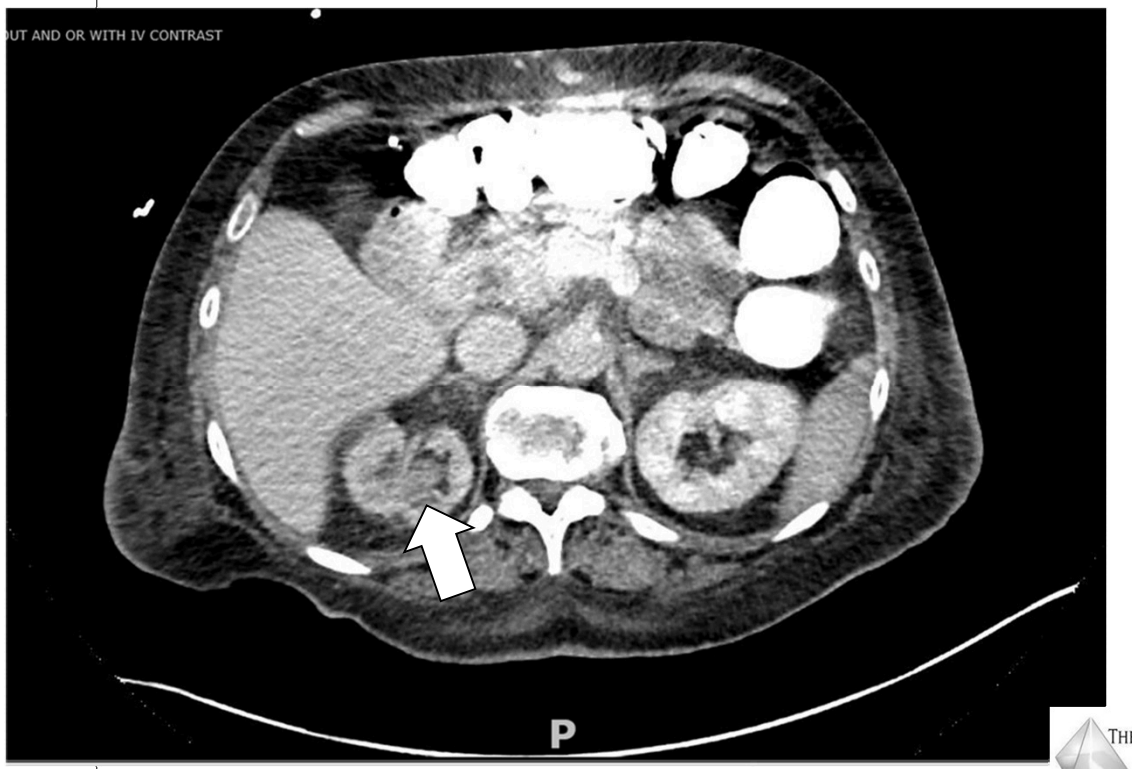


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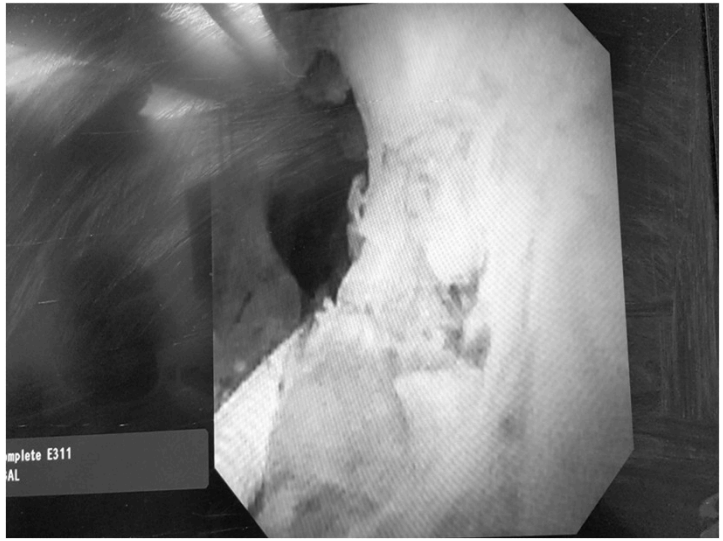


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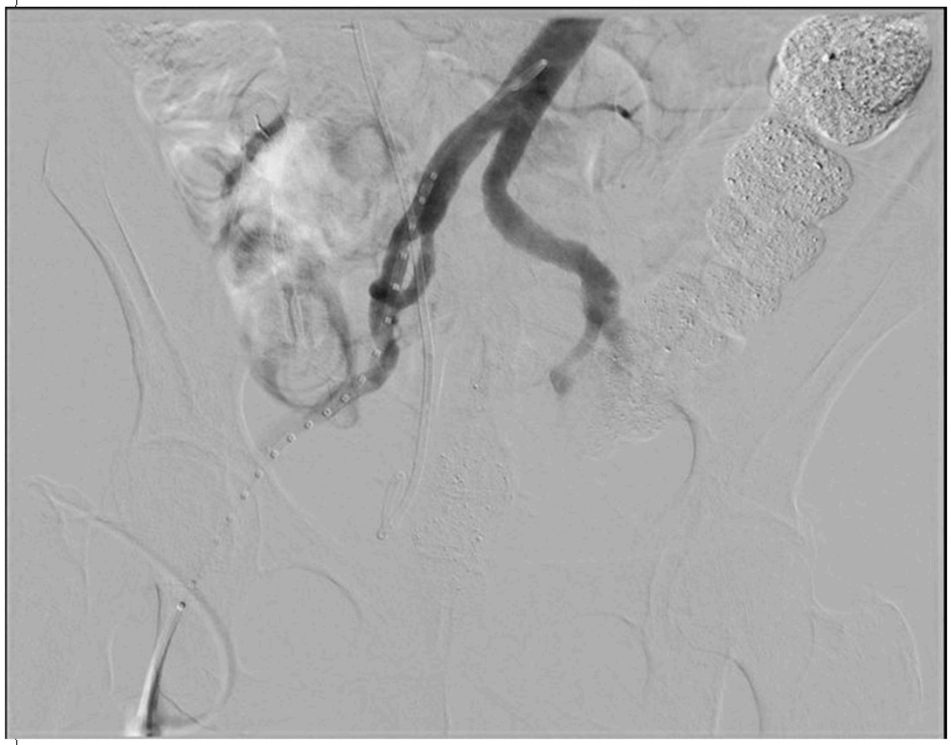

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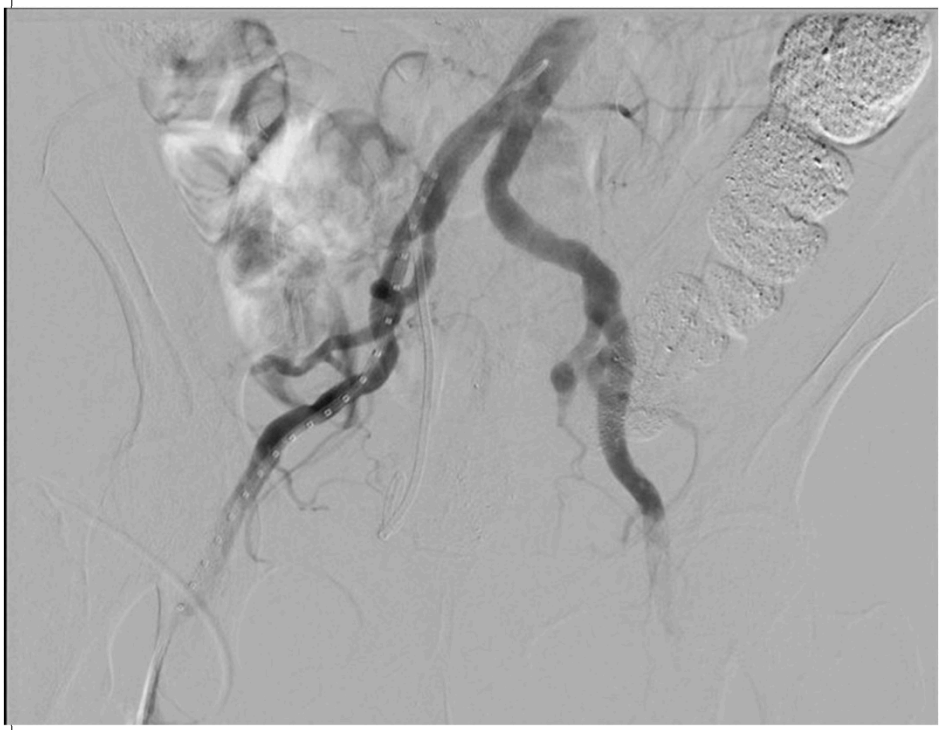

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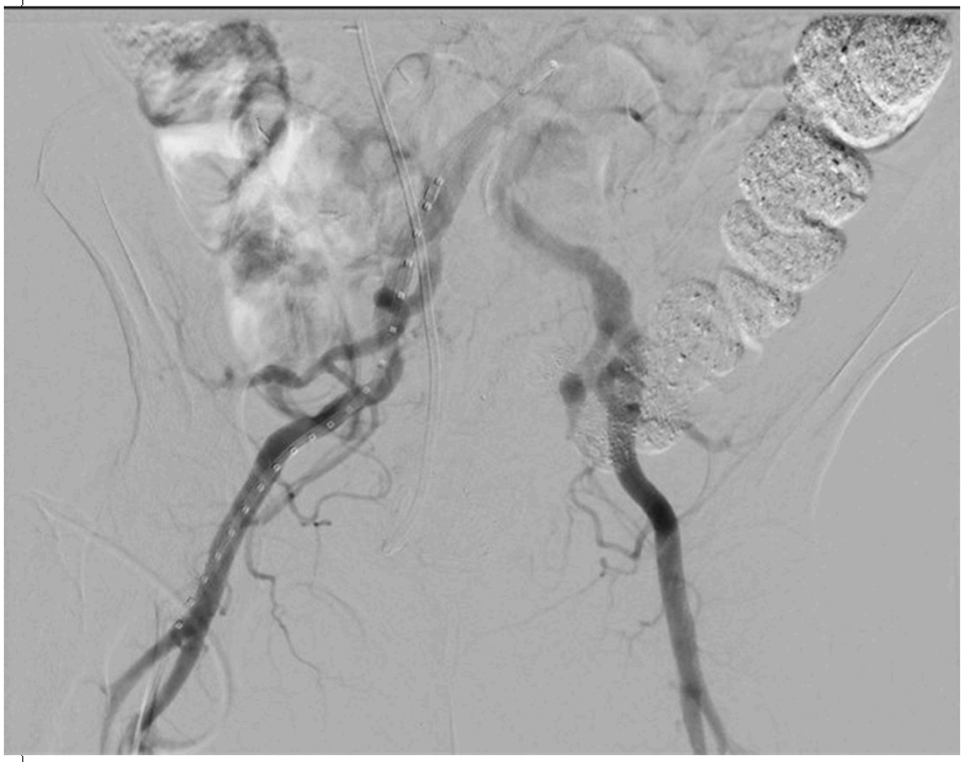

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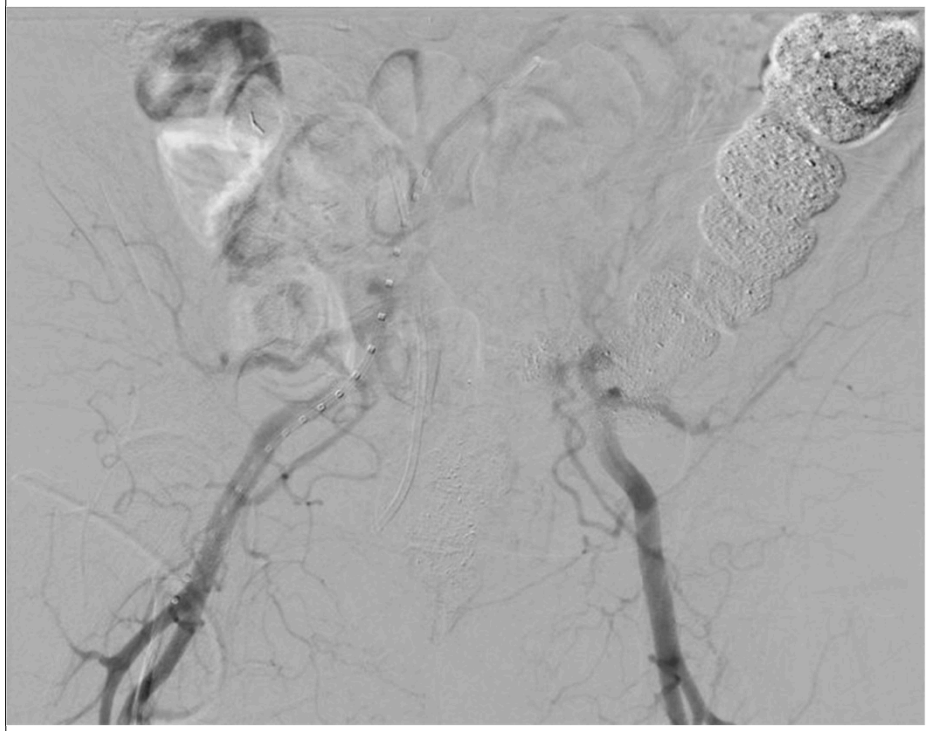

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# Review of Literature

# Review of L

| | Surgical History | Other risk factors | Presenting Symptom | Workup prior to diagnosis | Final diagnostic workup | Outcome |
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| 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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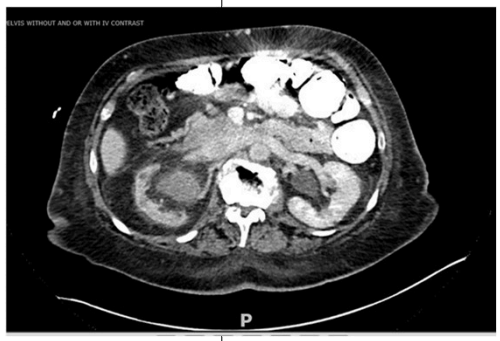


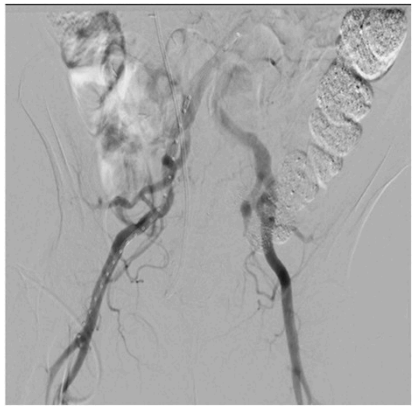

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Fungal ball

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

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# Case Presentation

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

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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



THANKYOU