

Iatrogenic Complications Affecting the Urinary Tract



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Disclosure of Commercial Interest

None

Iatrogenesis

- Greek iatros = healer
- Iatrogenesis - *brought forth by a healer*
- An inadvertent adverse effect or complication resulting from medical treatment

Iatrogenesis

"Iatrogenic" should NOT be construed to mean

- Culpability on the part of the physician
- The illness was necessarily preventable

Iatrogenic Complications Affecting the Urinary Tract

- Iatrogenic injury to the urinary tract, although rare, can result from any form of treatment - medical, surgical, minimally invasive & radiation therapy.
- Awareness of patient's medical and surgical history is vital in leading the radiologist to suspect iatrogenic etiology & guide to appropriate treatment.

Iatrogenic Complications Affecting the Urinary Tract

- Kidney
- Ureters
- Bladder

Iatrogenic Complications Affecting the Kidney

Complications of:

- **Medical treatment**
 - Anticoagulant-related
- **Surgical treatment**
 - Nephron sparing surgery, AAA repair, RPLND
- **Minimally invasive procedures**
 - Endovascular aortic stent, lithotripsy
- **Radiation therapy**
- **Lines and Tubes**

Suburothelial Hemorrhage due to Anticoagulant Treatment

Subepithelial Pelvic Hematoma
(Antopol–Goldman Lesion)

MEDICAL COMPLICATIONS Anticoagulant treatment

- Most common side effect of anticoagulation - bleeding
- Suburothelial space of renal pelvis and ureter - a rare location for bleeding
- Presentation: flank pain and gross hematuria

Gayer G et al. AJR 2011 197:5
Spontaneous suburothelial hemorrhage in coagulopathic patients: CT Diagnosis

Suburothelial pelvic hematoma

Overlapping clinical and radiological similarities with those of upper urinary tract neoplasm (TCC)

Suburothelial pelvic hematoma

- Since the first report (1948):
Nephrectomy > 30 patients
Based on clinical presentation and radiological studies that
"could not rule out a renal neoplasm"

Eccher A., et al. Subepithelial pelvic hematoma (Antopol–Goldman lesion) simulating renal neoplasm: report of a case and review of the literature. *Int J Surg Pathol* 2009; 17:264–7

Suburothelial pelvic hematoma

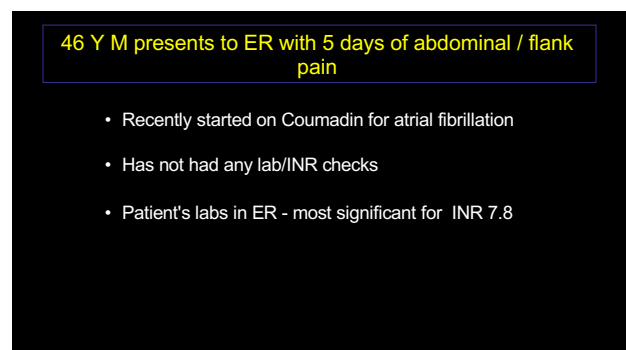
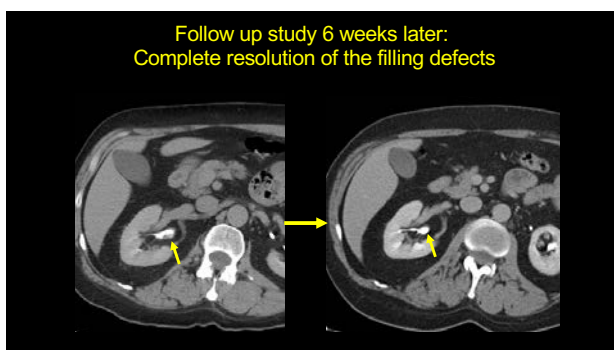
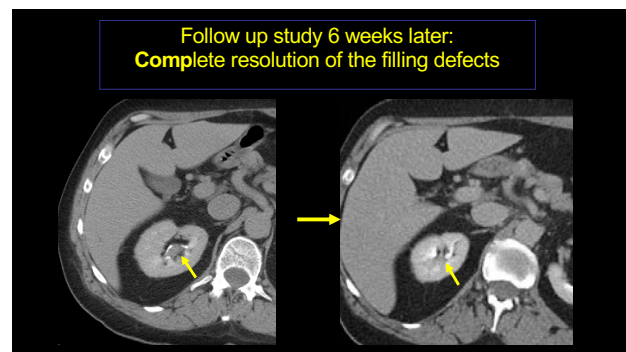
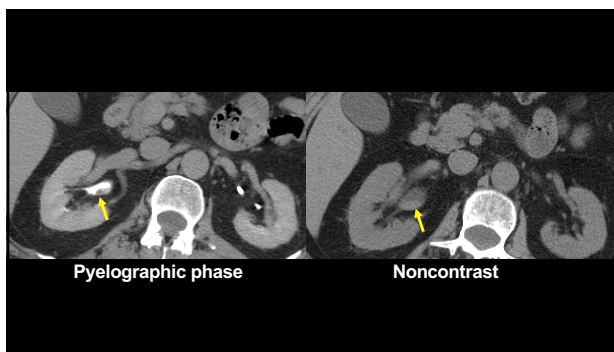
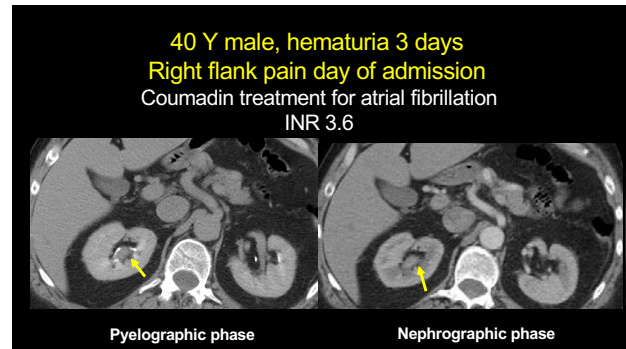
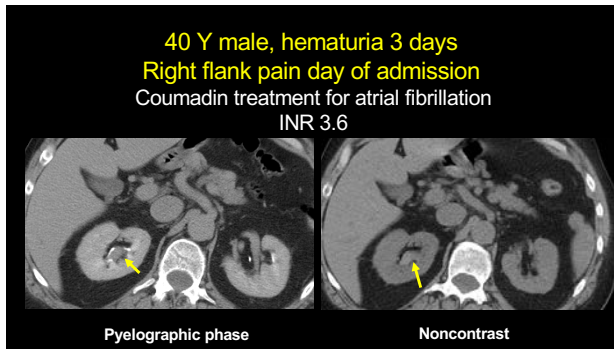
CT:

- Mural thickening and filling defects in renal pelvis, which may mimic TCC
- Suburothelial hemorrhage is best appreciated on **unenhanced images**, when high density of the lesion is most conspicuous.

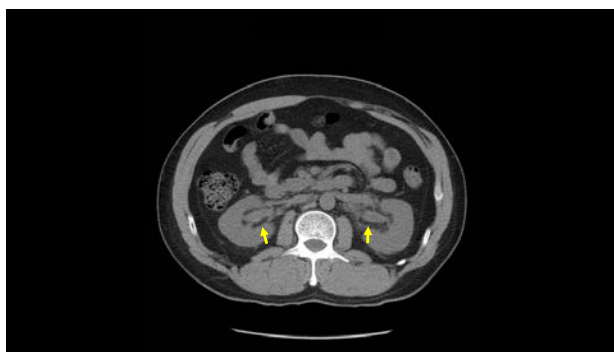
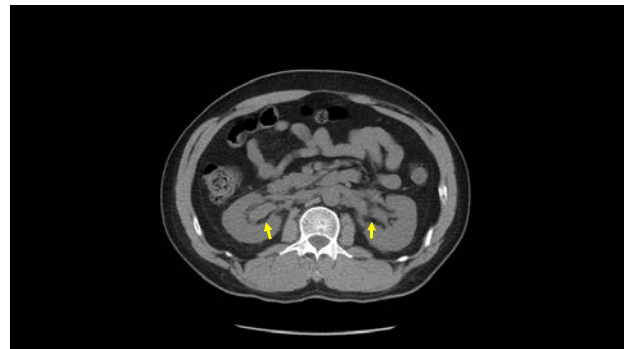
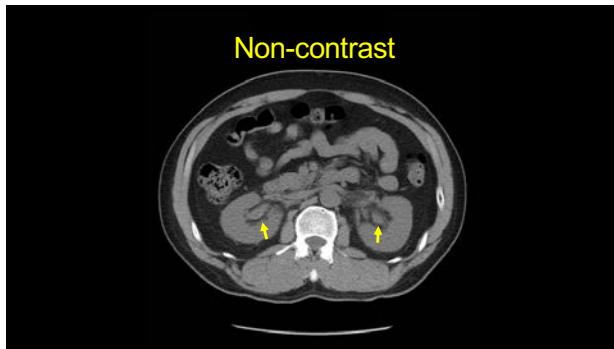
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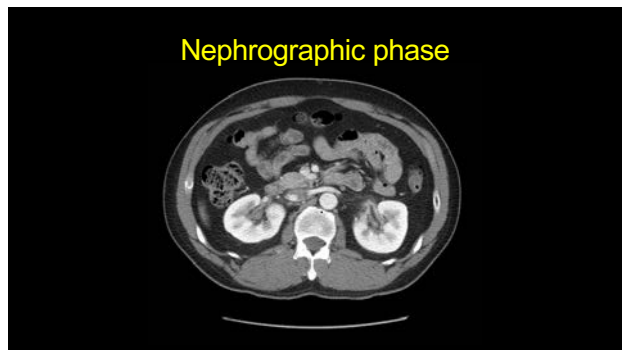
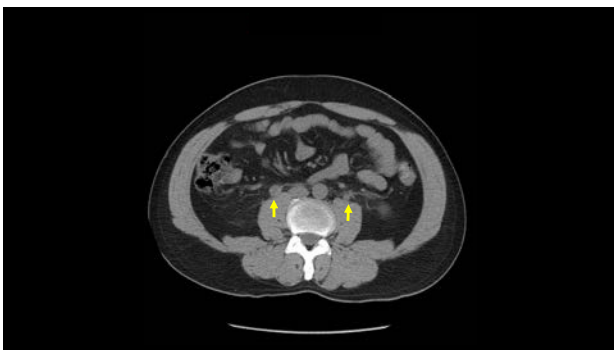
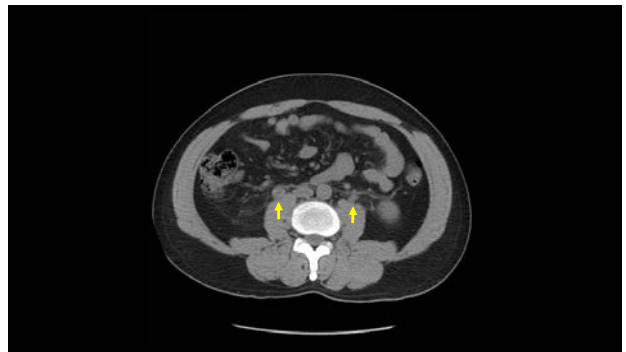
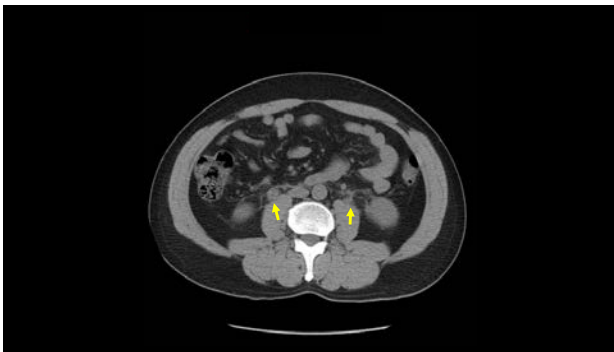
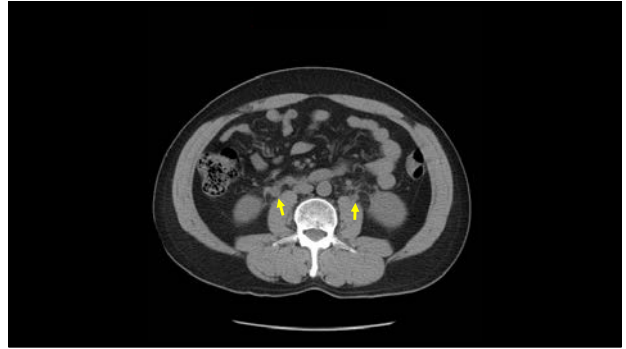


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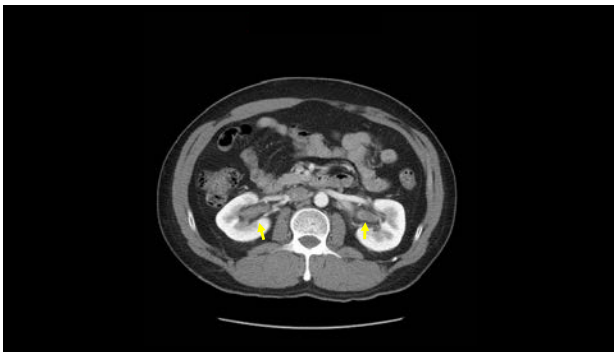
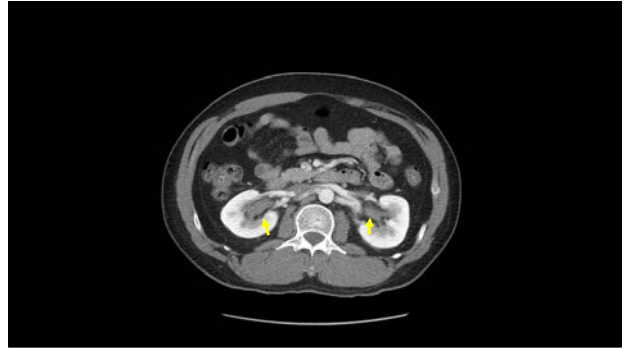
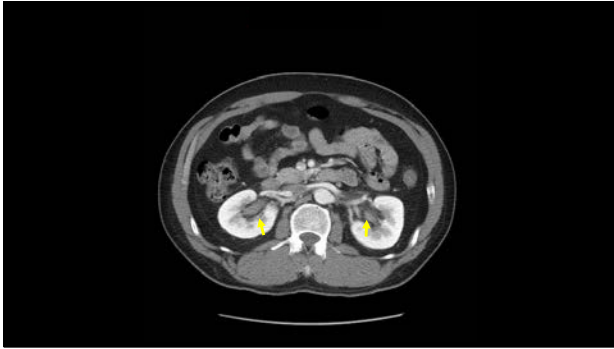


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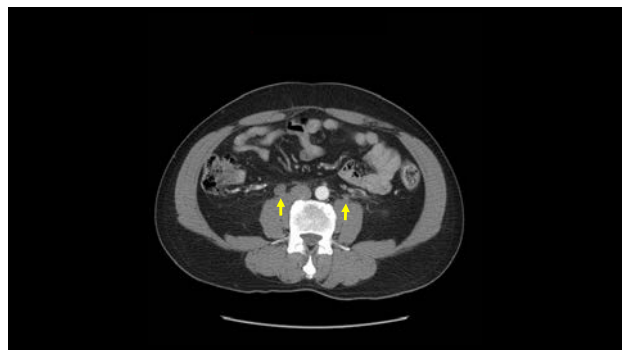
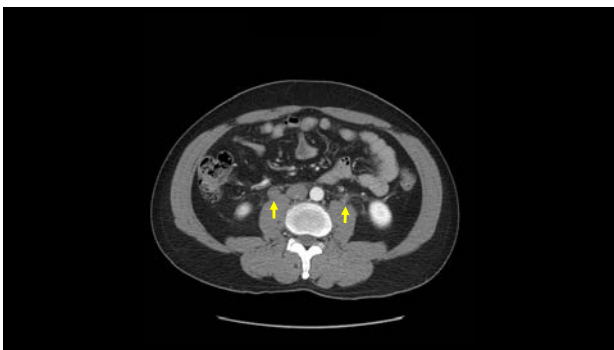
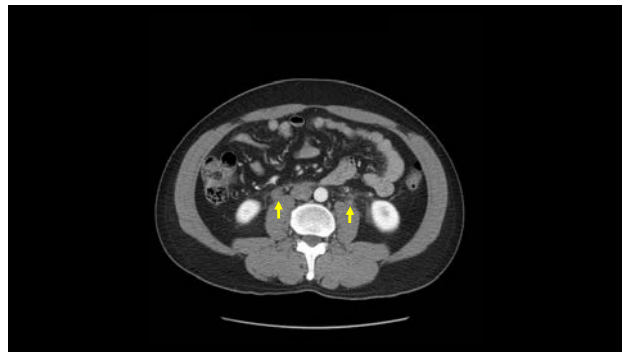
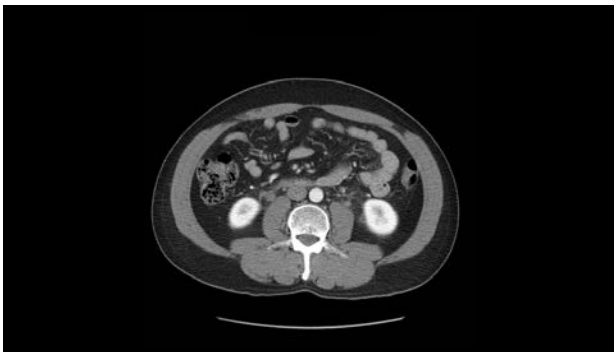
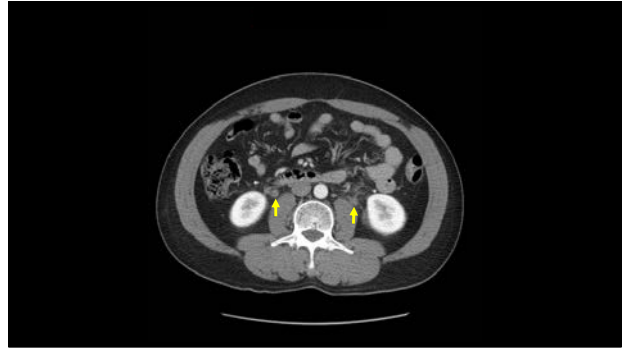
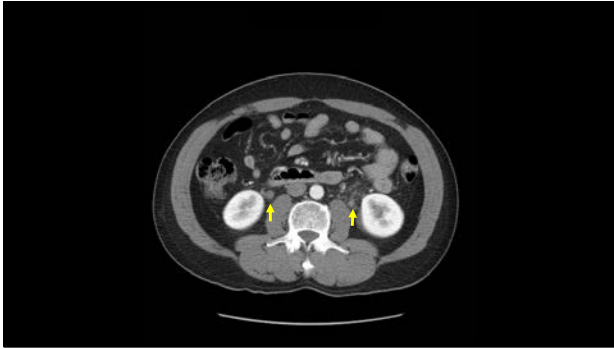
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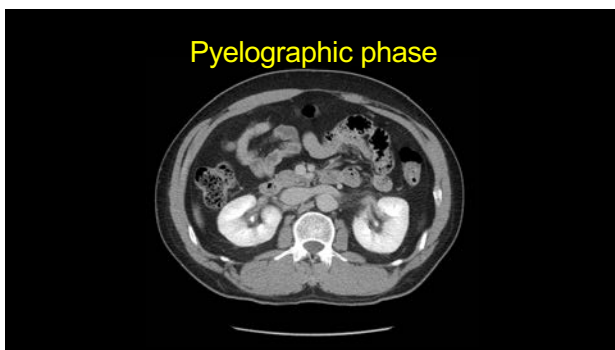
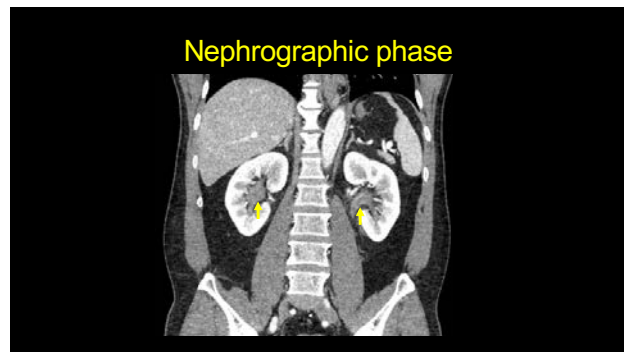
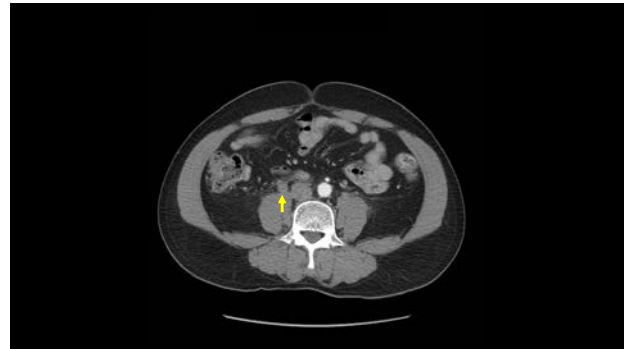
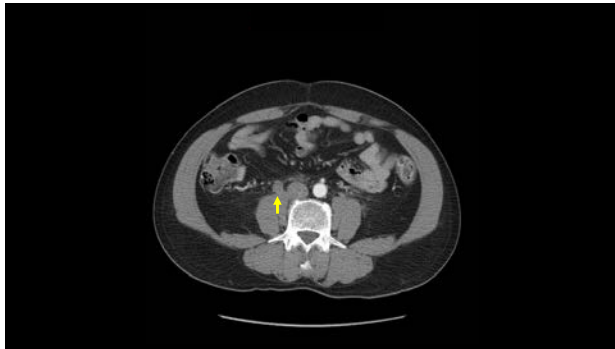


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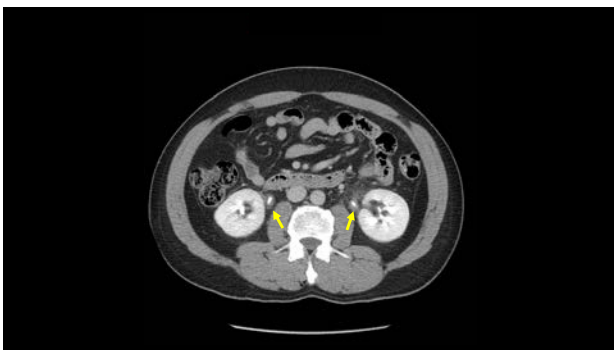
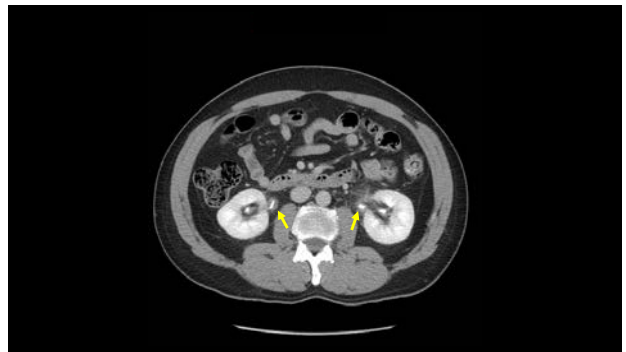


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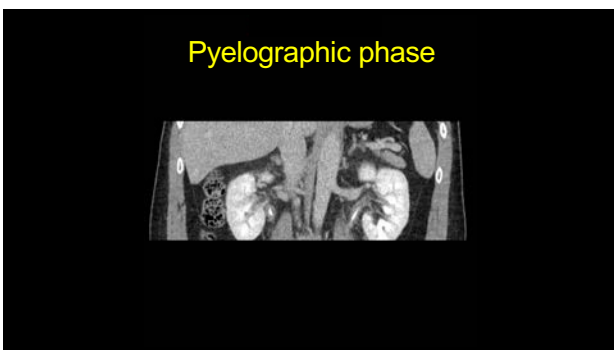


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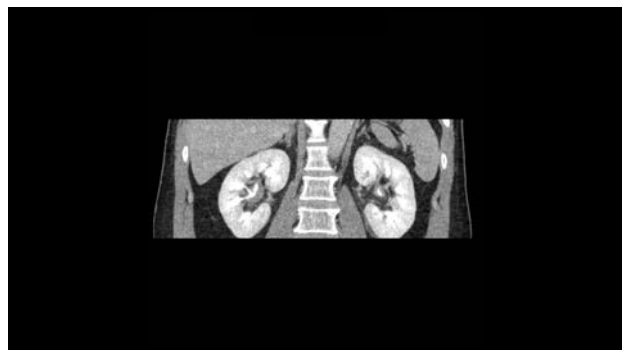
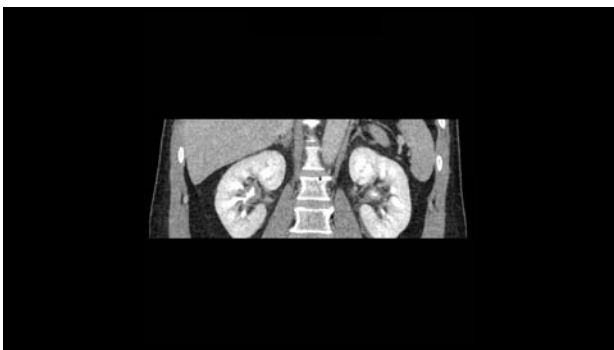
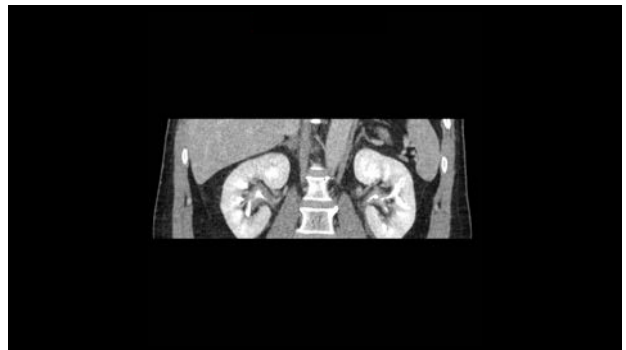
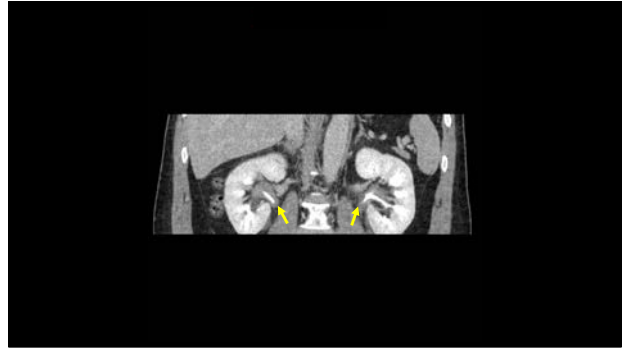
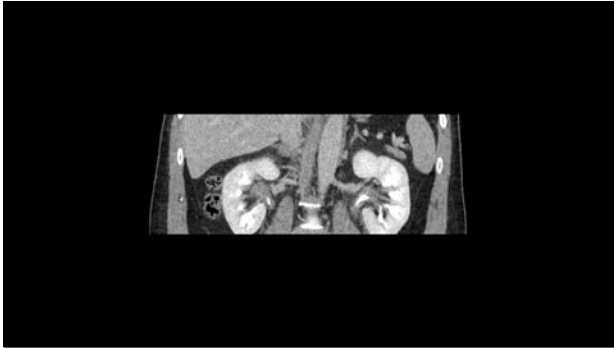
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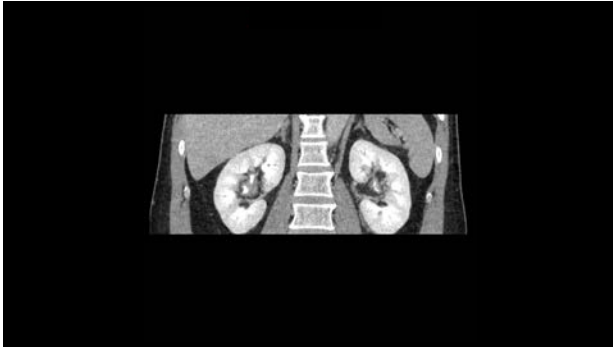
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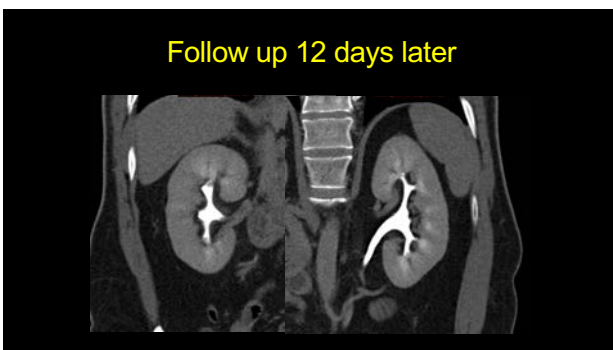
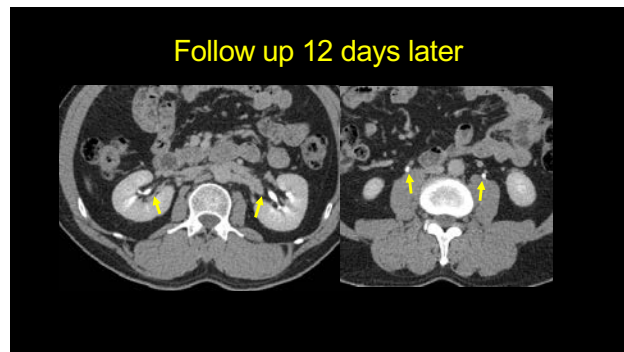
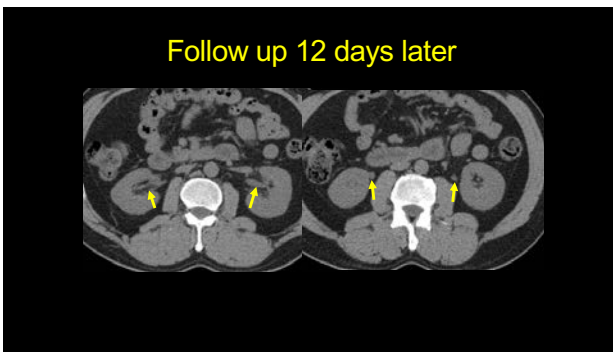
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Next step

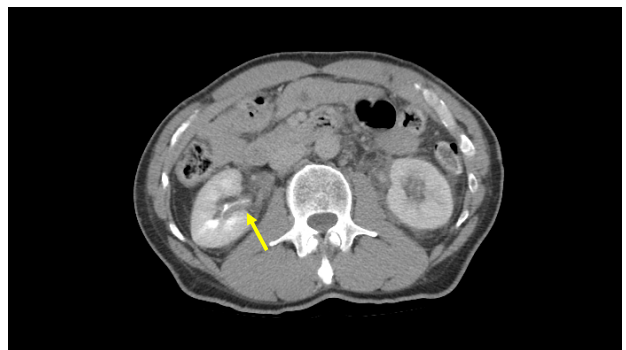
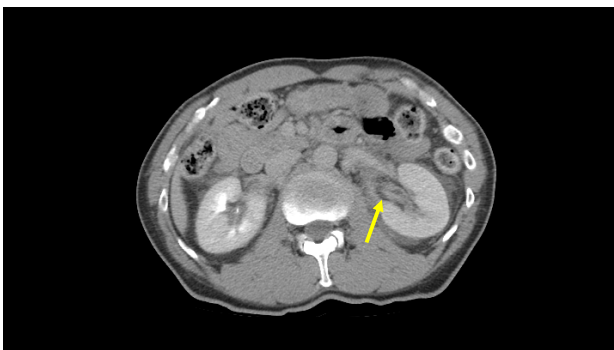
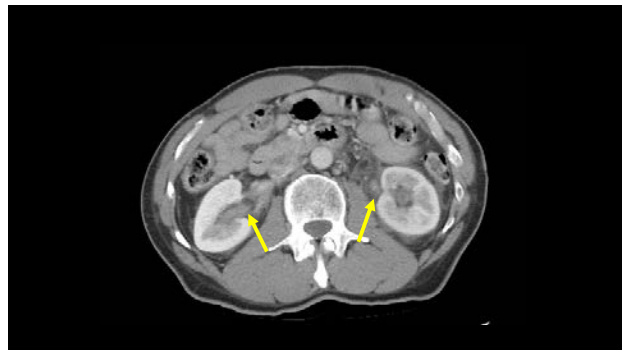
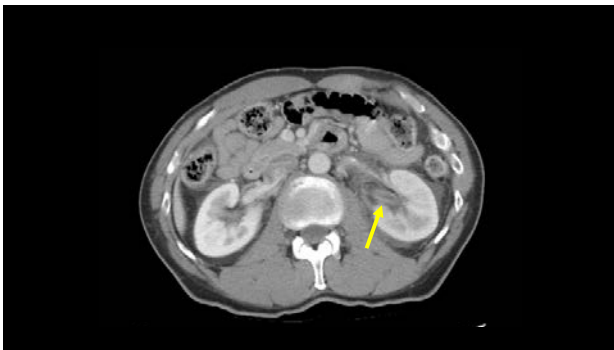
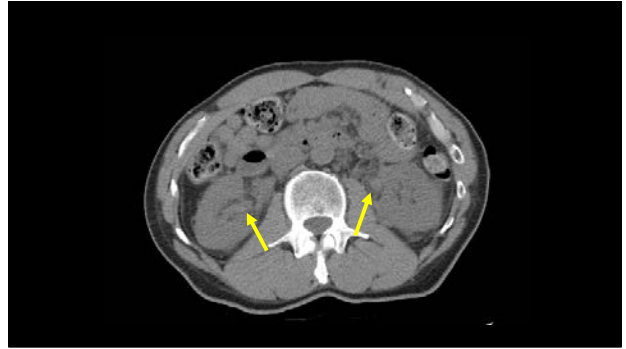
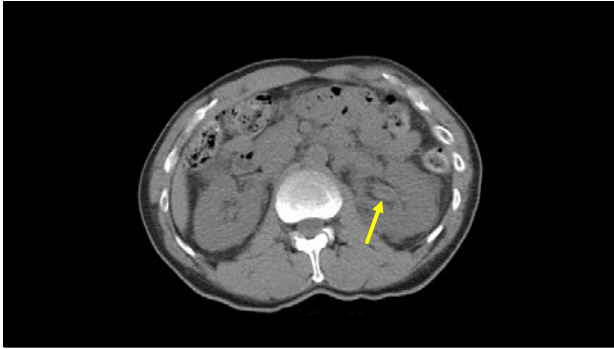
- Withdraw Coumadin, correct coagulopathy
- Follow-up CT: there are no guidelines recommending follow-up CT to document resolution



Gross hematuria, Renal Colic

- 60-y-old man 1 week history of left-sided renal colic and LLQ abdominal pain
- Gross hematuria with passage of brownish urine for several days
- No clots, no frank trauma
- Patient is on Coumadin

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Factor V Leiden heterozygous on Coumadin for DVT and PE prophylaxis

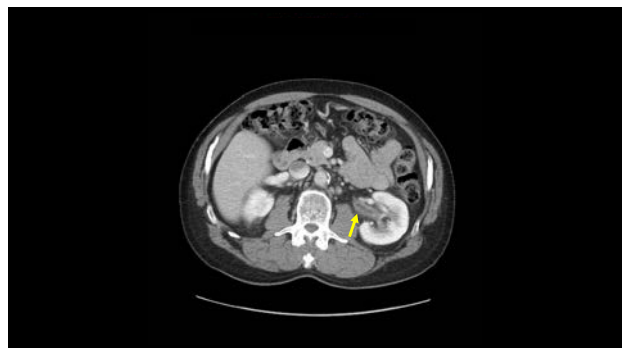
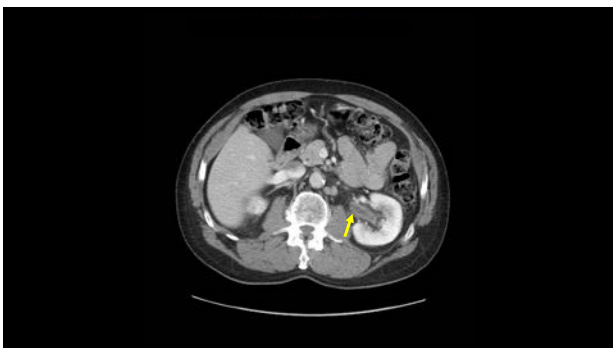
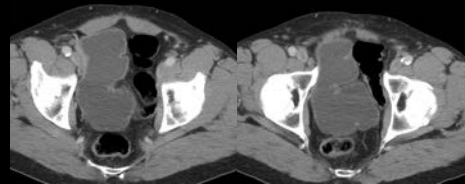
- INR of over 25 =>
- 2.5 after correction with FFP & vitamin K

Bleeding is the major complication of anticoagulant therapy

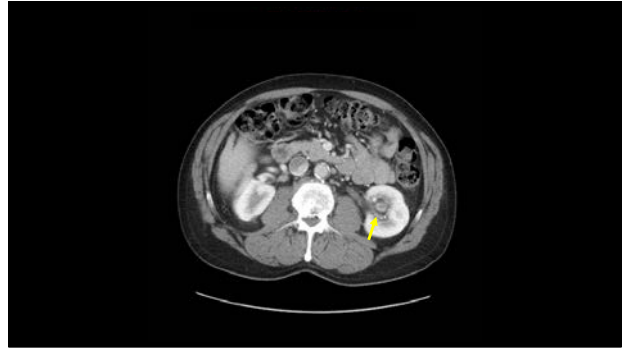
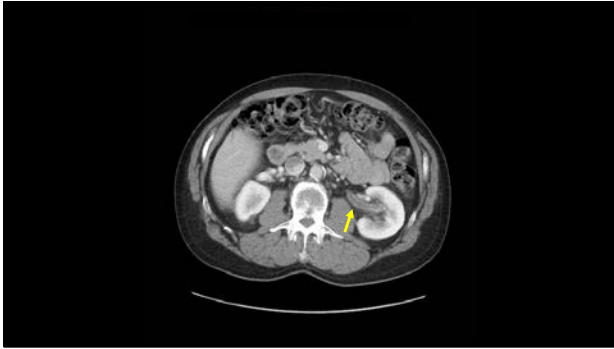
Bleeding is the major complication of anticoagulant therapy

- Consider suburothelial hemorrhage, find out if patient is on anticoagulant treatment
- However, in medicine and in love....

63M history of bladder cancer s/p cystectomy, ileal neobladder



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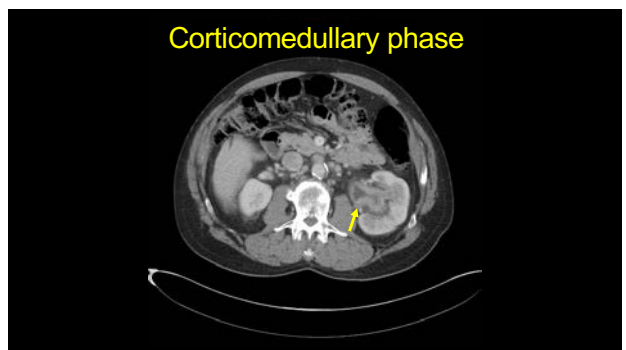




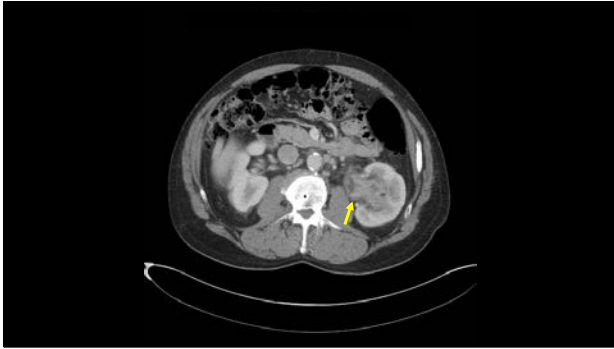
Differential diagnosis

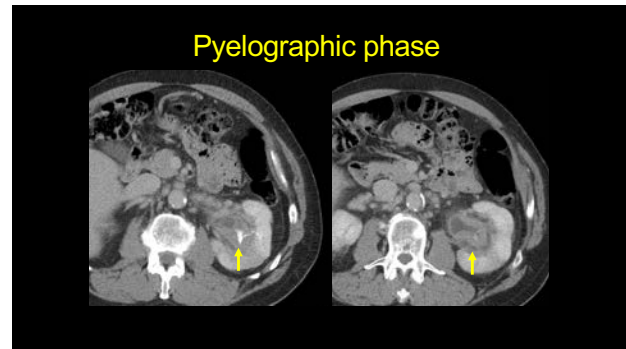
- Hemorrhage?
- Infectious?
- Neoplastic?

6 months later



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Bilateral TCC

MEDICAL COMPLICATIONS

Anticoagulant treatment

- Suburothelial hemorrhage is best appreciated on unenhanced images, when high density of the lesion is most conspicuous!

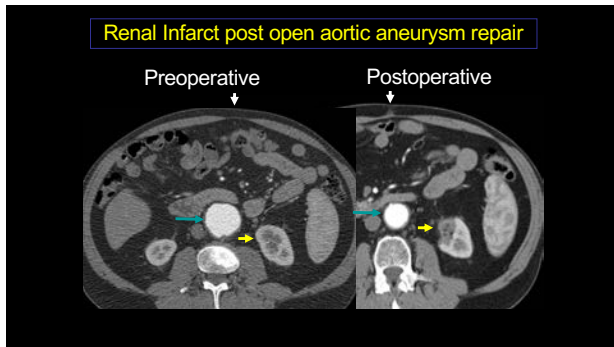
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SURGICAL COMPLICATIONS

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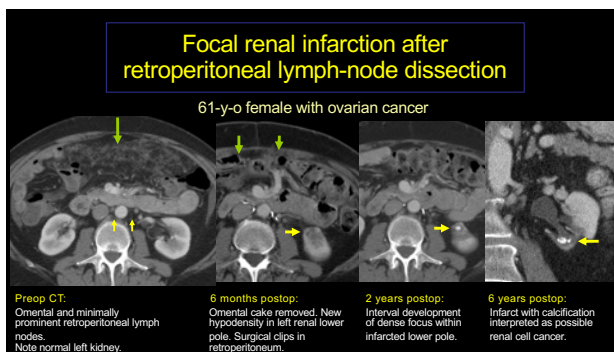
Open Aortic Aneurysm Repair

- The kidneys play a major role in determining outcome after AAA repair
- Post-procedural renal failure up to 10% of patients
- Causes for postoperative renal dysfunction:
 - Renal hypoperfusion due to cross clamping
 - Emboli
 - Ischemia-reperfusion injury
- ~ 2% require dialysis, associated with increased mortality



SURGICAL COMPLICATIONS
Retroperitoneal lymph-node dissection

- RPLND has a diagnostic and therapeutic role in many urologic (most commonly testicular) and gynecologic malignancies.
- Injury to renal vessels (~4%) may result in partial renal infarction.
- Such infarct evolves over the years and may be mistaken for an incidental renal cell cancer.

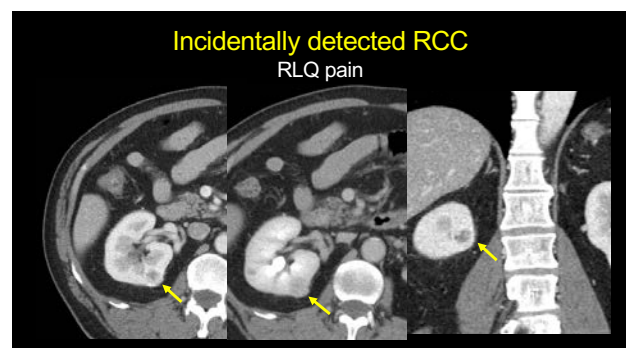


SURGICAL COMPLICATIONS
Nephron-sparing surgery (partial nephrectomy)

- Nephron-sparing surgery is more complex than traditional radical nephrectomy and more frequently results in complications.
- Complications affect vascular and collecting systems.

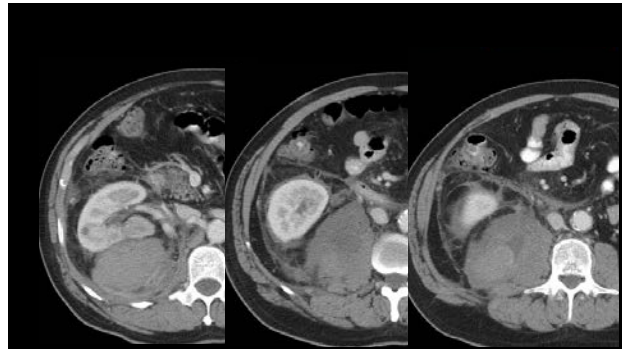
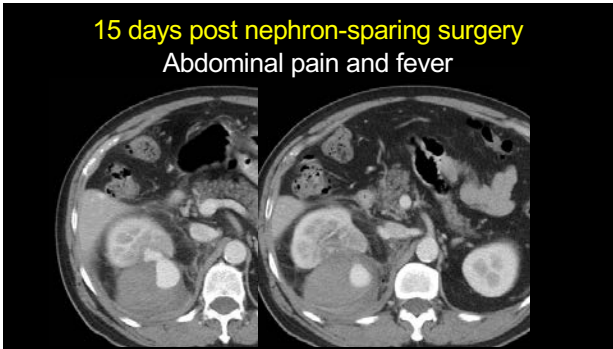
SURGICAL COMPLICATIONS
Nephron-sparing surgery (partial nephrectomy)

- Pseudoaneurysm ~ 2% of partial nephrectomy.
- Presentation: gross hematuria, flank pain.
- Time interval: usually 2-3 weeks after surgery, but may be delayed up to several months.
- Treatment: selective embolization; some cases resolve spontaneously.



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15 days post nephron-sparing surgery
Abdominal pain and fever



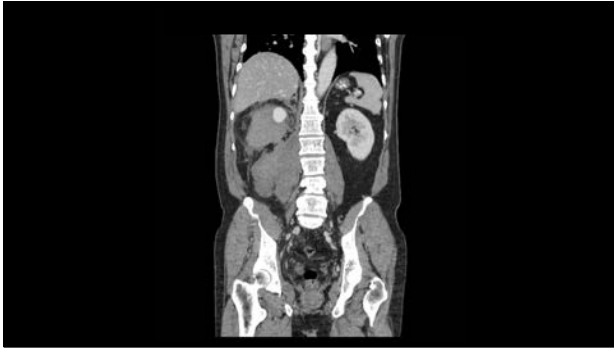
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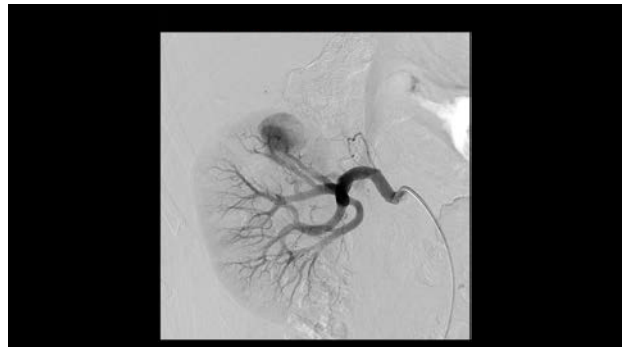
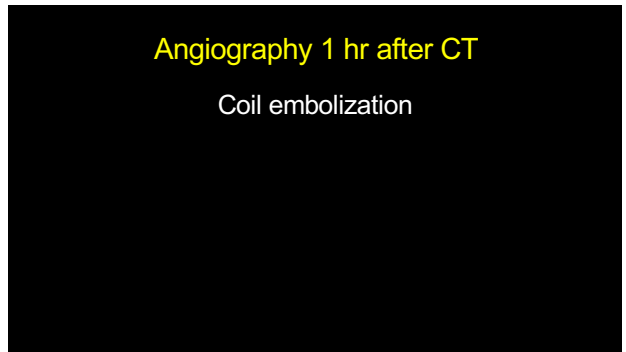
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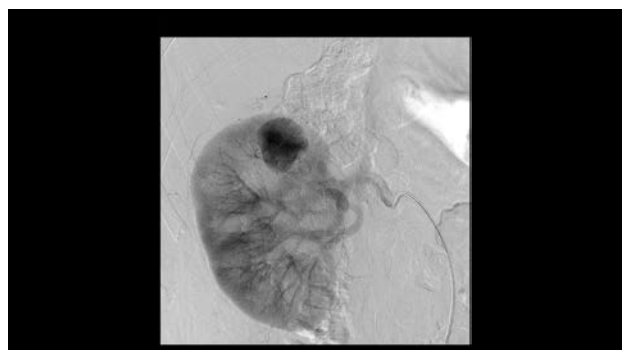
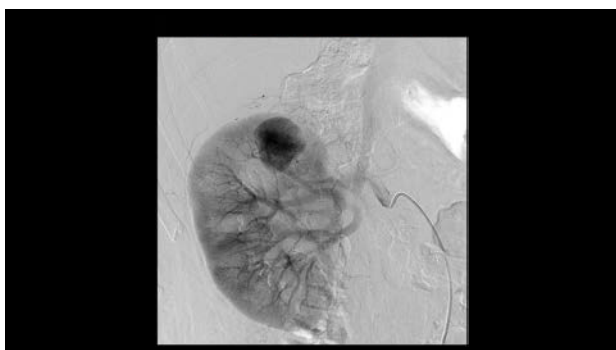
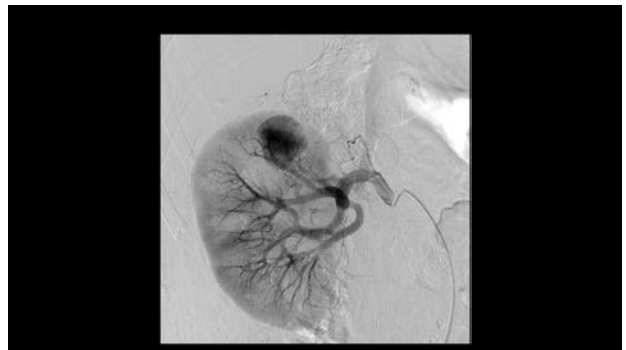
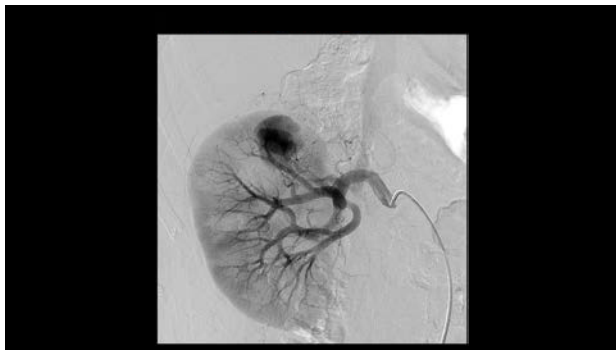
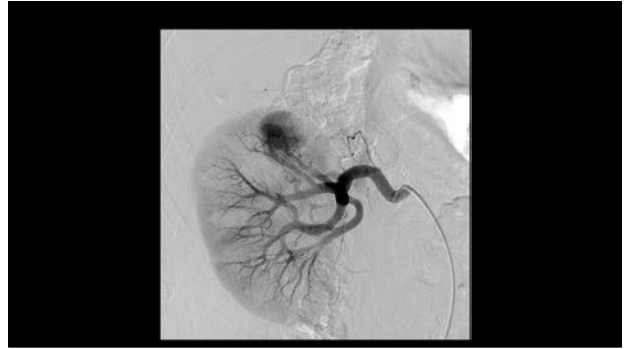
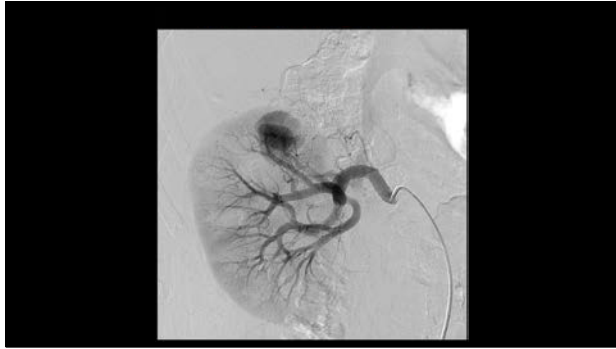
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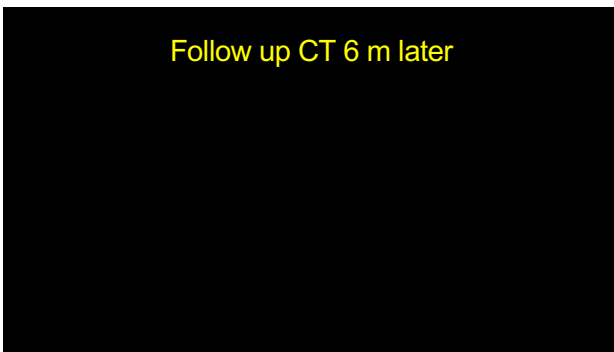
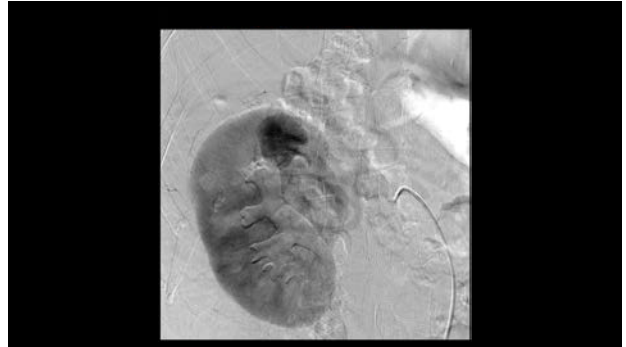
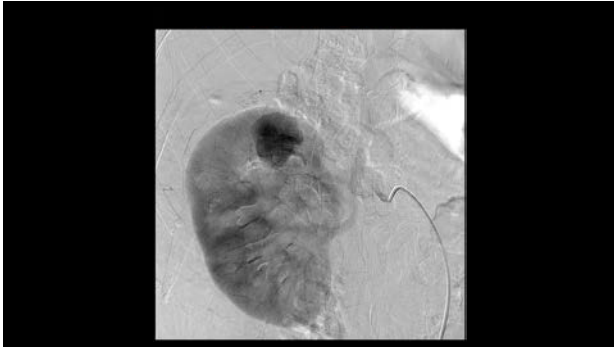
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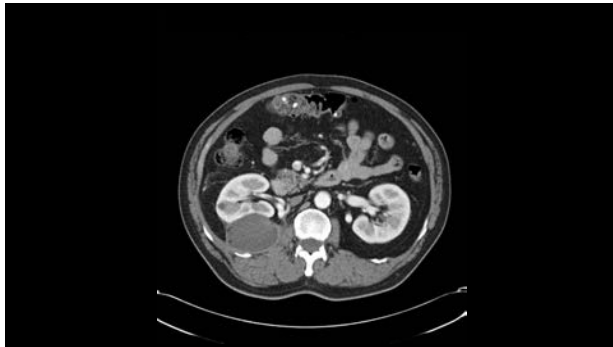
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Renal artery pseudoaneurysm (RAP)

- Best seen on the **arterial phase**: a focal high-attenuation lesion with a density similar to that of the adjacent arterial vessels.
- May be visible in the **nephrographic phase**, but may be missed when adjacent renal parenchyma is densely enhanced, masking the high density of the RAP.
- RAP will not be seen in the **pyelographic phase** due to washout of contrast material from pseudoaneurysm.

MINIMALLY INVASIVE PROCEDURES

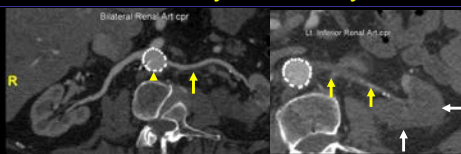
MINIMALLY INVASIVE PROCEDURES Endovascular aortic aneurysm repair

Incidence and clinical consequences

Overall renal infarction rate - 12%

- 3.5% limited, segmental infarction - intentional covering of accessory renal arteries
- 8.5% unintentional infarction- occlusion of undiagnosed accessory renal arteries
- Incidence higher:
 - suprarenal fixation > infrarenal
 - modular grafts > unibody
- ~3% unilateral kidney loss

Partial renal infarct due to stenting AAA over accessory renal artery



Curved planar reformat:
Patent left superior renal artery.
Note stent in aorta.

Curved planar reformat:
Occluded left inferior renal artery
and associated lower pole infarct.

MINIMALLY INVASIVE PROCEDURES

Treatment of renal and ureteral stones



MINIMALLY INVASIVE PROCEDURES

Treatment of renal and ureteral stones

- Extracorporeal shock wave lithotripsy (ESWL)
- Ureteroscopy

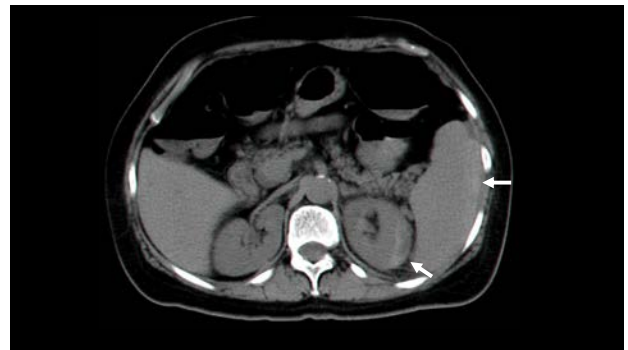
Widely used in the treatment of symptomatic renal and ureteral stones

MINIMALLY INVASIVE PROCEDURES

Treatment of renal and ureteral stones

- ESWL is less invasive than ureteroscopy, but has some limitations: high retreatment rate, availability
- Potential renal and urinary tract complications:
 - Incomplete stone fragmentation => ureteral obstruction
 - Renal parenchymal injury

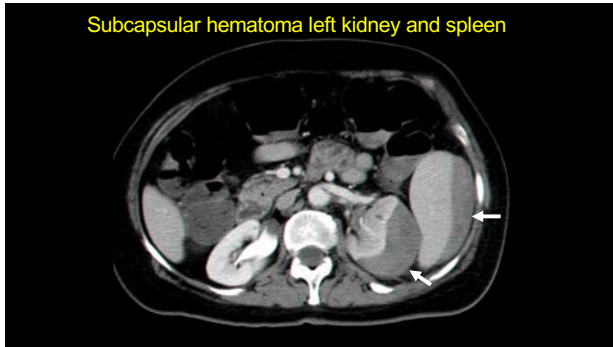
A 60-y-old woman
presented with left flank pain
and decline in hemoglobin level
2 days after ESWL



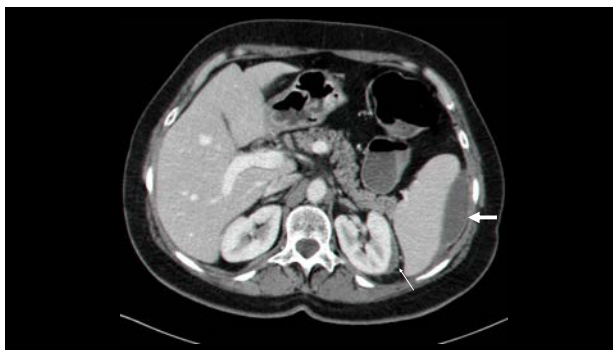
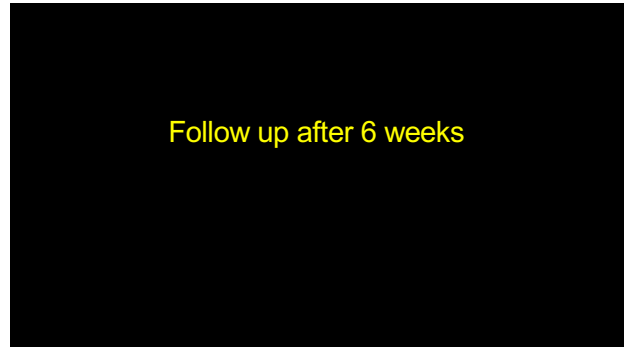
Iatrogenic Complications Affecting the Urinary Tract

Gabriela Gayer, MD

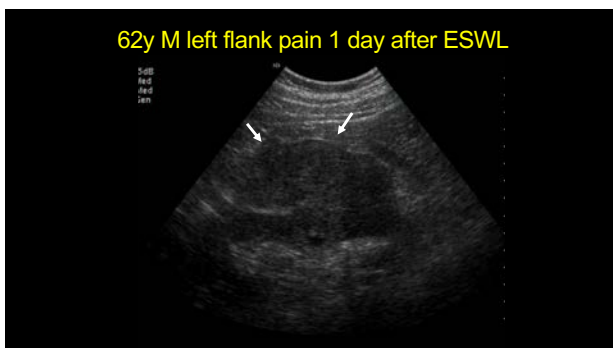
Subcapsular hematoma left kidney and spleen



Follow up after 6 weeks



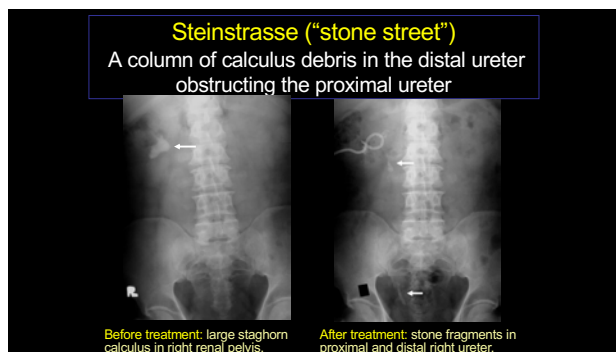
62y M left flank pain 1 day after ESWL





Complications related to stone fragments

- Much of the morbidity associated with ESWL results from stone fragments failing to pass out of the ureter after lithotripsy
- Steinstrasse ("stone street"):
Stone fragments in the distal ureter, forming a column of calculus debris in the mid and distal portions of the ureter and obstructing the proximal ureter



Radiation Injury

Radiation Injury

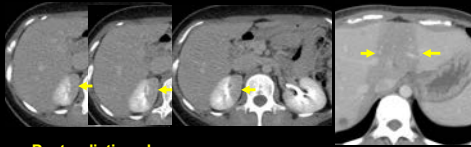
- In acute radiation nephritis, kidney remains normal in size and shape, but glomerular damage is present histologically
- Radiological changes appear months to years after treatment resulting in atrophic poorly functioning kidneys

Radiation Injury

- If only a portion of kidney is irradiated, only that portion is affected
- Compensatory hypertrophy of contralateral kidney can develop
- Malignant hypertension may develop 1–10 y later due to renin overproduction, requiring nephrectomy relief

Renal radiation injury

23 F Nasopharyngeal Ca with sternal metastasis
treated with radiation to sternum



Post radiation changes:

Well-defined hypodense area mimicking
• Renal infarct
• Pyelonephritis

Irradiated liver (same patient) is
hypodense with well-defined
linear margins conforming to
radiation portals

Iatrogenic Complications Affecting the Ureters

Iatrogenic Complications Affecting the Ureters

Result from:

- Instrumentation –
ureteroscopy, stent insertion
- Abdominopelvic surgery

Iatrogenic ureteral injury

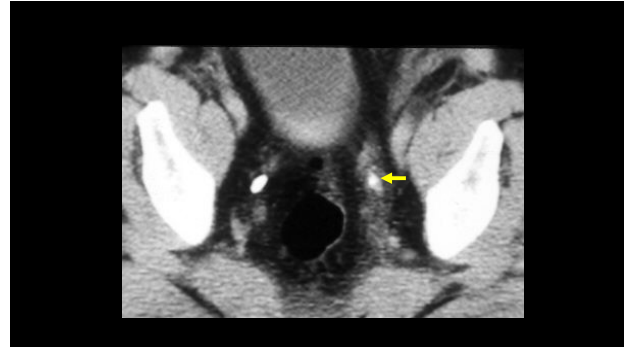
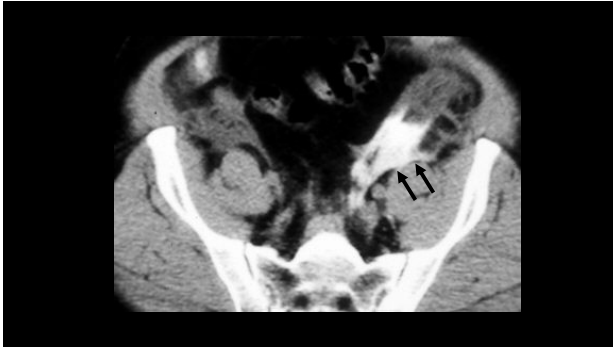
- Information regarding recent instrumentation is critical for the radiologist in order to consider ureteral injury
- Tailor the CT exam – delayed phase

Severe abdominal pain 24 h after ureteroscopy
for stone removal from left ureter



Additional delayed scan



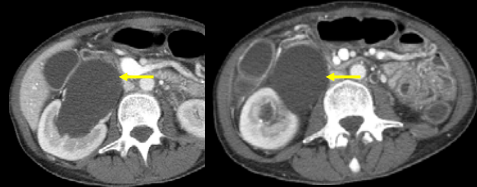


Ureteral injury

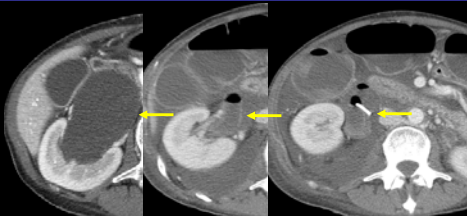
- Urine does not necessarily accumulate only adjacent to injured segment
- Urine dissects through fascial planes

Ureteral injury by ureteral stent

42-y-old woman acute leukemia
Graft-versus-host disease

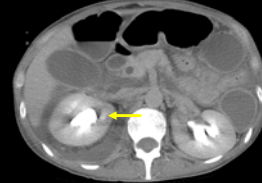


After insertion of ureter stent



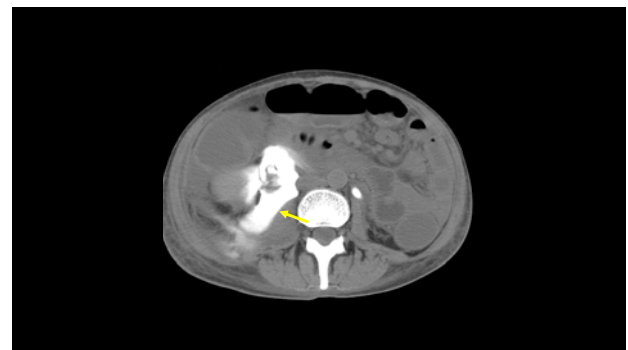
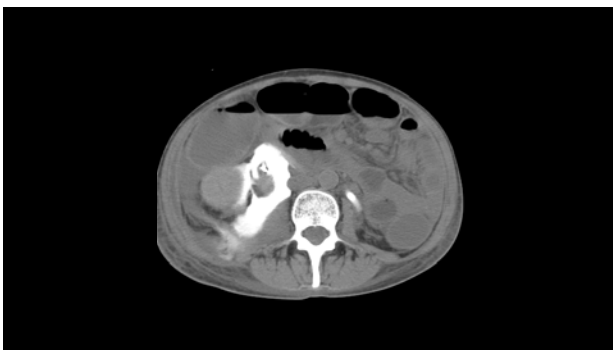
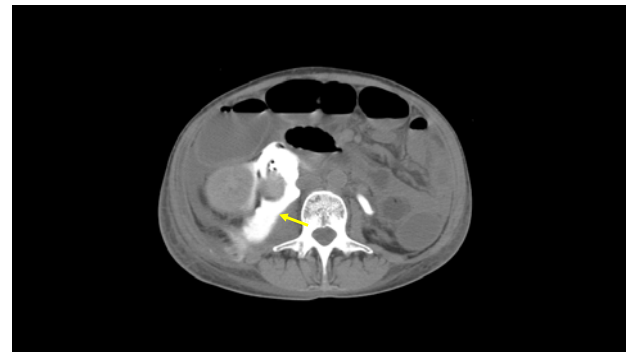
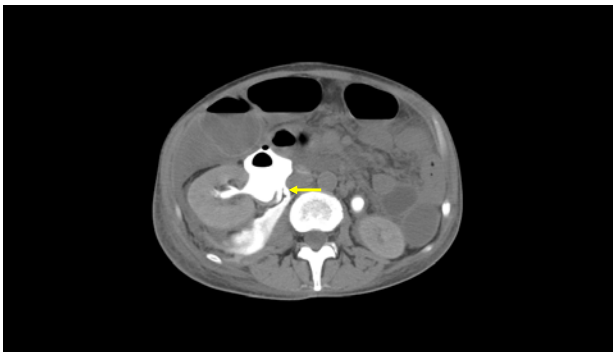
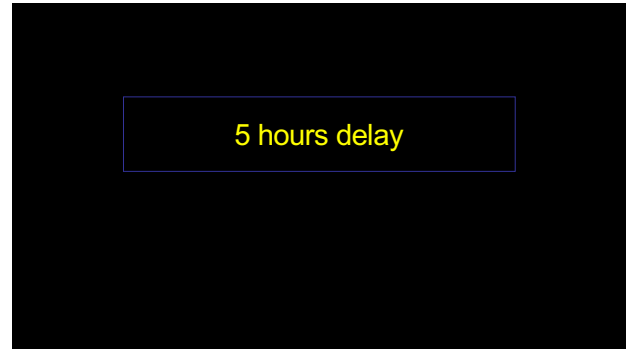
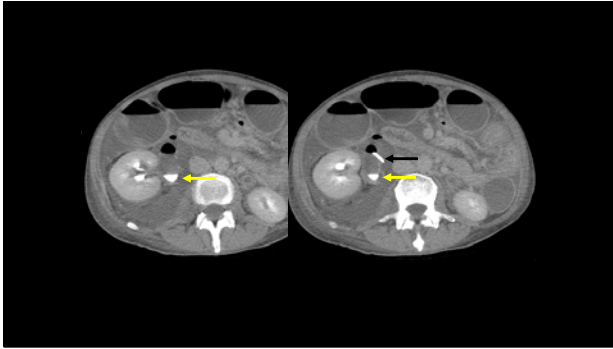
Decompression of collecting system
New free fluid perinephric space

Pyelographic phase (5 minutes)

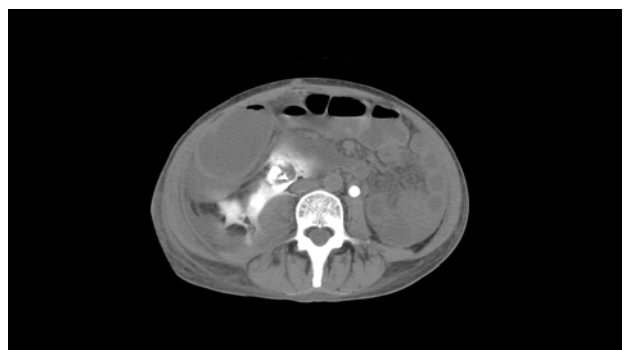
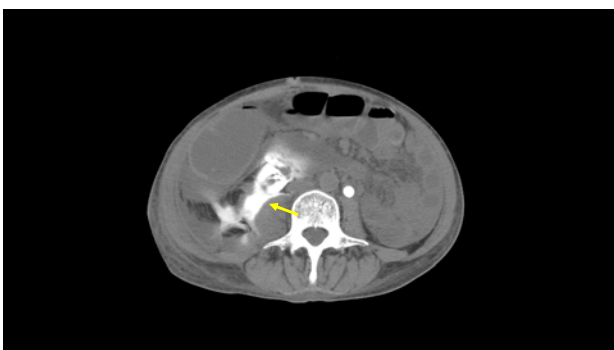
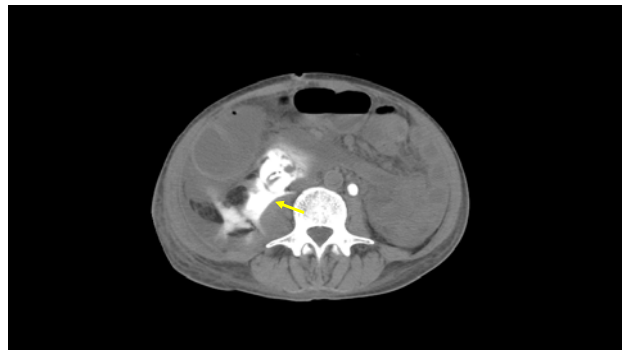
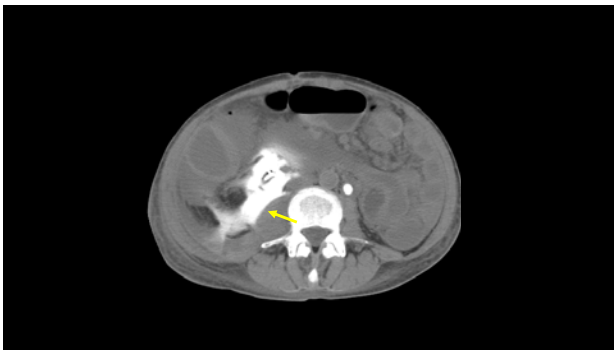
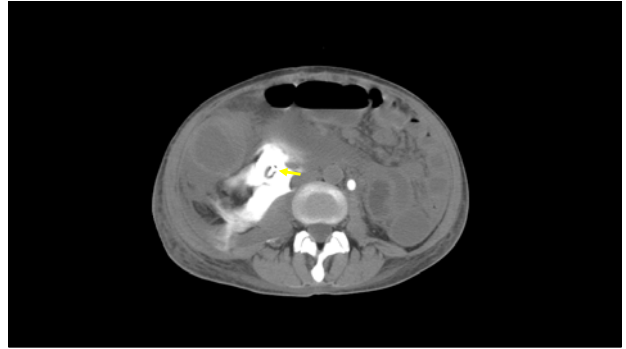
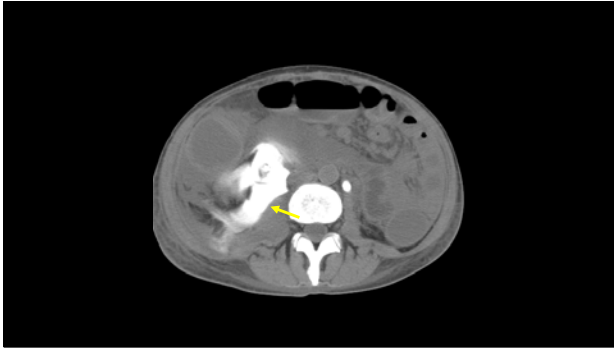


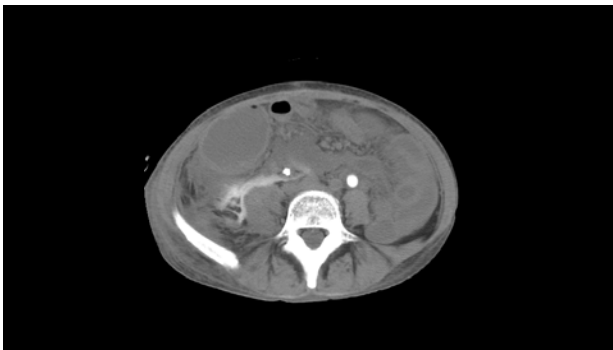
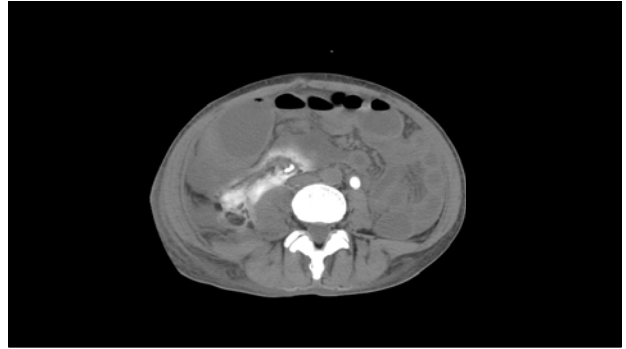
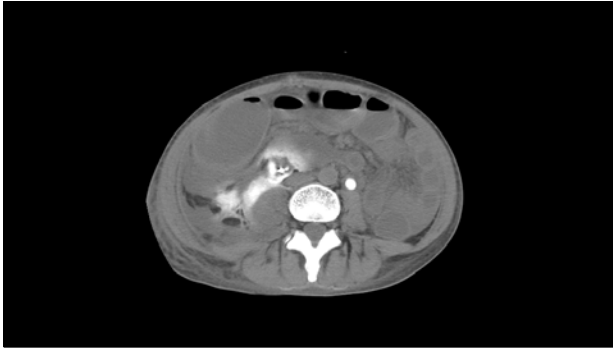
Iatrogenic Complications Affecting the Urinary Tract

Gabriela Gayer, MD



Iatrogenic Complications Affecting the Urinary Tract
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Iatrogenic Complications Affecting the Ureters

Result from:

- Instrumentation – ureteroscopy, stent insertion
- Abdominopelvic surgery

Iatrogenic ureteral injury

Potential complication of any abdominopelvic surgery

Occurs in 0.1% - 1.5% of abdominopelvic surgeries

- Gynecologic > 50%
- Urologic
- Colorectal
- Vascular
- Spinal

Iatrogenic ureteral injury

Only 50% of ureteral injuries recognized and repaired during the primary operation

Ureteral injury - symptoms

- Non-specific symptoms:
 - flank pain, prolonged ileus, fever, watery vaginal discharge
- Ureteral injury is rarely suspected
- Dx made with great delay: weeks-months

Ureteral injury

Often associated with significant morbidity

- Potential loss of kidney function
- Ureterovaginal fistulas

Ureteral injury - the role of CT

CT is usually performed to evaluate patient's nonspecific symptoms

When to suspect ureteral injury

Information regarding recent surgery is critical for the radiologist in order to:

- Consider ureteral injury
- Tailor the CT exam – delayed phase

Ureteral injuries caused by surgery

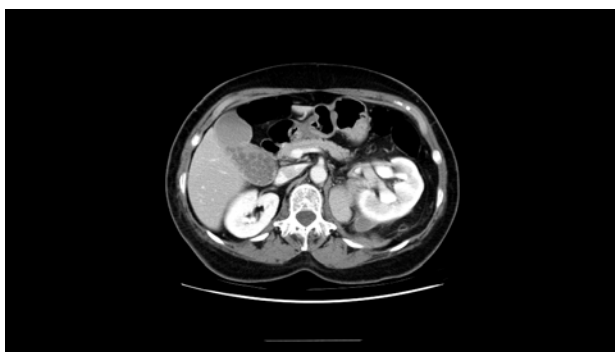
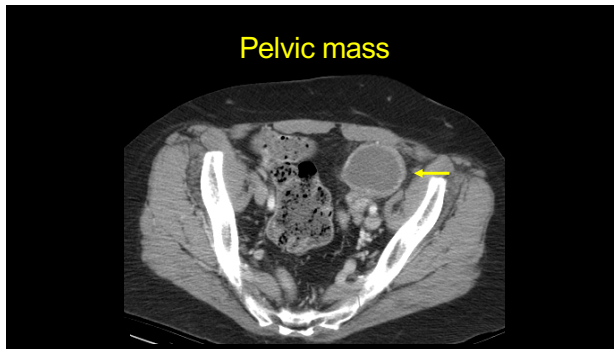
Types of Injury – in descending order of frequency –

- Ligation
- Partial laceration
- Crush and loss of blood supply

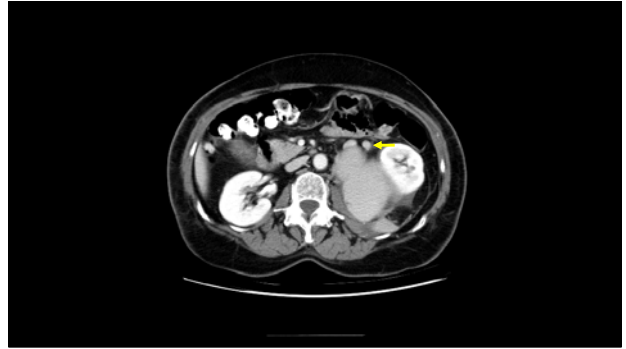
Ureteral ligation

- Leads to acute ureteral obstruction
- Urinoma collects mainly in the medial perinephric space

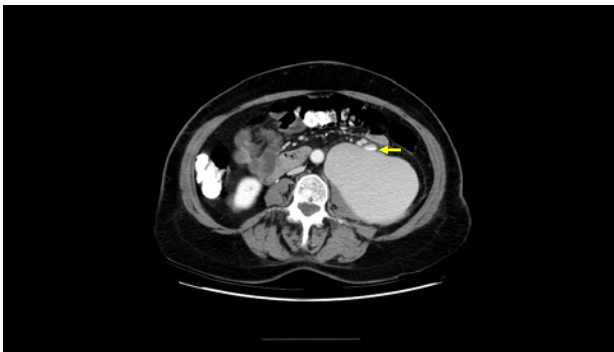
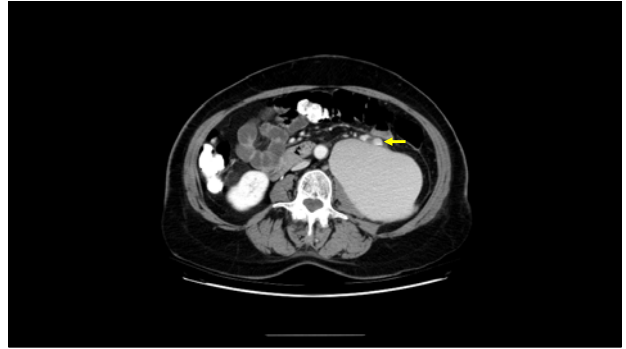
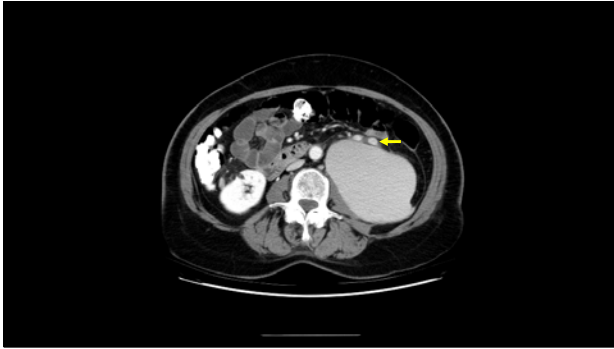
Iatrogenic Complications Affecting the Urinary Tract
Gabriela Gayer, MD



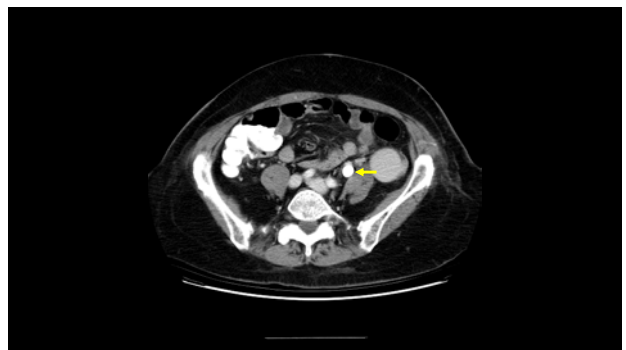
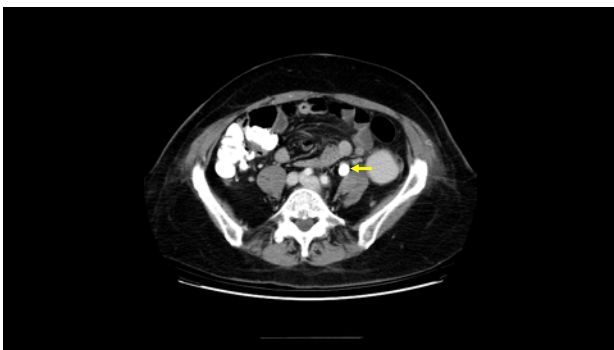
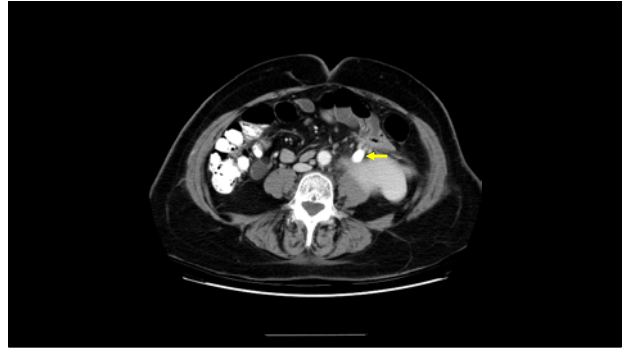
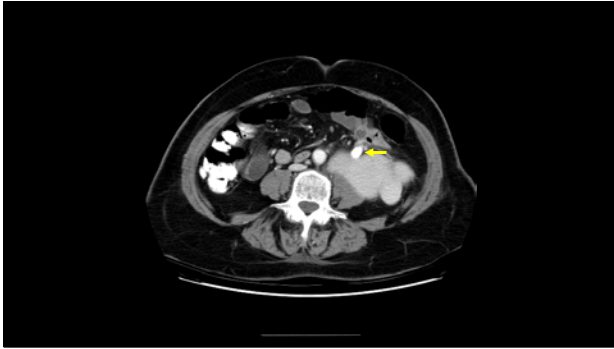
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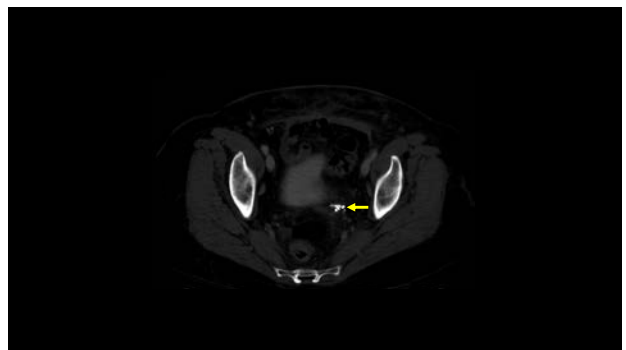
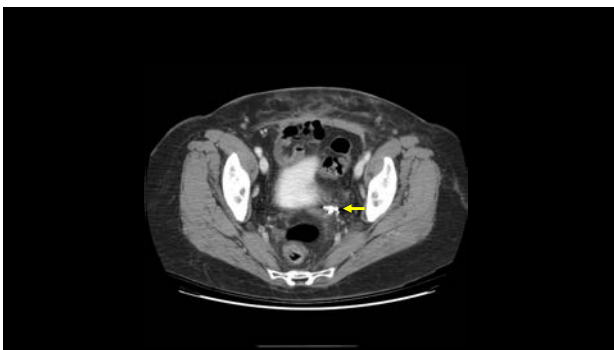
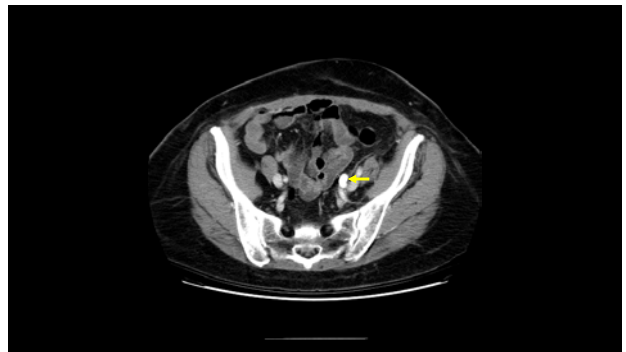
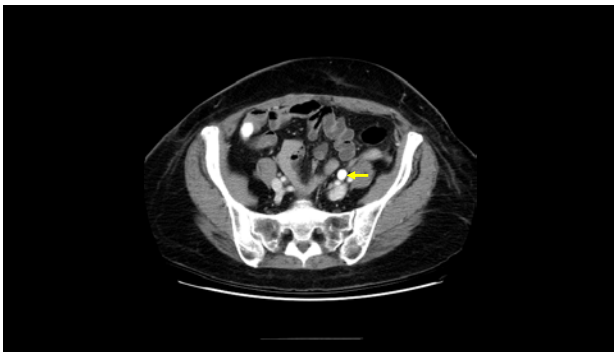
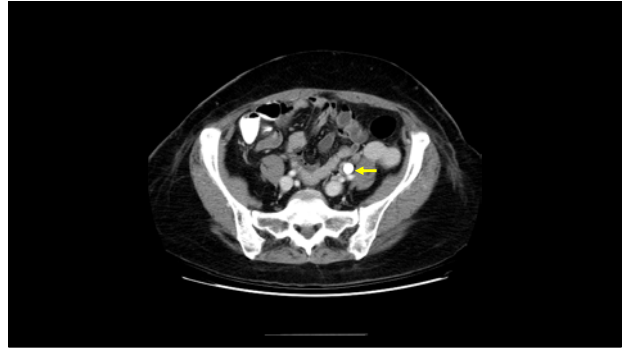
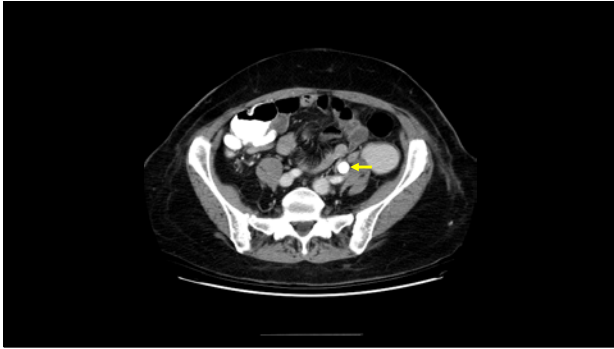
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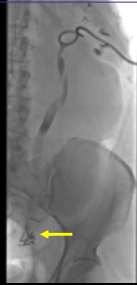
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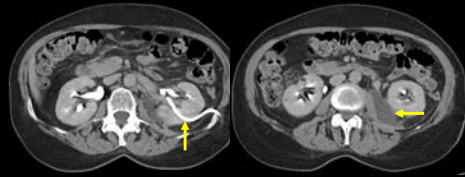


Antegrade pyelography



3 weeks later, post nephrostomy

Hydronephrosis resolved; Urinoma almost absorbed



Antegrade pyelography 3 wks postop



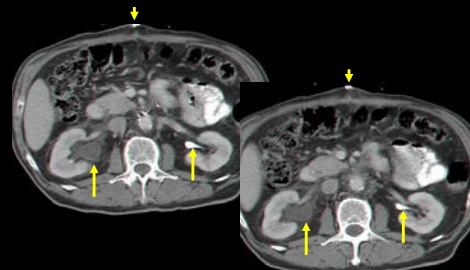
Antegrade pyelography 3 wks postop



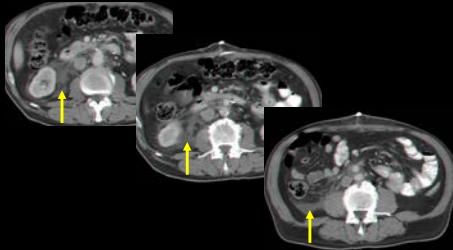
Complication of Vascular Surgery

- 68-year-old man
- 12 d after aorto-rt femoral artery bypass
- Acute abdominal pain
- Suspected appendicitis

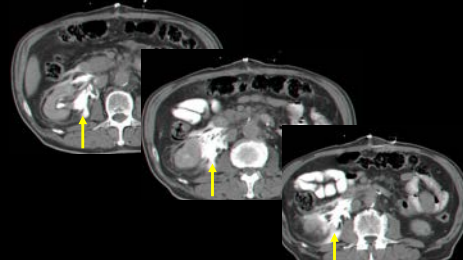
CECT - Rt hydronephrosis



Right perinephric infiltration



Delayed scan - 2 h later



Ureteral injury incurred during colostomy

70-y-old woman with colon cancer presenting with fever and abdominal pain 1 week after laparoscopic colostomy



Several fluid collections, two of which are round and contain air-fluid levels. A collection in the left pelvis contains no air

New left hydronephrosis, not present on the preop CT 10 days earlier

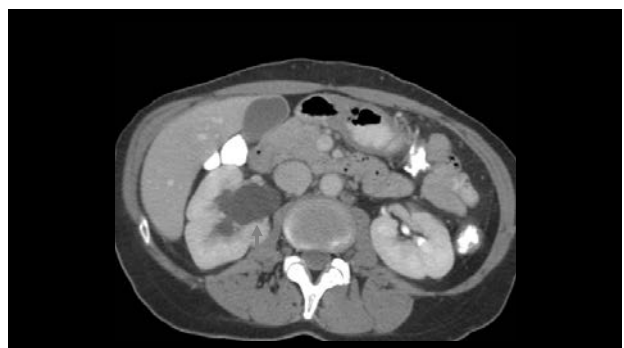
Delayed scanning: left pelvic collection does not appear to be a bowel loop

Antegrade pyelography confirms left ureteral injury resulting in a pelvic urinoma

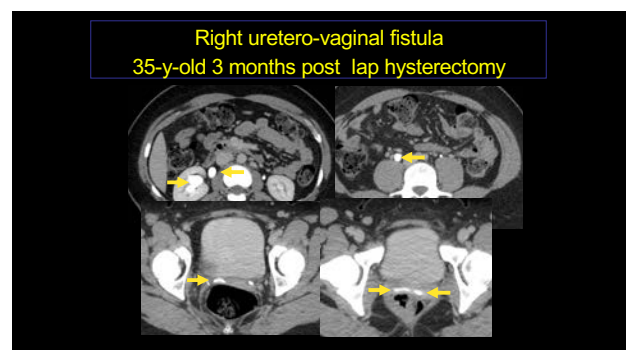
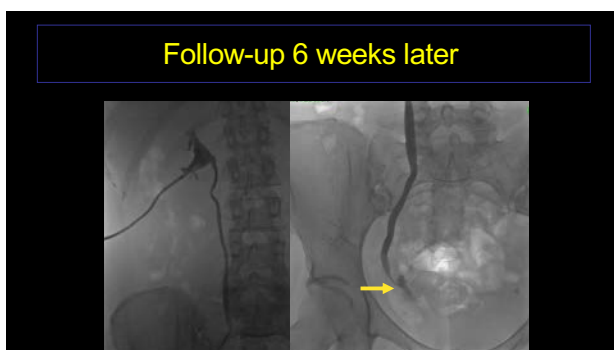
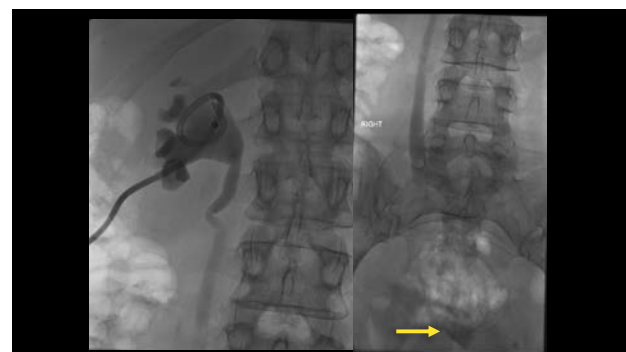
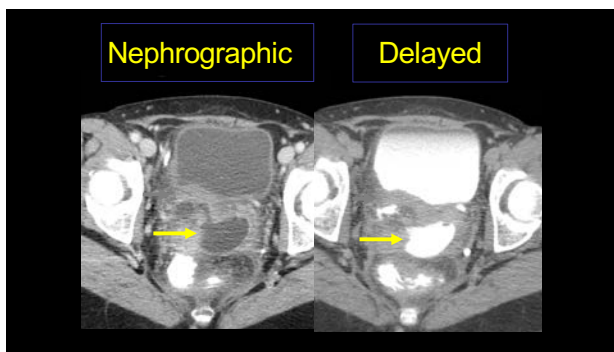
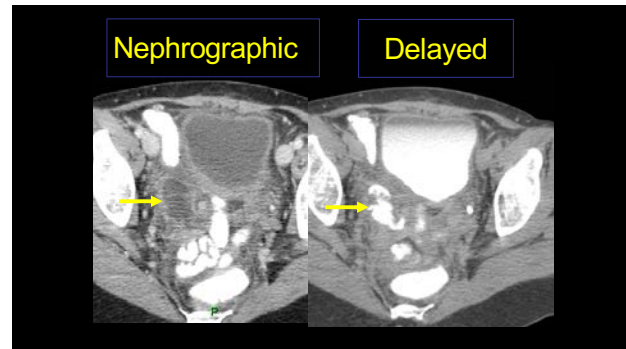
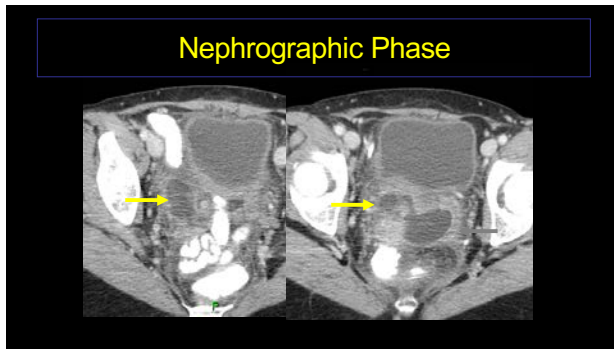
Ureterovaginal fistula

- > 50% of fistulas occur after hysterectomy for benign diseases: uterine fibroids, prolapse or after cesarean delivery
- Urine dissecting into the vaginal suture line
- Suspect in acute onset of incontinence after recent gynecologic surgery

49-y-old woman fever and flank pain 9 days after hysterectomy



Iatrogenic Complications Affecting the Urinary Tract
Gabriela Gayer, MD



Right uretero-vaginal fistula
35-y-old 3 months post lap hysterectomy

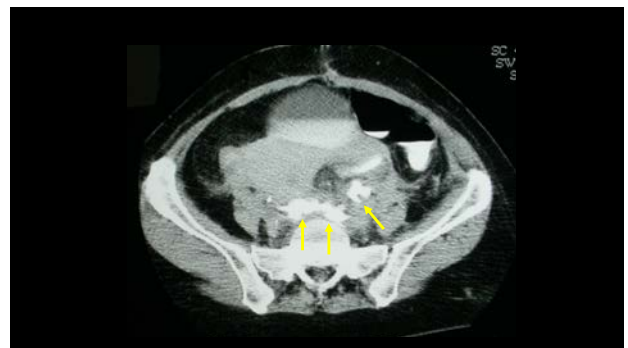
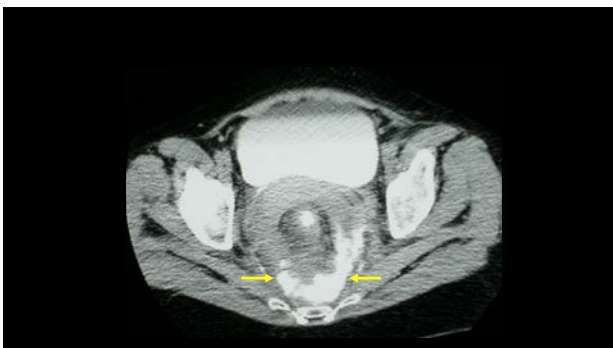


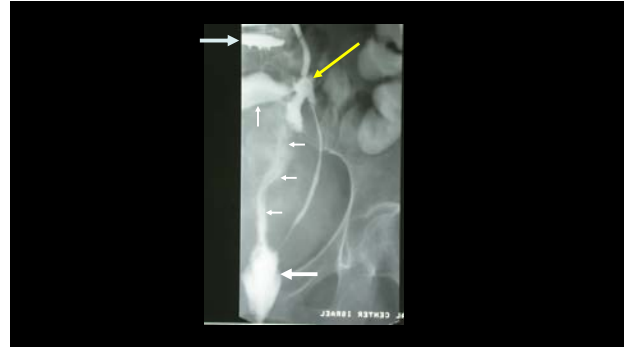
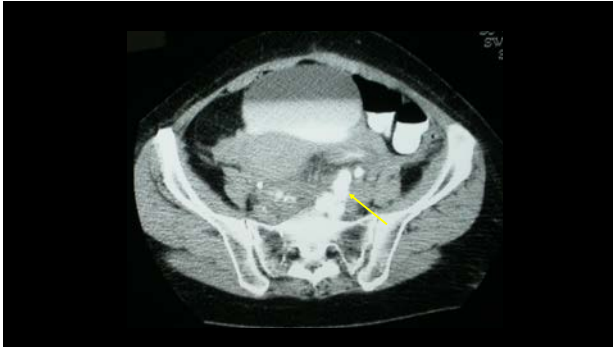
Caveat

- Urine dissects through fascial planes
- May accumulate remote from injured segment
- May be confused with leak from the GIT

Complication of discectomy

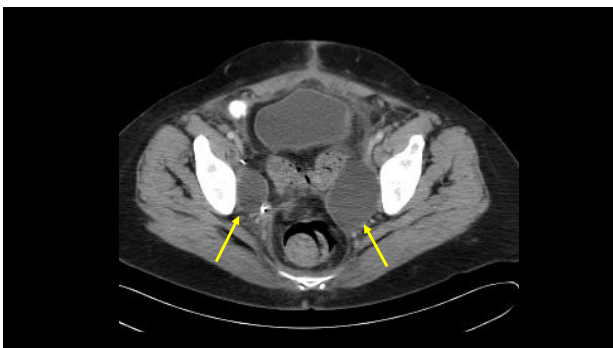
- 55-y-old woman
- 6 days after discectomy and insertion of disc prosthesis at L4-5 through an anterior left retroperitoneal approach
- Abdominal pain & fever





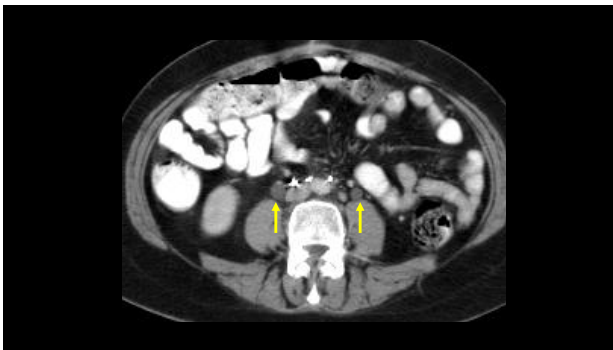
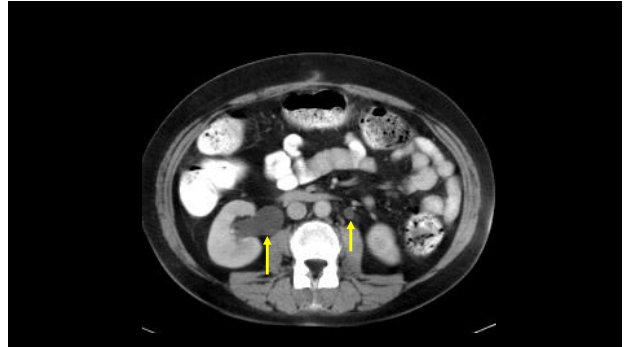
**Complication of hysterectomy
& lymph node dissection**

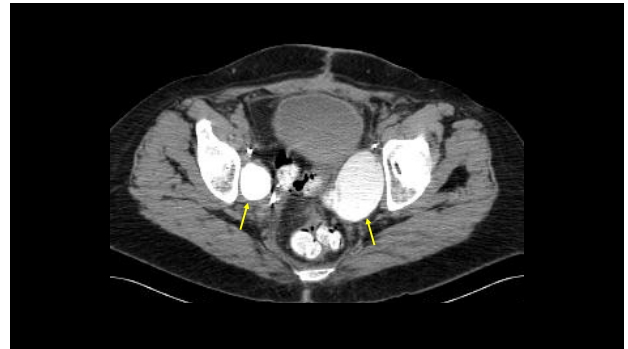
- 52-year-old woman
- 2 months after radical hysterectomy
& RPLN dissection for cervical cancer
- Asymptomatic, baseline prior to chemo



Bilateral pelvic fluid collections

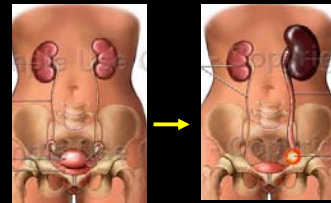
- Seromas?
- Lymphoceles?
- Urinomas?





Hydronephrosis

Mild to moderate hydronephrosis secondary to ureteral injury attributed to periureteral fibrosis



Iatrogenic Ureteral Injuries

When to suspect:

- Febrile patient after instrumentation of the ureter or abdominopelvic surgery
- Fluid collection or free fluid
- Hydronephrosis

Iatrogenic Ureteral Injuries

How to Detect on CT

- Obtain another delayed scan
- Verify opacification of the entire ureter in order to rule out or confirm injury

Iatrogenic Complications Affecting the Bladder

Iatrogenic bladder perforations

Most iatrogenic bladder injuries occur during

- Obstetric / gynecological procedures
- Urological and general surgical procedures

Iatrogenic Complications Affecting the Bladder

Complications of surgery:

- Bladder injury
- Bladder-vaginal (vesicovaginal) fistula

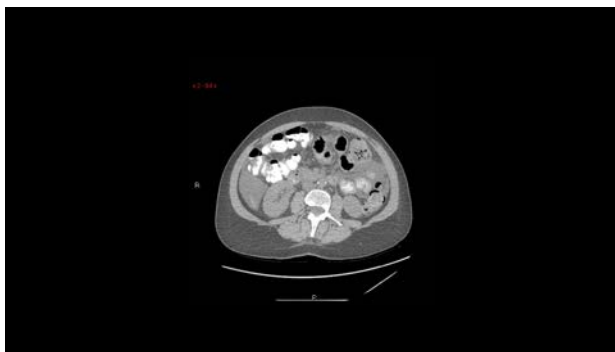
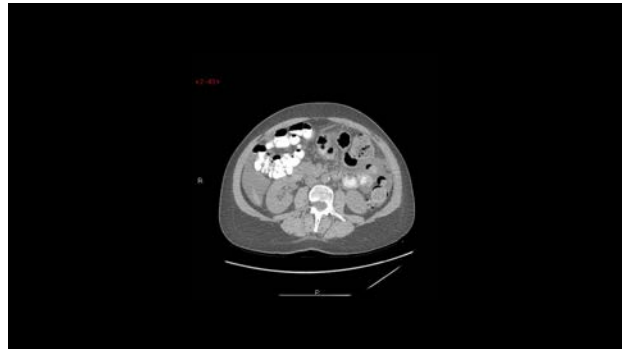
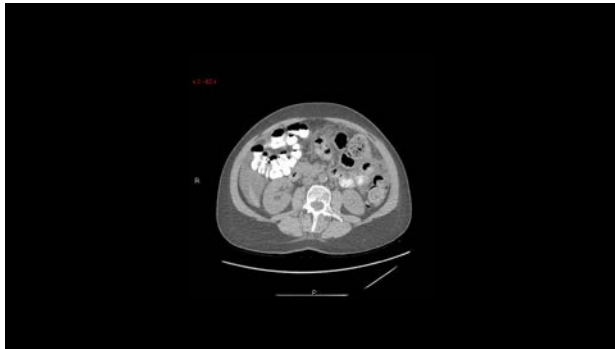
High index of suspicion

- 49 year-old female
- 3 days after Laparoscopic hysterectomy and right oophorectomy
- Peritoneal irritation



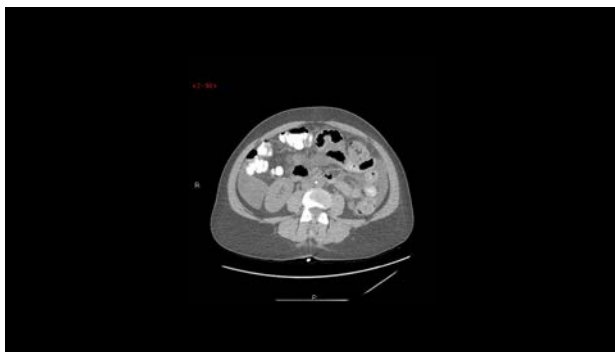
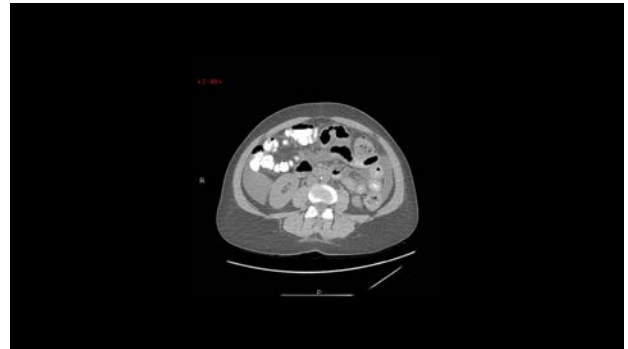
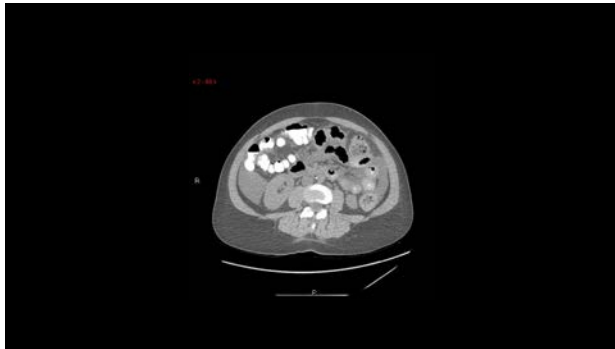
Iatrogenic Complications Affecting the Urinary Tract

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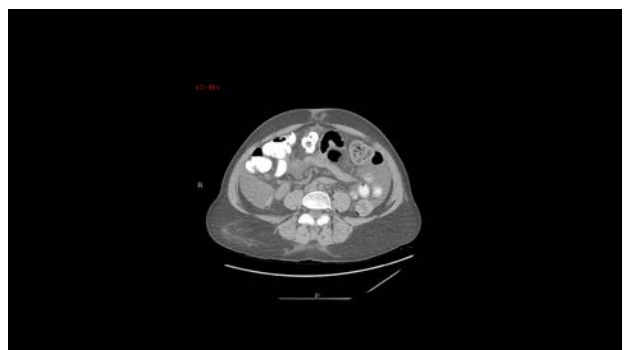
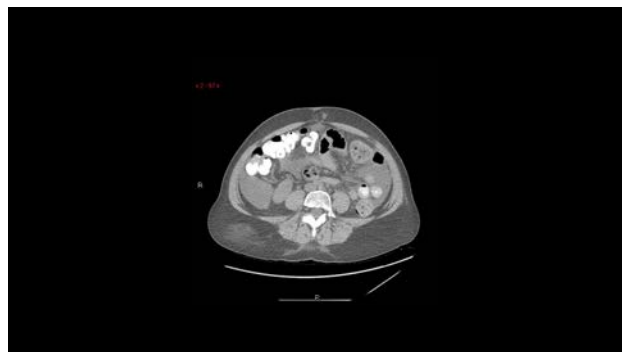
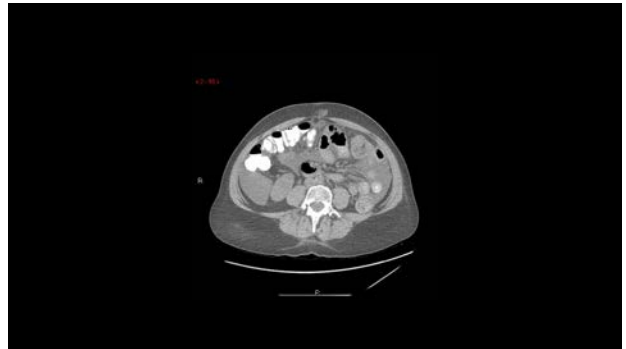
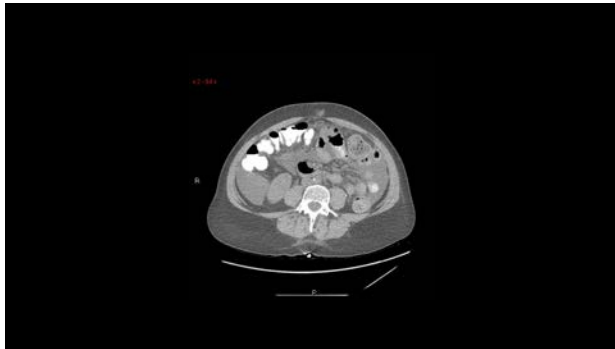
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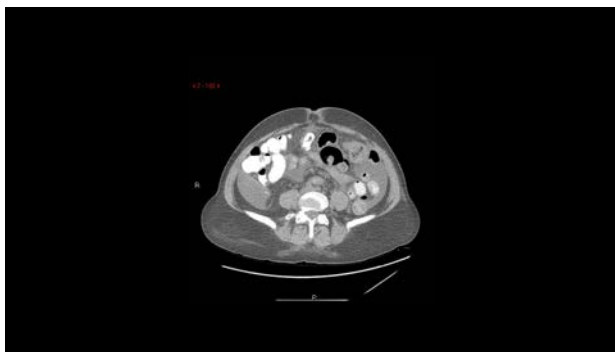
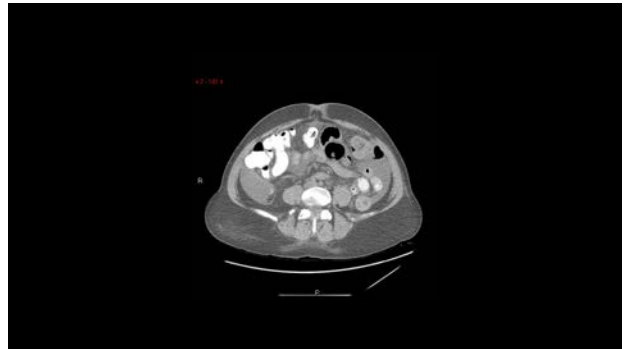
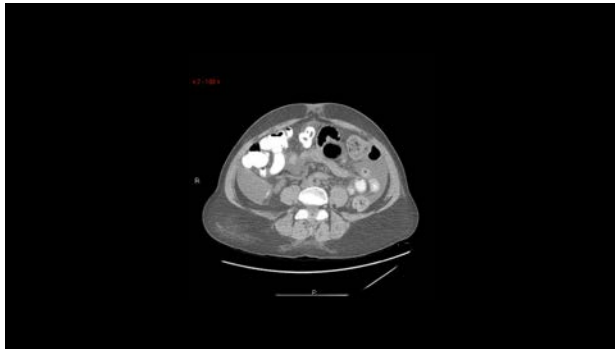
Iatrogenic Complications Affecting the Urinary Tract

Gabriela Gayer, MD



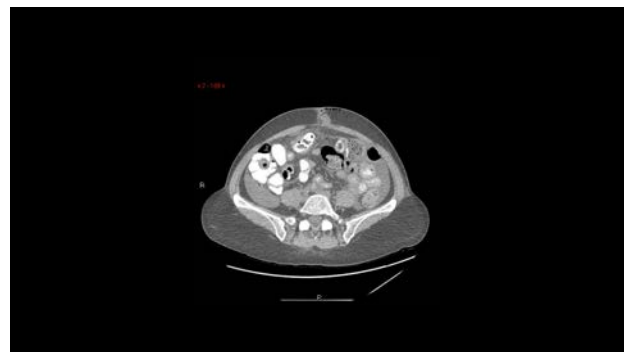
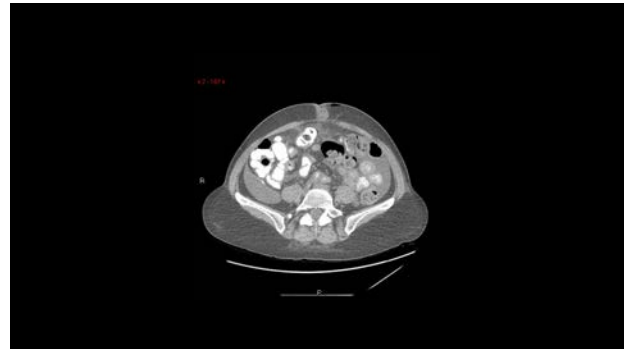
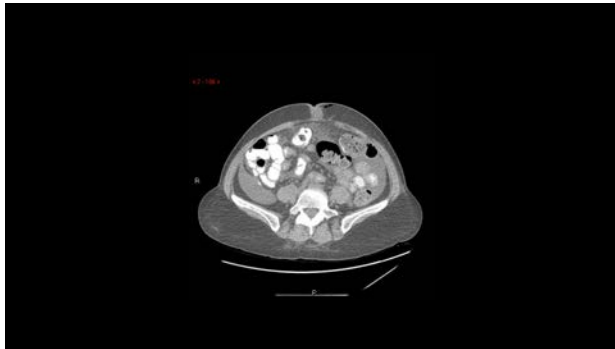
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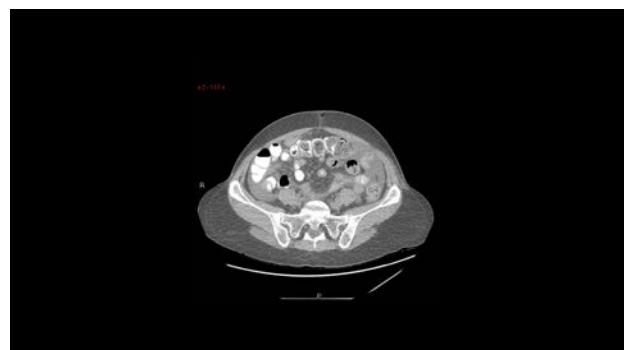
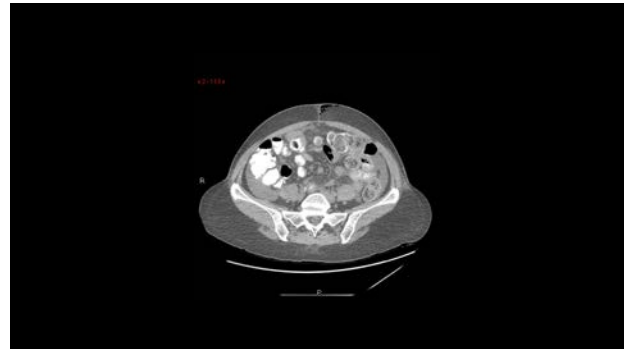
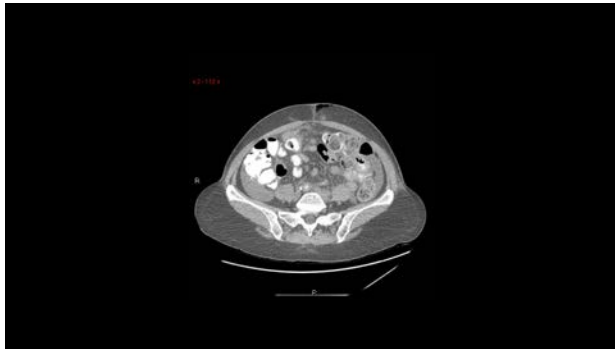
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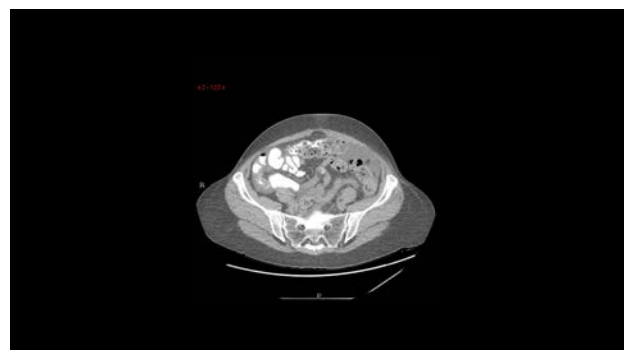
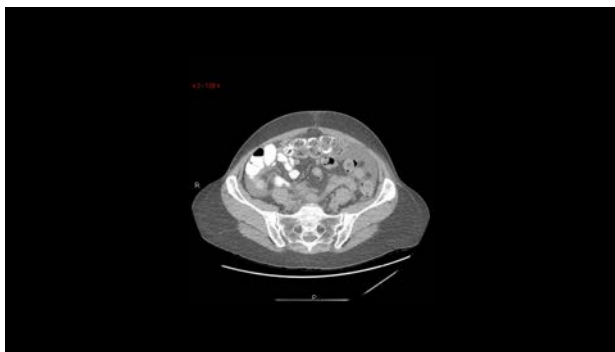
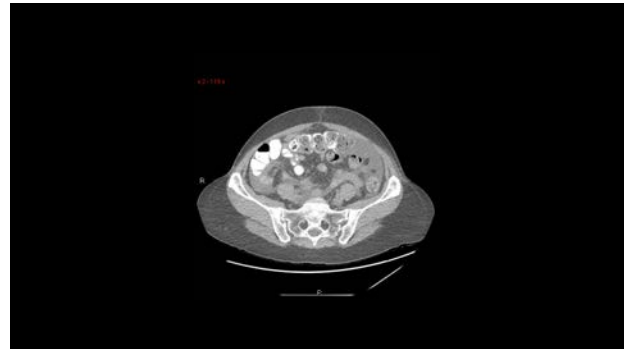
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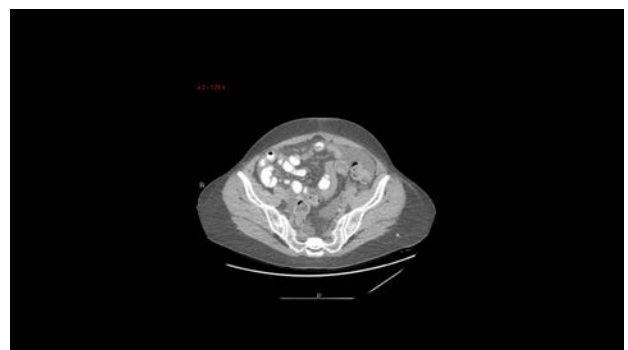
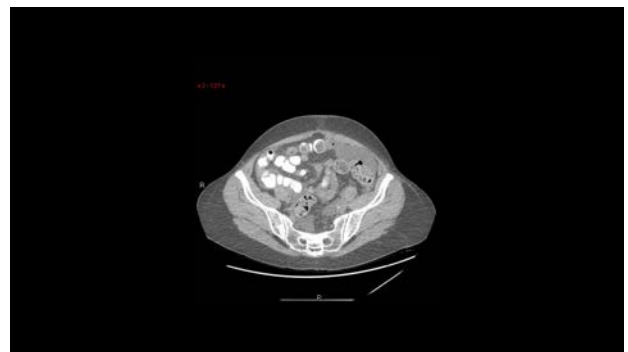
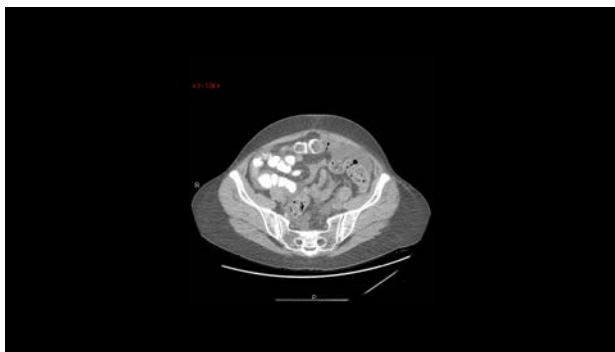
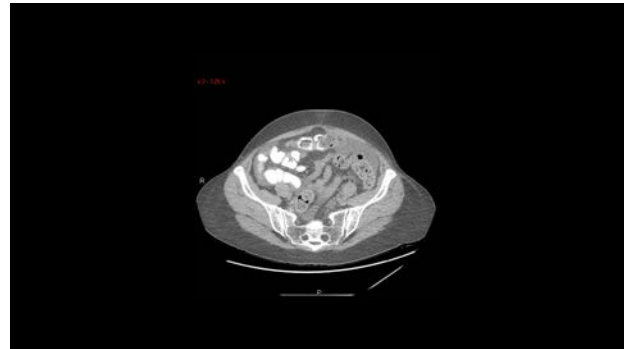
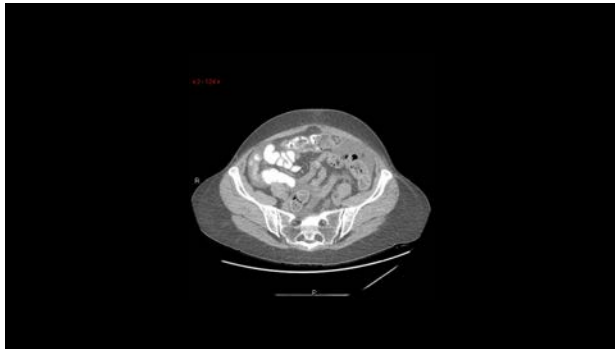
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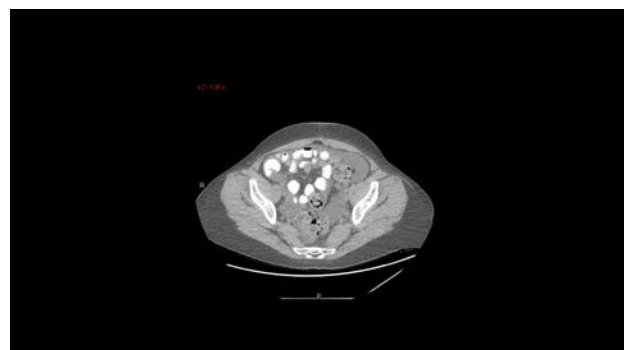
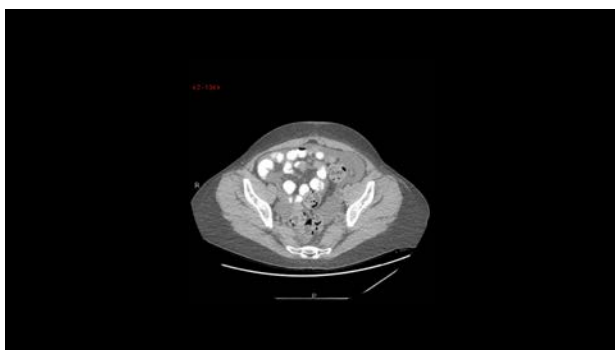
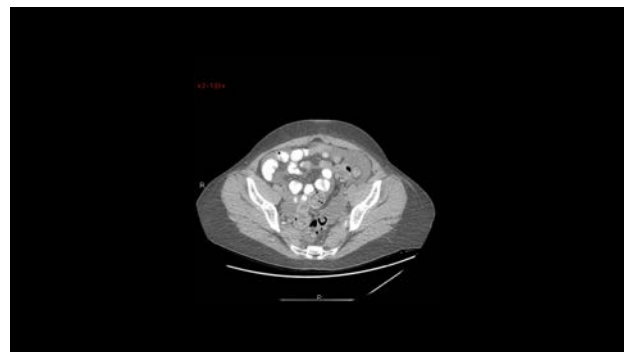
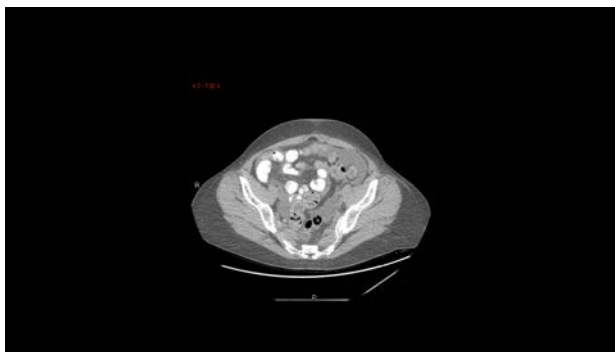
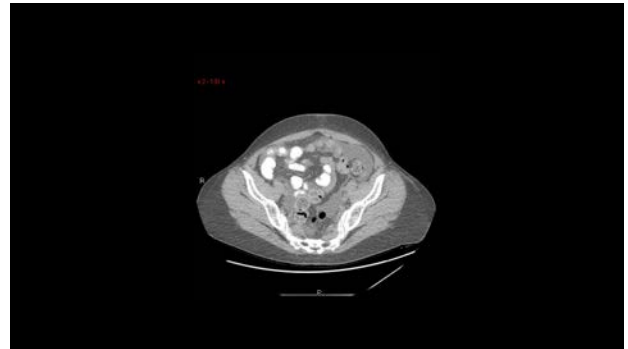
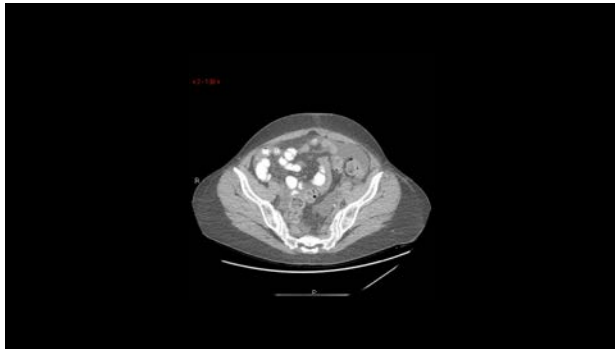
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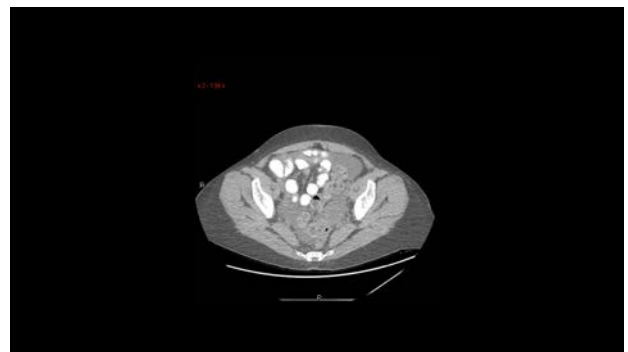
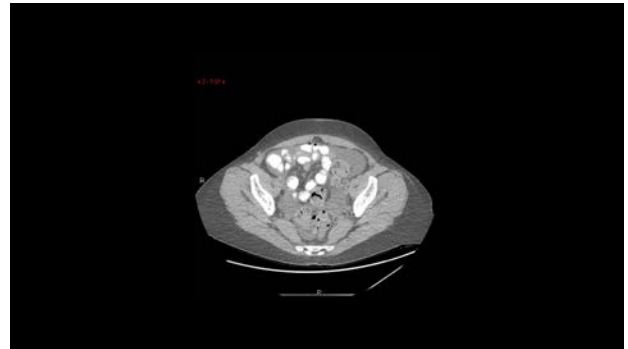
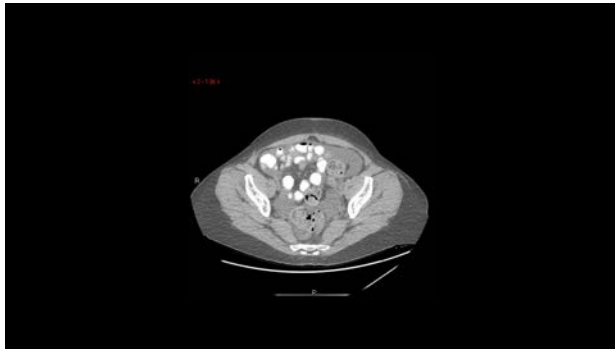
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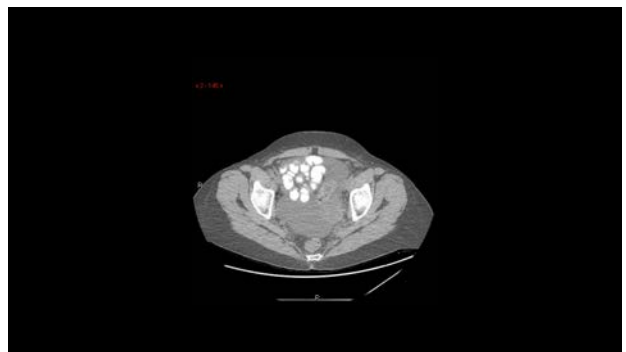
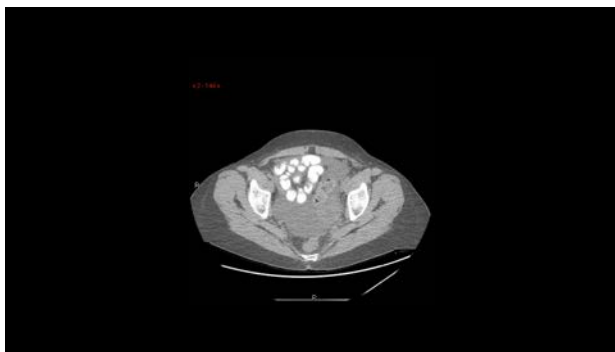
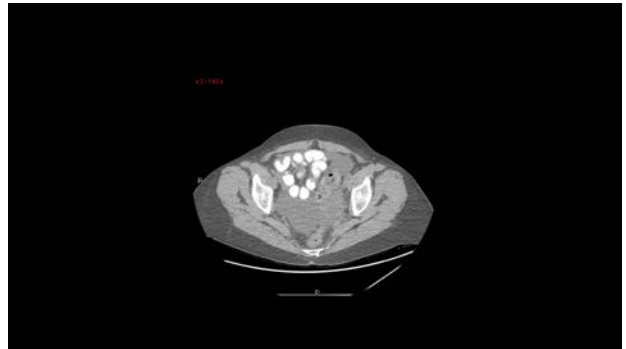
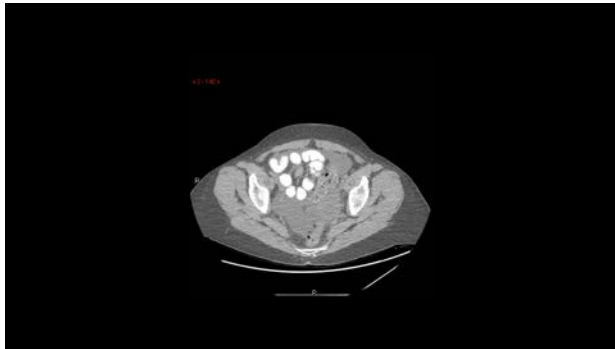
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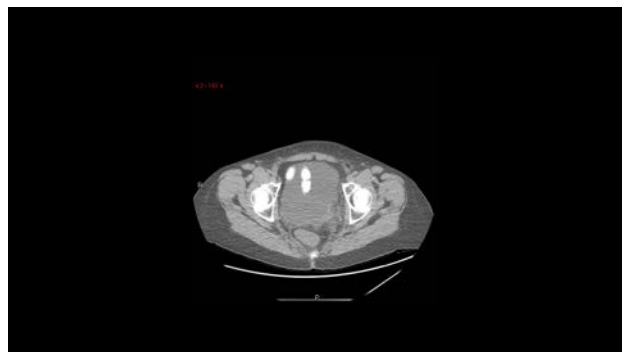
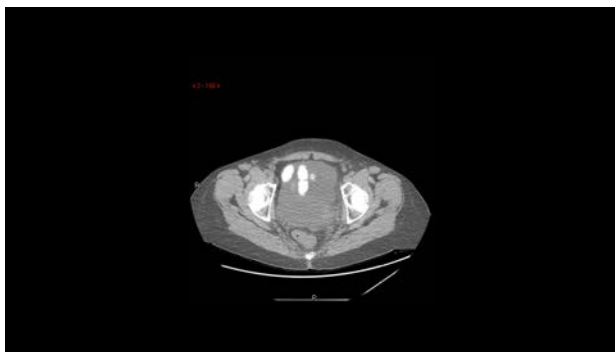
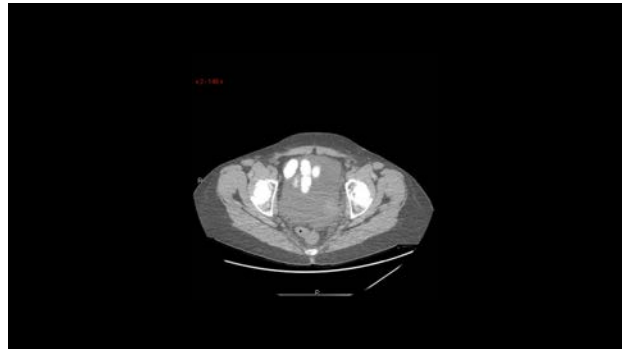
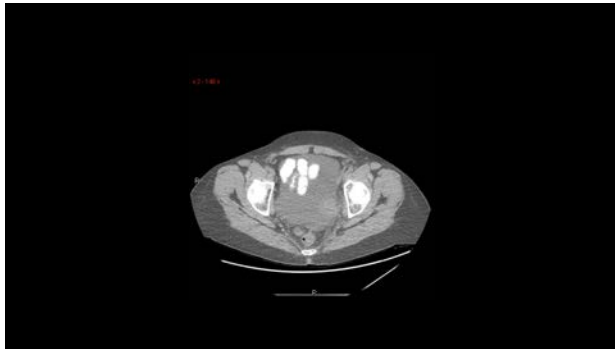
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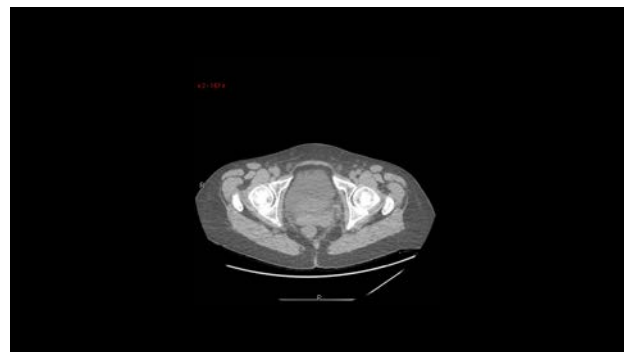
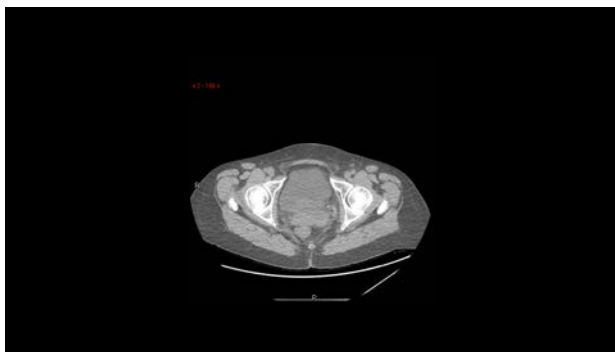
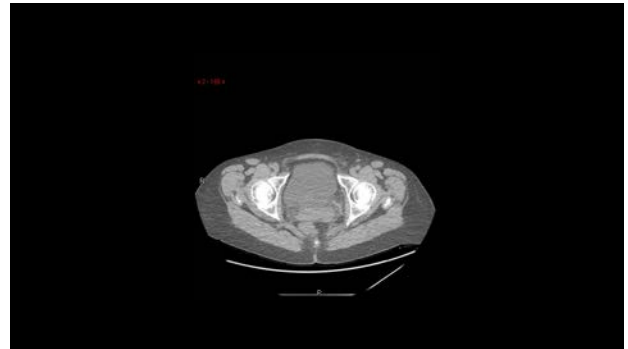
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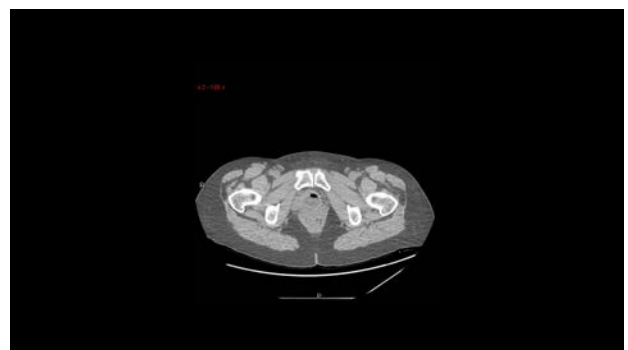
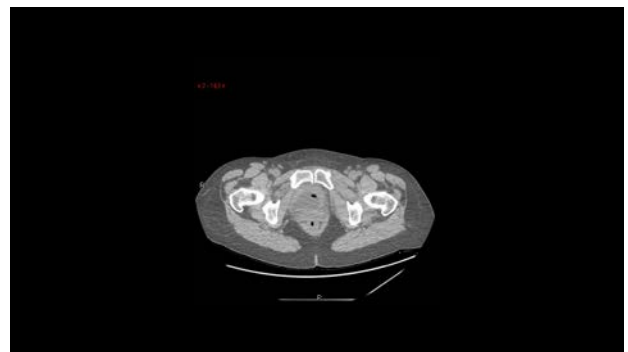
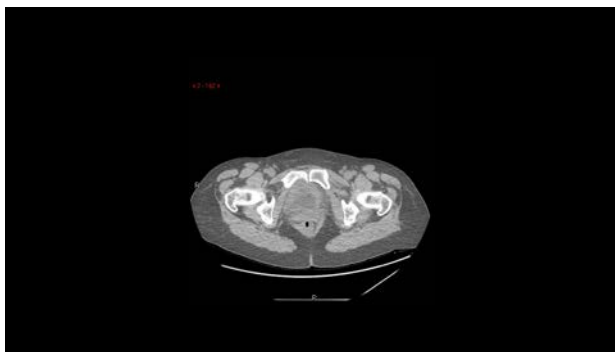
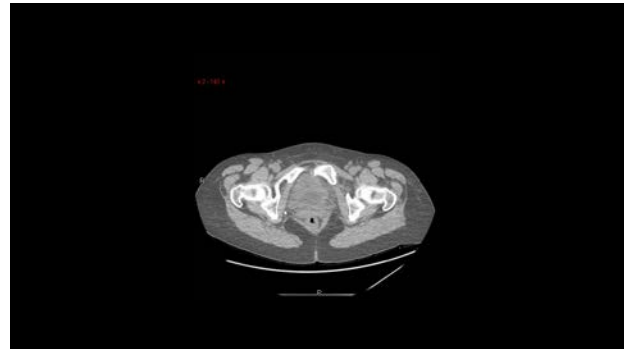
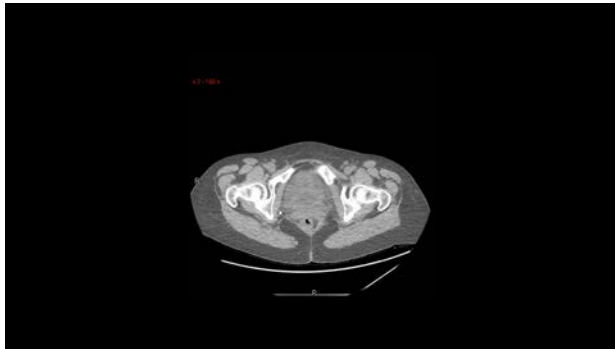
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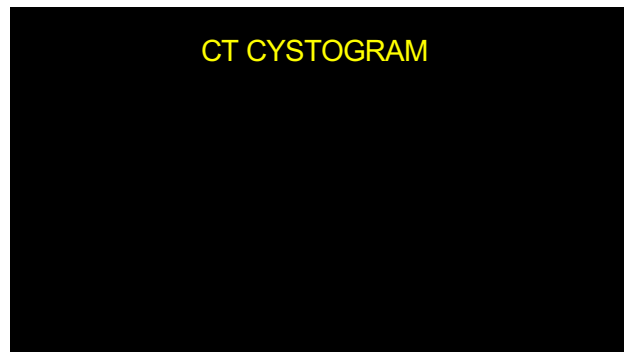
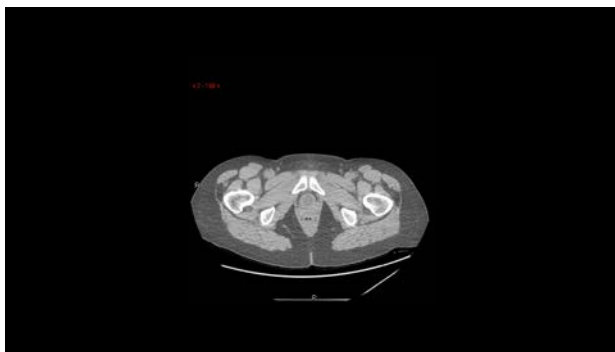
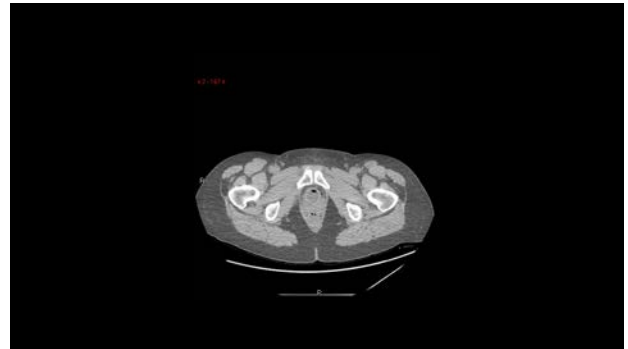
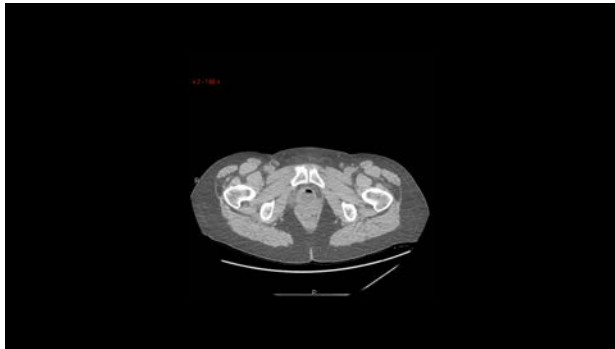
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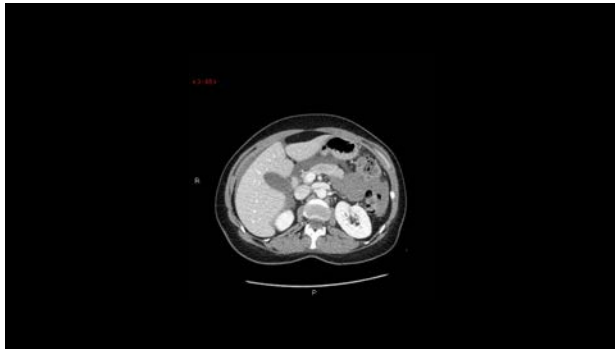
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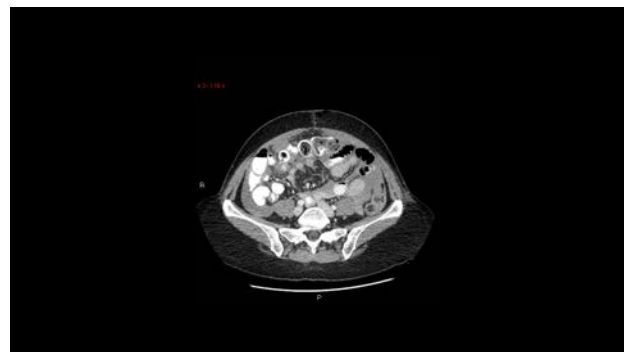
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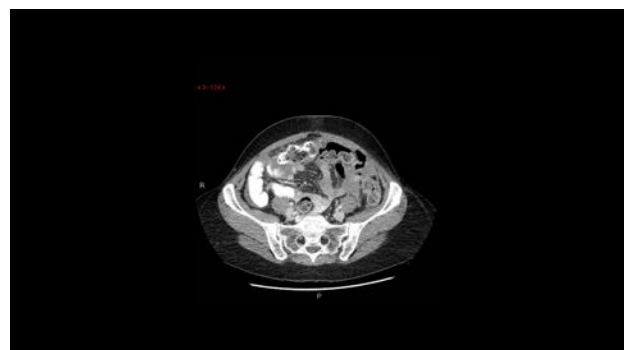
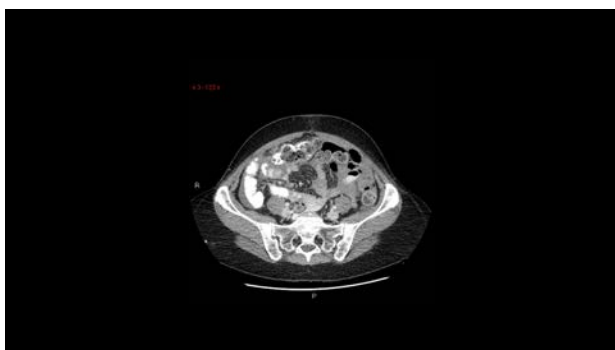
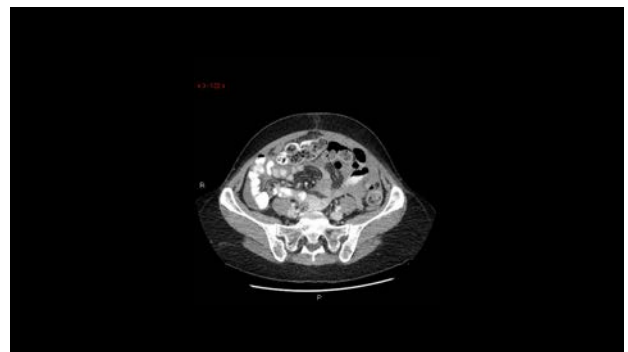
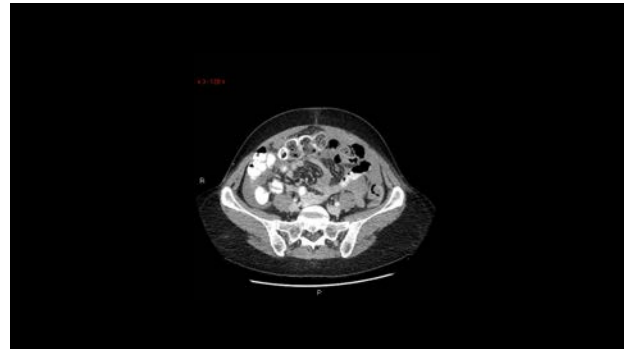
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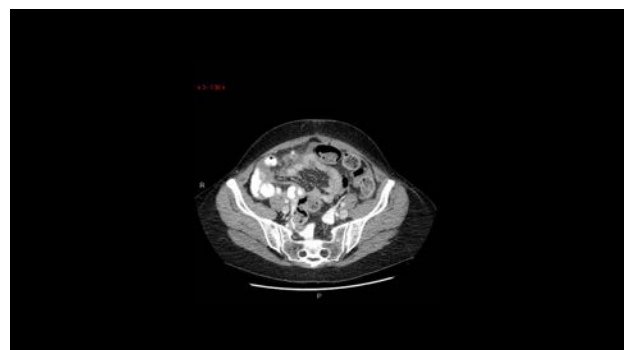
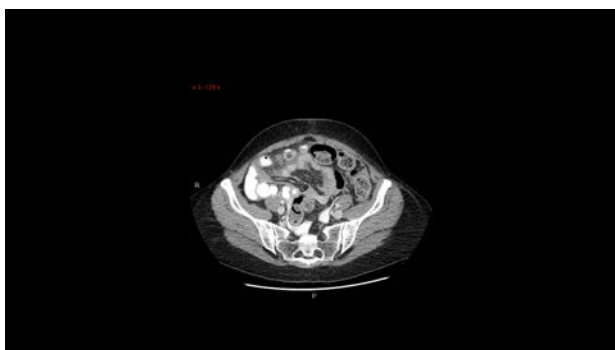
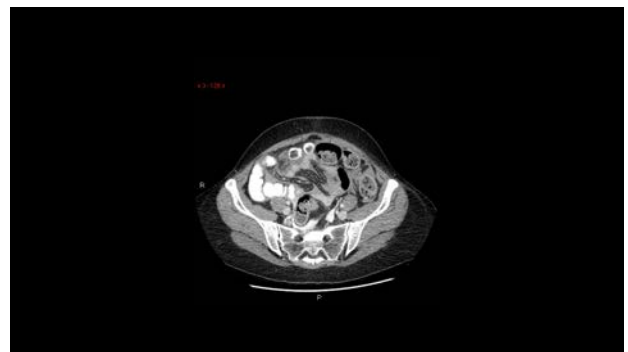
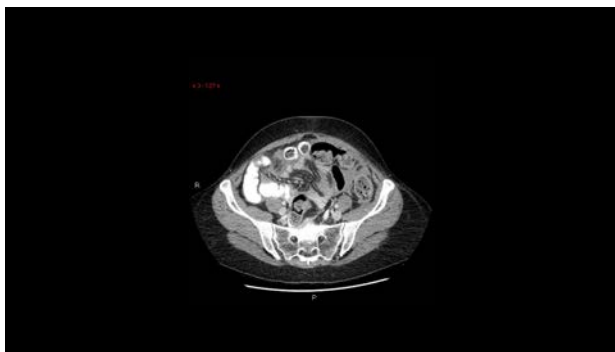
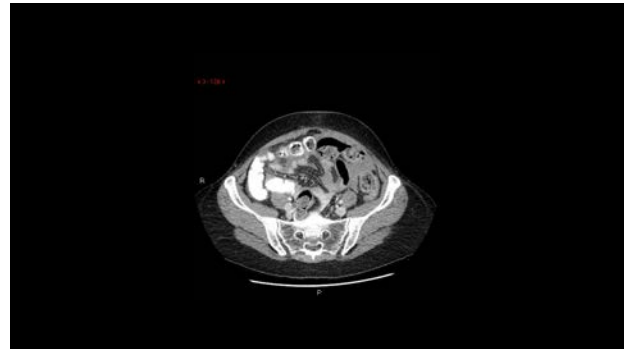
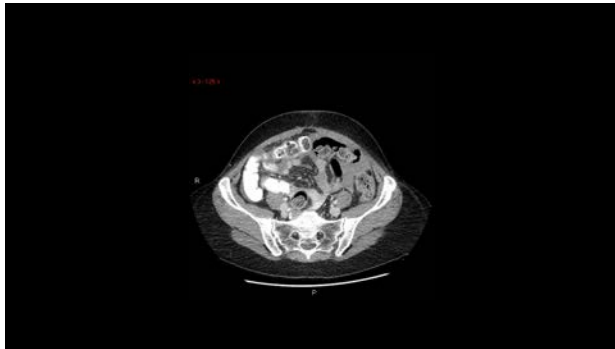
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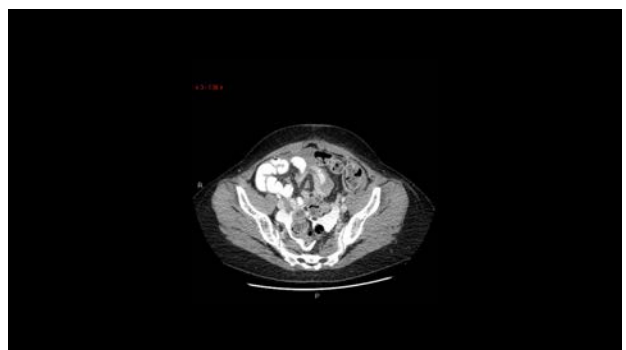
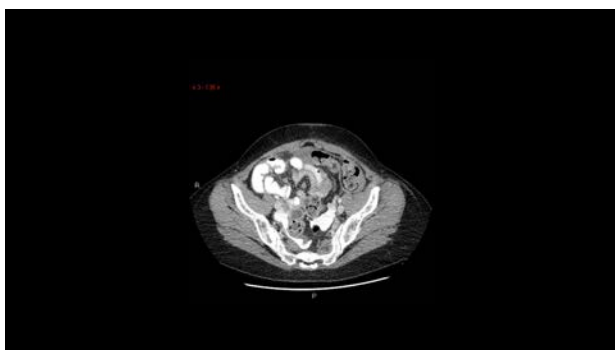
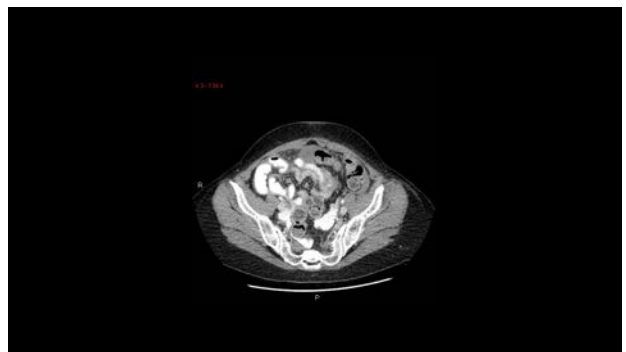
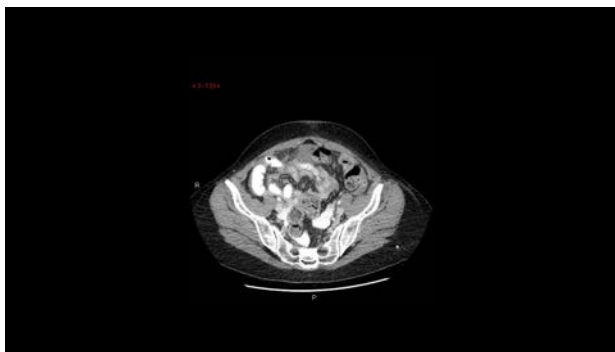
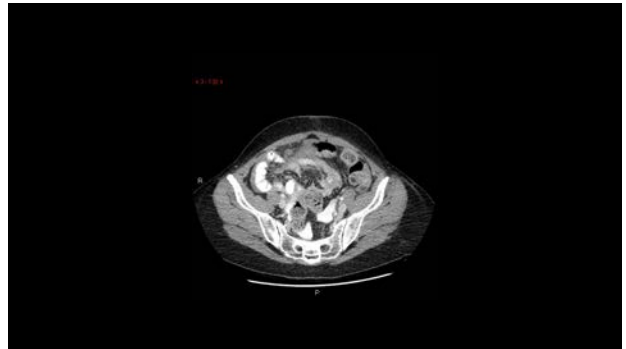
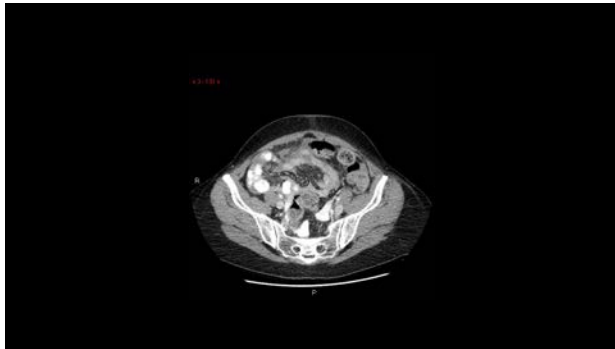
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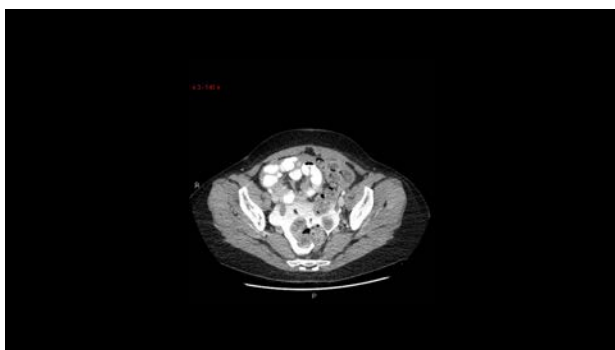
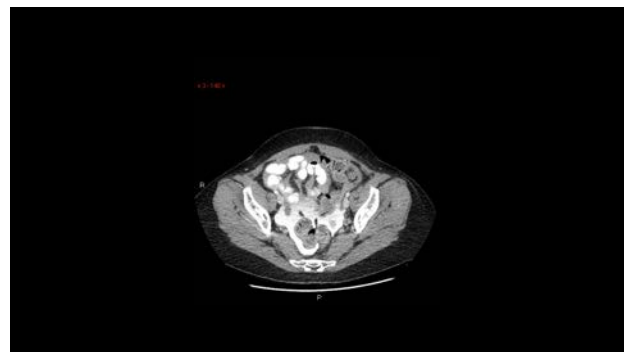
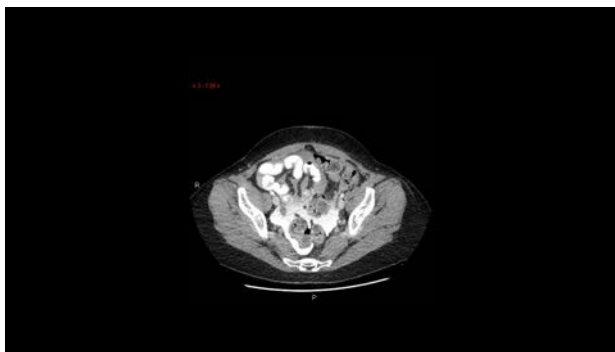
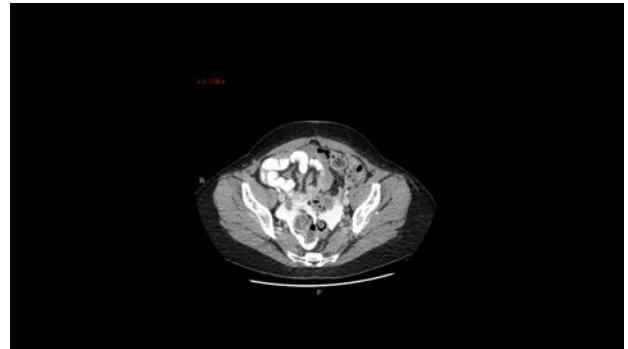
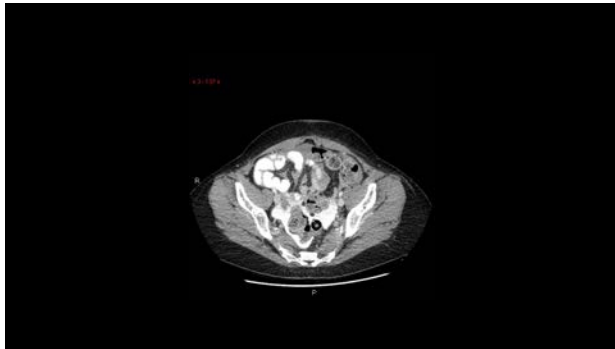
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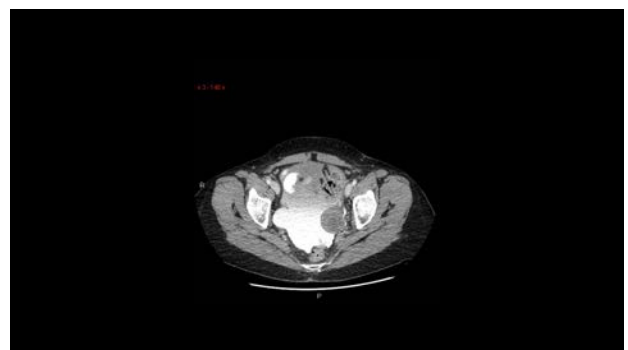
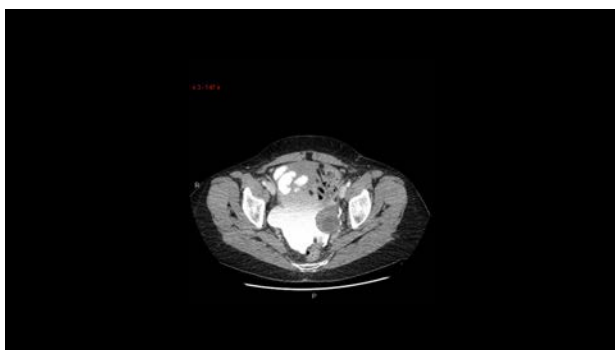
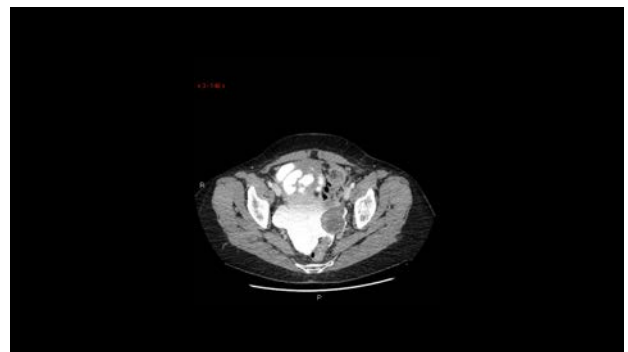
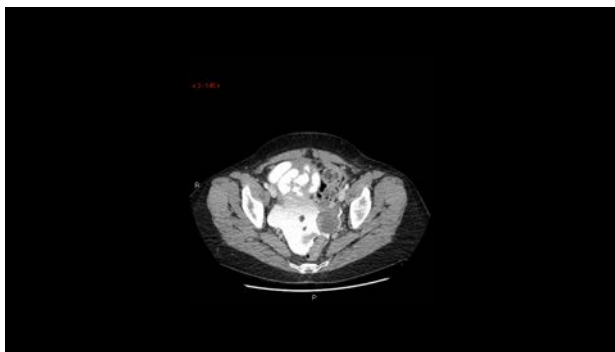
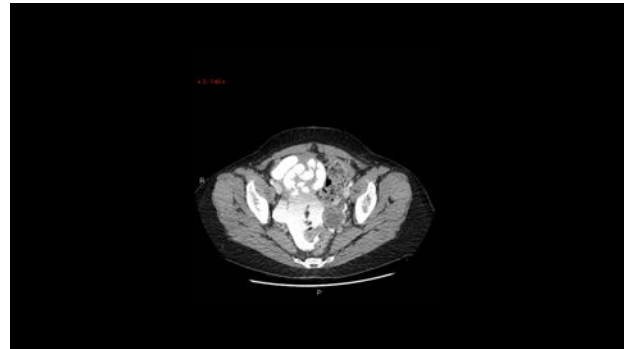
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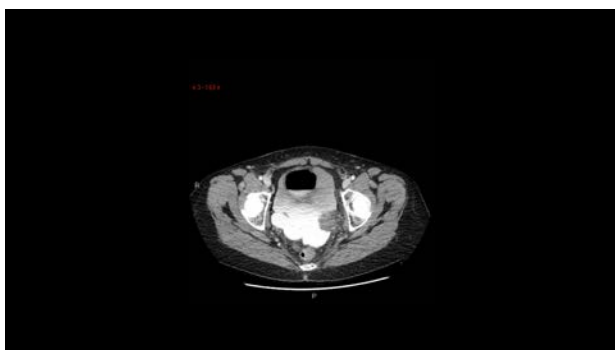
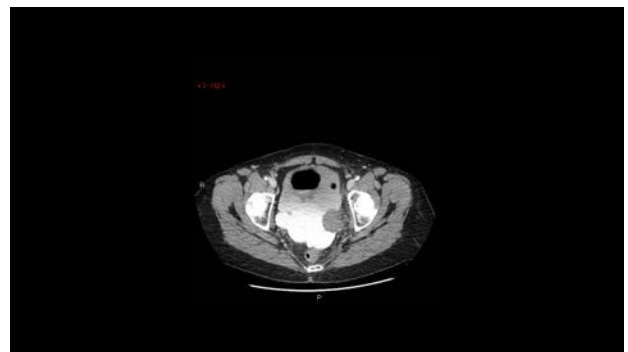
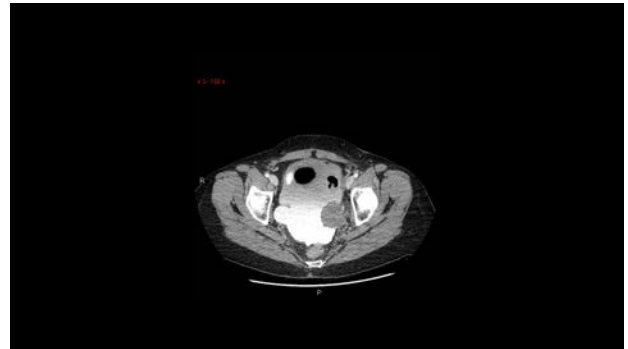
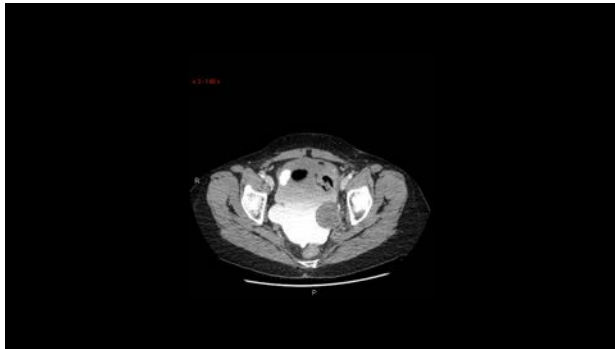
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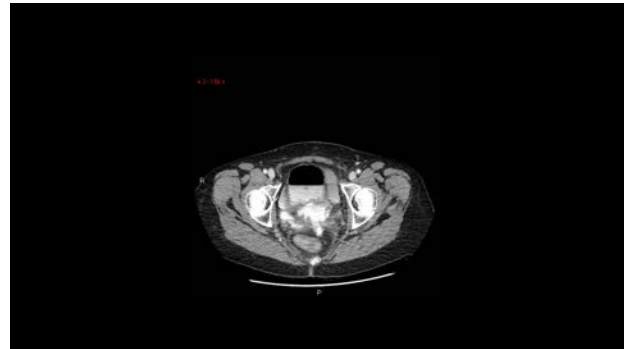
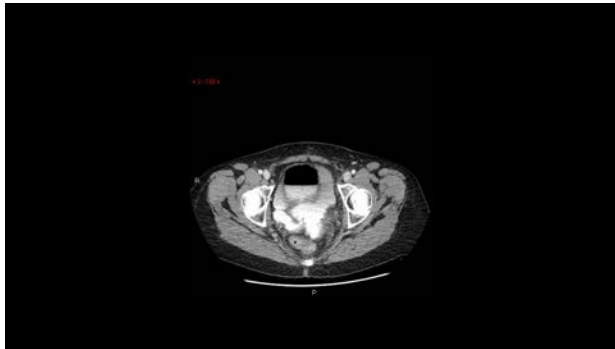
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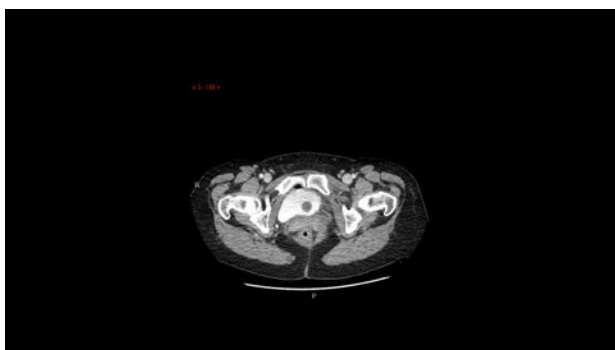
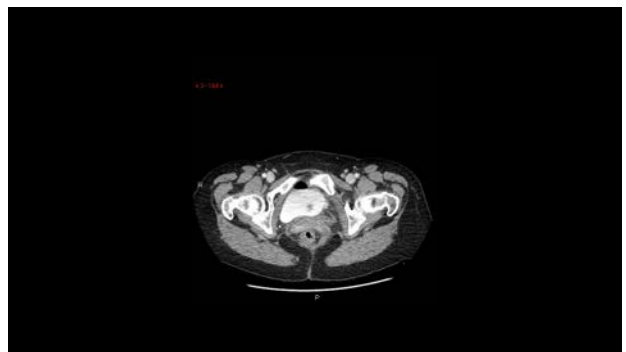
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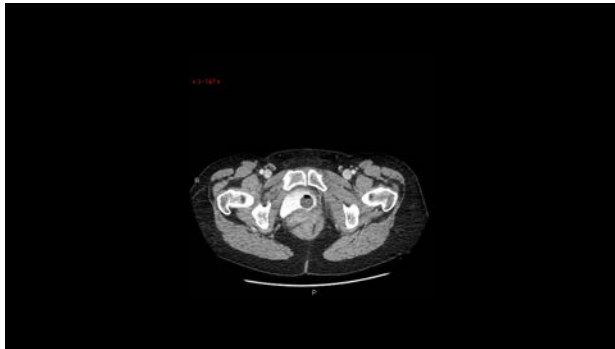
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CT cystogram

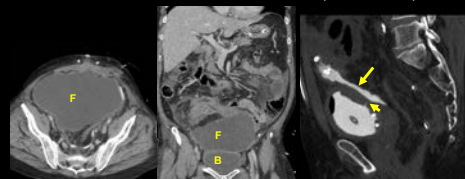
- As the urinary bladder is a low-pressure and large compliance storage system, intravesical pressure should be increased by bladder distension or the injury may be easily missed.

CT cystogram

- A normal cystographic phase on standard contrast enhanced CT, with only passive bladder filling through catheter clamping, is NOT sufficient to exclude a bladder injury
- An unacceptably high false-negative rate results with these approaches

Inadvertent bladder injury incurred at surgery diagnosed on CT cystography

Patient after low anterior resection of rectum and reoperation for SB perforation



A large clear fluid collection (F) cranial to bladder (B). There are no radiological findings to confirm leak of urine from bladder.

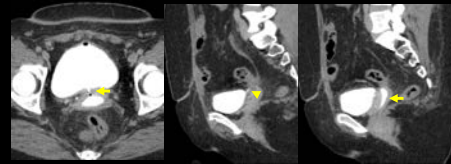
Sagittal image CT cystography shows leak of urine into peritoneal cavity, confirming bladder injury.

Vesico-vaginal fistula

When bladder injury is not recognized intra-operatively during hysterectomy - a vesico-vaginal fistula can develop due to urine leaking and following the path of least resistance and drain through the vaginal cuff suture line.

Vesicovaginal fistula incurred at hysterectomy diagnosed on CT cystography 3 m after surgery

43-y-old woman with 'incontinence' without sensation since hysterectomy 3 months earlier. A bladder laceration during hysterectomy had been repaired.



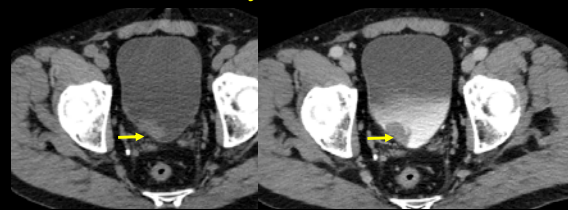
CT cystography shows contrast opacifying the vagina.

Note small size of fistula.

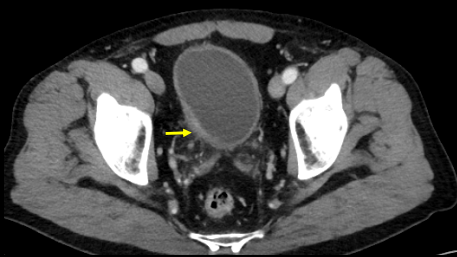
Cystoscopy confirmed an obvious fistula opening posterior to the trigone.

Iatrogenic Complications Following Cystectomy and Prostatectomy

60y-o-m TCC



3 months later Post TURBT x 2

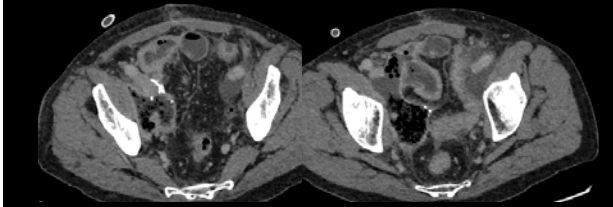


Complex surgery

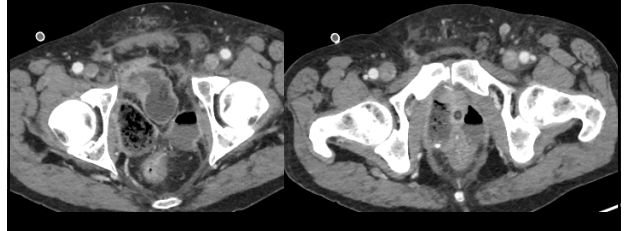
1. Robot-assisted radical cystoprostatectomy
2. Robotic bilateral extended pelvic lymphadenectomy
3. Urinary diversion with robotic harvesting of bowel, open creation of neobladder and robotic urethral-neobladder anastomosis

Iatrogenic Complications Affecting the Urinary Tract
Gabriela Gayer, MD

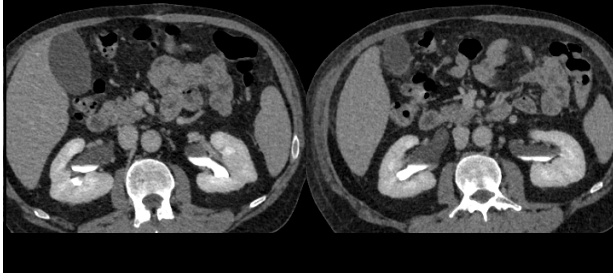
Patient presents 12 days after surgery with
Foley catheter dysfunction and acute altered
mental status



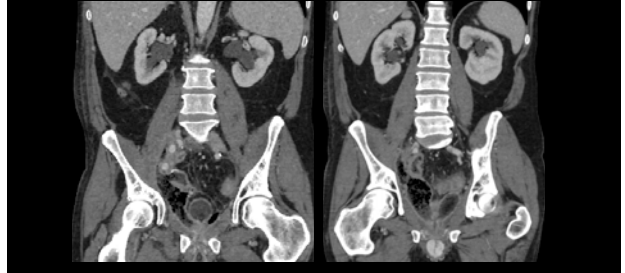
2/26/18



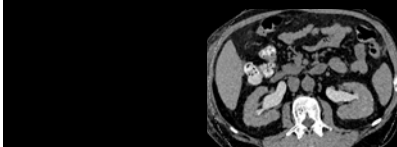
Standard delays



Standard delays

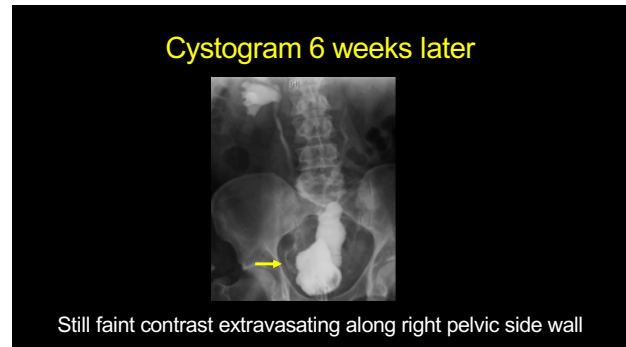
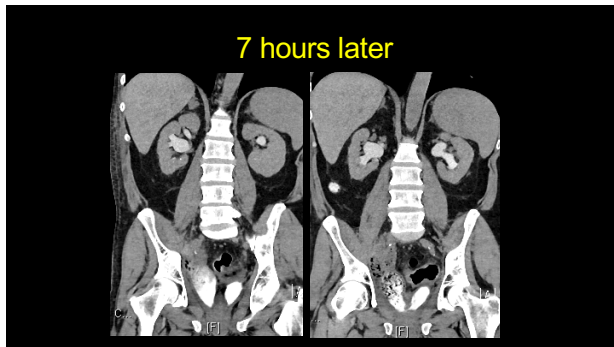


7 hours later



7 hours later





Complications following prostatectomy

Urinary leakage at the urethrovesical anastomosis

- One of the most common short-term complications
- Incidence of 3% to 33%
- Diagnosis can be determined primarily by establishing the nature of the drain output

Complications following prostatectomy

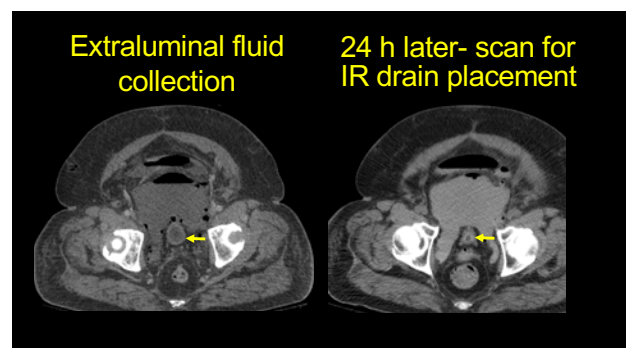
Urinary leakage at the urethrovesical anastomosis

Imaging modalities:

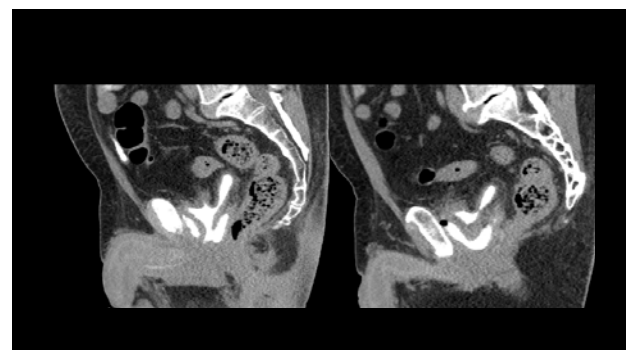
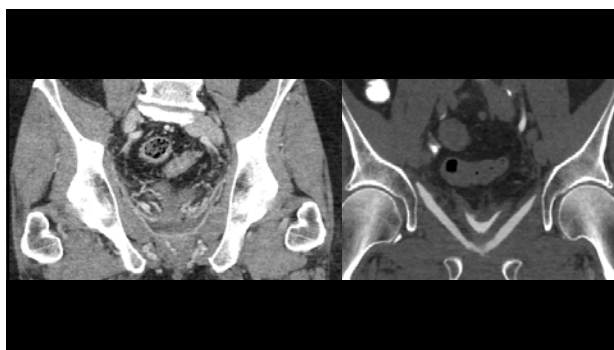
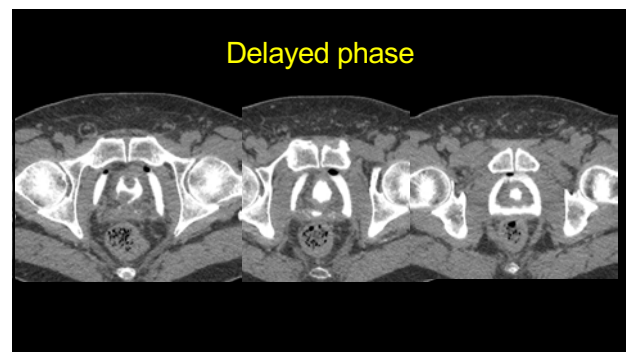
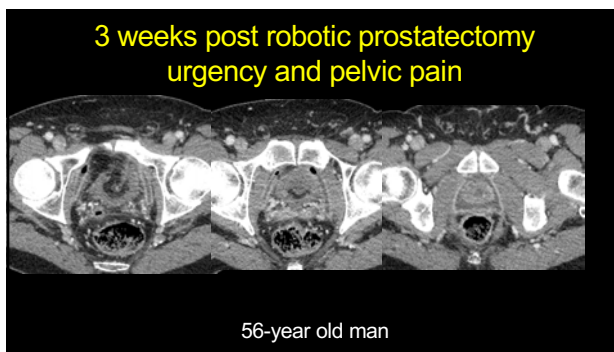
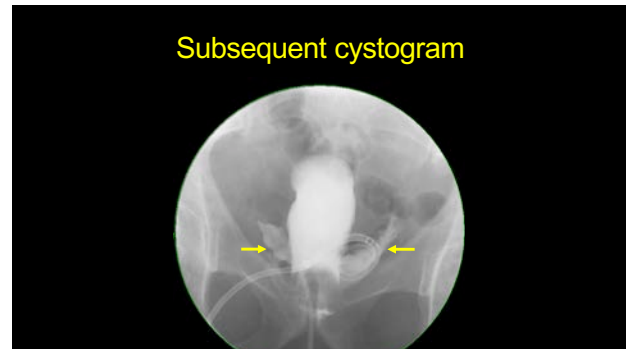
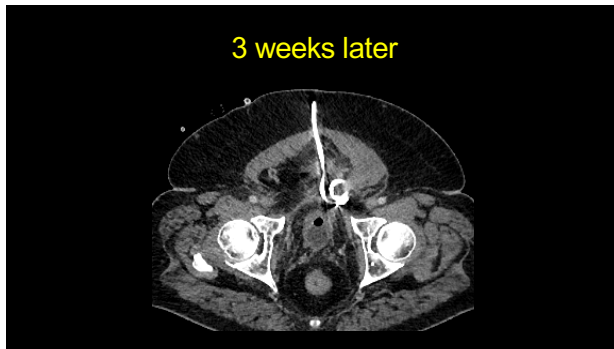
- Retrograde cystography
- CT cystography
- Transrectal US
- Contrast enhanced US
- Excretory urography

Robotic-assisted laparoscopic prostatectomy

- 62-y-o male
- Presents to ED 7 days after RALP with abdominal pain
- Reports of poorly draining Foley catheter
- Foley was noted to be draining dark amber urine
- Some shortness of breath due to abdominal pain, diaphoresis
- Negative cardiac work up



Iatrogenic Complications Affecting the Urinary Tract
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Iatrogenic Complications of Lines and Tubes

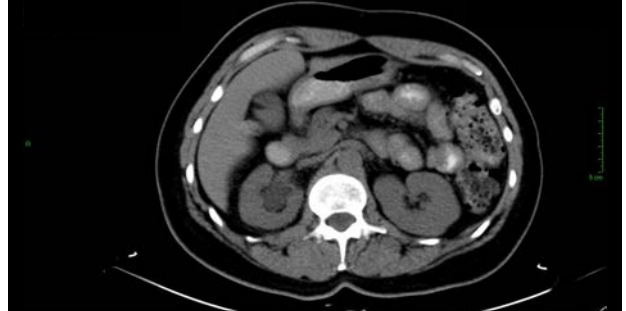
Lines and Tubes

Nephrostomy tube

49-y-old woman Ca cervix

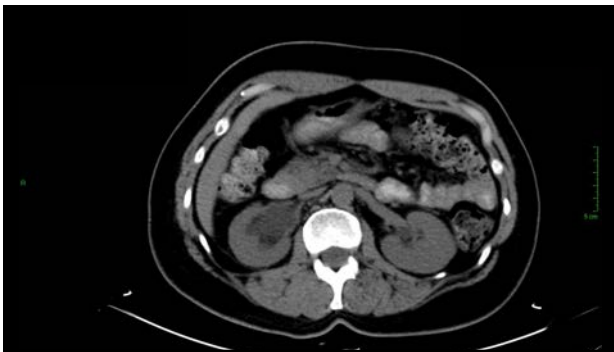
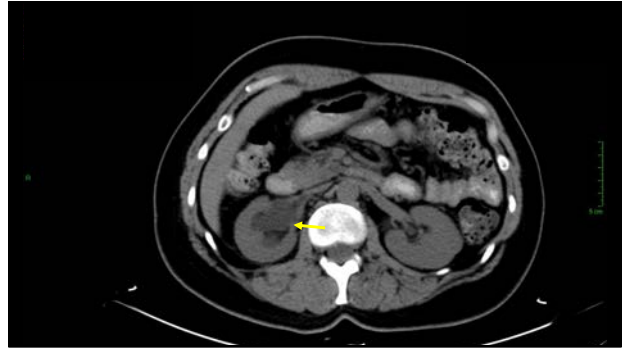
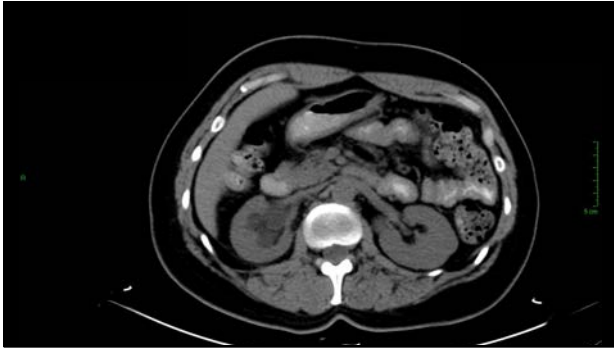


2 days later - PET/CT restaging



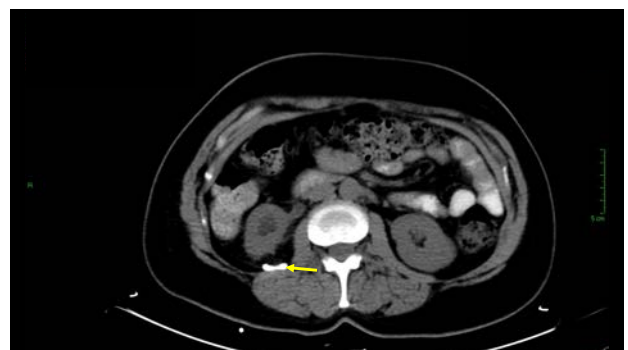
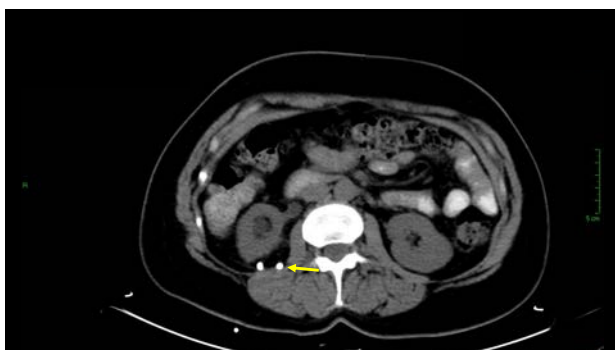
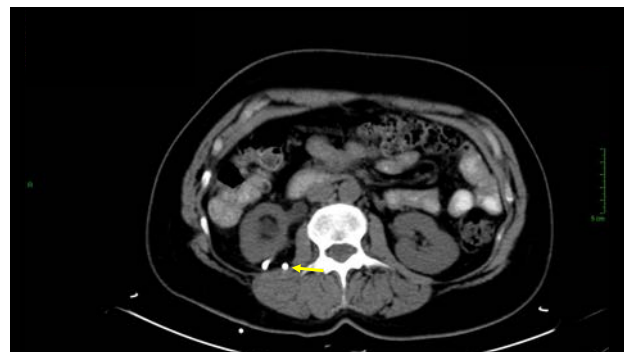
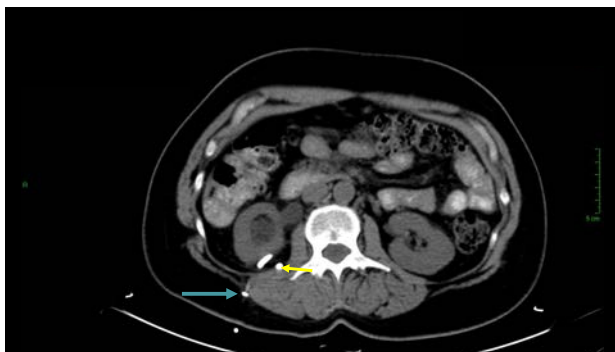
Iatrogenic Complications Affecting the Urinary Tract

Gabriela Gayer, MD



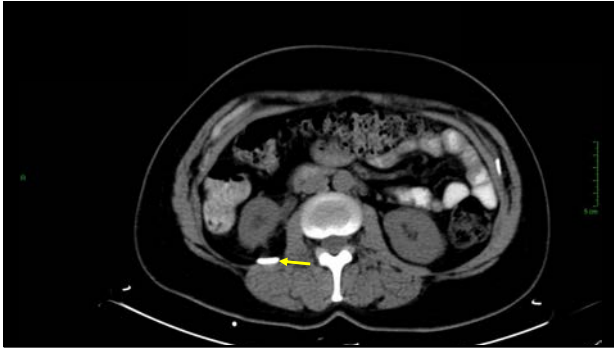
Iatrogenic Complications Affecting the Urinary Tract

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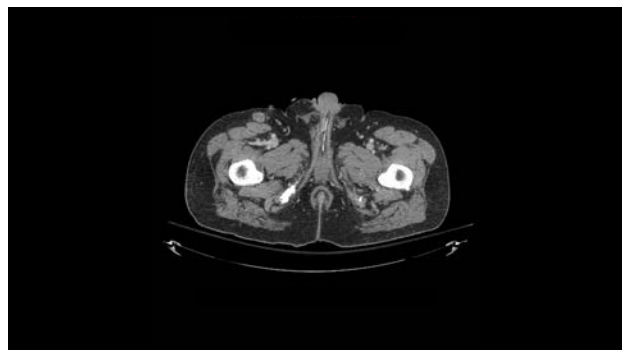
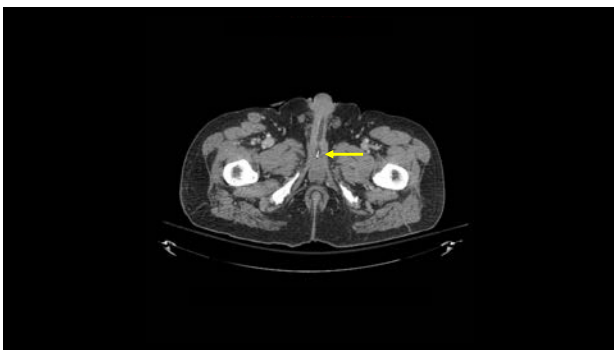
Iatrogenic Complications Affecting the Urinary Tract

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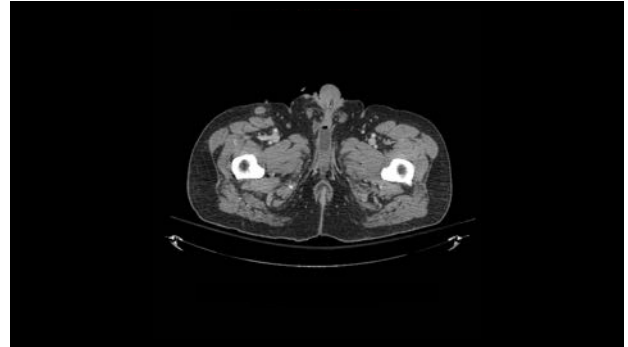
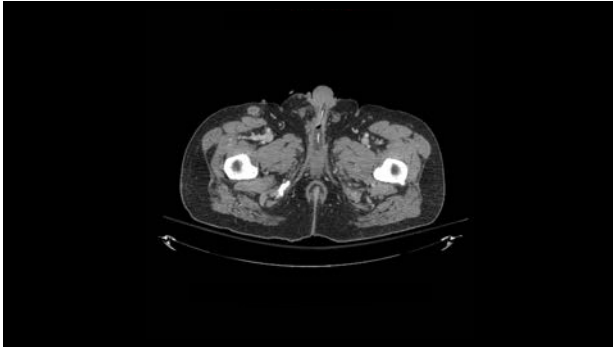
Lines and Tubes

The Foley Catheter

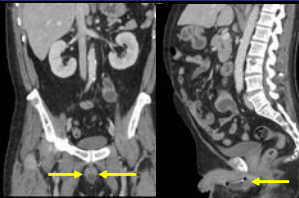


Iatrogenic Complications Affecting the Urinary Tract

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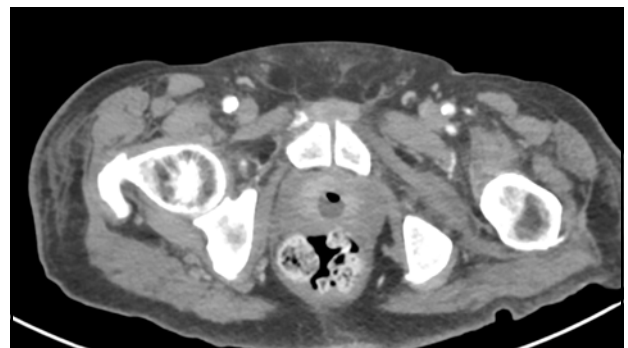


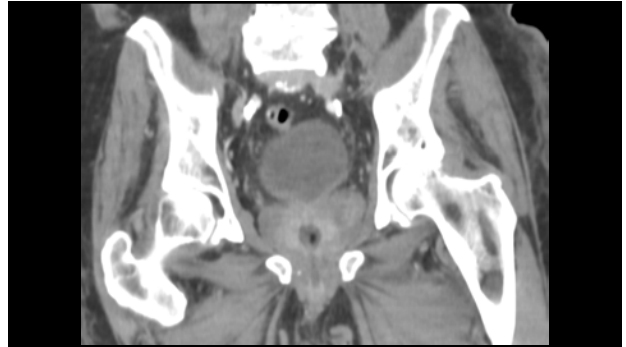
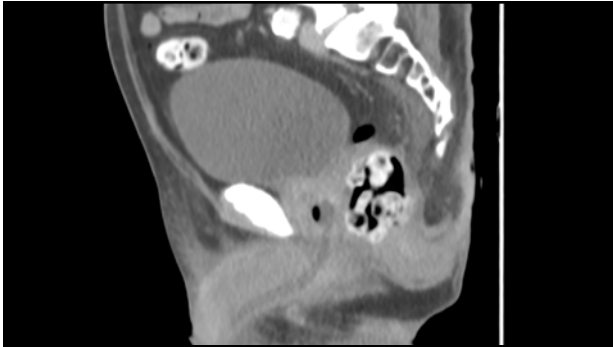
Malpositioned Foley Catheter



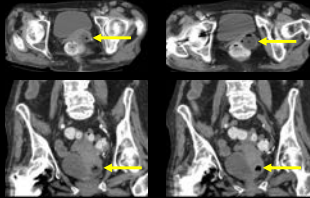
Malpositioned Foley catheter in the prostatic urethra, easily overlooked on axial images

Foley catheter in penile urethra





Malpositioned Foley Catheter



Foley catheter misplaced within the vagina

Iatrogenic Complications

- Medical treatment
- Surgical treatment
- Minimally invasive procedures
- Radiation therapy
- Lines and Tubes

Conclusion

- Referring physicians rarely suspect the correct etiology of the pathological entities reviewed
- The radiologist plays a key role in the evaluation of these patients
- Accurate diagnosis depends on the radiologist and is critical to reduce the potential impact of subsequent complications.

Thank you

