**Listen to the associated podcast episodes available at theradiologyreview.com or on your favorite podcast directory.**

**What are key computed tomography (CT) findings in acute pyelonephritis?**
CT findings in Acute Pyelonephritis can be nonspecific, and the CT may be normal in up to 75% of cases. When findings are present, they can include a unilaterally enlarged kidney, wedge-shaped or striated regions of decreased enhancement, and perinephric stranding. The urothelium may also be thickened and hyperenhancing. Acute pyelonephritis may be complicated by renal abscess, which can appear as round or geographic low attenuation collections that do not enhance centrally but have an enhancing rim.

**What are the typical ultrasound findings in acute pyelonephritis?**
The most common appearance on ultrasound in acute pyelonephritis is a normal kidney. Occasionally, generalized renal edema and engorgement can be seen. Focal pyelonephritis may present as a hypoechoic mass (or masses) that disrupts the corticomedullary junction without a distinct wall. In emphysematous pyelonephritis, ultrasound shows hyperechoic echoes in the renal parenchyma representing gas locules with posterior dirty acoustic shadowing.

**How can Nuclear Medicine with DMSA be used in the evaluation of acute pyelonephritis?**
A normal DMSA study excludes the diagnosis of acute pyelonephritis. A positive study can show focal cortical defects, multifocal cortical defects, or diffusely decreased radiotracer uptake.

**What might a Nuclear Medicine scan with MAG3 or DTPA show in cases of acute pyelonephritis?**
In acute pyelonephritis, there may be asymmetric decreased renal uptake in the flow phase on a Nuclear Medicine scan with MAG3 or DTPA. Remember that MAG3 is not an inflammatory marker like FDG but shows uptake in normally functioning kidney. With areas of acute pyelonephritis, normal renal function can be impaired, and uptake may be reduced or absent.

**What are classic computed tomography (CT) findings of a renal abscess?**
A renal abscess appears on CT as round or geographic low attenuation collections that do not enhance centrally but have an enhancing rim.

**How does a renal abscess typically appear on ultrasound?**
On ultrasound, a renal abscess appears as a well-defined hypoechoic area, typically close to the cortex or the corticomedullary portion of the kidney.

**What are the imaging findings of emphysematous pyelonephritis on computed tomography (CT)?**
CT shows gas replacing the renal parenchyma, and gas may extend into the ureter in emphysematous pyelonephritis. Emphysematous pyelonephritis is an acute emergency and without early intervention has a high mortality. Classic clinical history would include a renal infection in a diabetic with hyperglycemia or an immunocompromised patient.

**How does emphysematous pyelonephritis appear on ultrasound?**
Ultrasound shows high-amplitude echoes in the renal parenchyma representing gas locules with posterior dirty acoustic shadowing in emphysematous pyelonephritis.

**Listen to the associated podcast episodes available at theradiologyreview.com or on your favorite podcast directory.**

**What might radiography show in emphysematous pyelonephritis?**
Gas may be visible within or surrounding the kidney on an abdominal radiograph in emphysematous pyelonephritis.

**What are key clinical features of pyonephrosis?**
Pyonephrosis occurs when a renal infection results in pus in the upper renal collecting system which can become obstructed. Clinical symptoms include fever and flank pain with clinical and imaging findings of urinary tract obstruction on that side.

**What are classic ultrasound features of pyonephrosis?**
Ultrasound features of pyonephrosis include echoes within a dilated collecting system. A fluid level may be present.

**What is a limitation of computed tomography (CT) in distinguishing pyonephrosis from hydronephrosis?**
CT has trouble telling the difference between hydro- and pyonephrosis. However, if hydronephrosis is present on CT and there are clinical findings of urinary tract infection with fever and flank pain on that side, pyonephrosis should be considered. Secondary findings can include urothelial thickening, perinephric inflammatory changes, gas- of fluid-fluid level(s) in the collecting system.

**What computed tomography (CT) finding can be indicative of acute ureteral obstruction?**
A unilateral prolonged nephrogram (slow renal parenchymal uptake and prolonged enhancement) on CT can be due to acute ureteral obstruction. CT urography is used to evaluate the kidneys, ureters, and bladder, aiming to maximally distend and opacify the ureters and bladder to help reveal a cause of obstruction.

**What are CT urography findings suggestive of papillary necrosis of the renal calyces?**
Delayed imaging on CT urography can show pooling of contrast adjacent to the renal calyces in papillary necrosis, described as the "ball on tee sign," "lobster claw sign," and "signet ring sign".

**What is the role of Nuclear Medicine with MAG3 or DTPA in evaluating suspected acute renal obstruction?**
Suspected obstruction is one of the indications for dynamic renal scanning with Nuclear Medicine using MAG3 or DTPA. In obstruction, a diuretic renogram can help distinguish between obstruction and nonobstructive causes of collecting system dilation. A fixed mechanical obstruction will show no significant change in the renogram curve after Lasix administration. Asymmetric decreased renal uptake in the flow phase can indicate chronic obstruction with delayed uptake.

**How does a renal infarct typically appear on computed tomography (CT)?**
A renal infarct is most easily identified on post-contrast CT imaging in the cortical phase as wedge-shaped hypodensities in the kidney. Two potential tricks are the "Cortical Rim Sign", seen 8 hours to days later due to dual blood supply to the cortex, and "Flip Flop Enhancement", where a hypodense area on early phases becomes relatively hyperdense on delayed imaging. If the entire renal artery is occluded, the kidney will not enhance.

**Listen to the associated podcast episodes available at theradiologyreview.com or on your favorite podcast directory.**

**What might Nuclear Medicine with MAG3 or DTPA show in a renal infarct?**
Asymmetric decreased renal uptake in the flow phase can be seen with renal artery thrombosis or renal vein thrombosis on Nuclear Medicine with MAG3 or DTPA, which could lead to a renal infarct.

**What are the classic computed tomography (CT) findings in renal vein thrombosis?**
Renal vein thrombosis on CT can present with an enlarged kidney and a delayed nephrogram.

**How might renal vein thrombosis be identified on ultrasound with Doppler?**
Ultrasound with Doppler will show reversed arterial diastolic flow and absent venous flow in renal vein thrombosis.

**What might Nuclear Medicine with MAG3 or DTPA show in renal vein thrombosis?**
Asymmetric decreased renal uptake in the flow phase can be seen in renal vein thrombosis on Nuclear Medicine with MAG3 or DTPA.

**What is a key finding of renal artery thrombosis on computed tomography (CT)?**
The affected kidney will show a lack of or significantly decreased enhancement in renal artery thrombosis on CT. CT angiography with arterial phase imaging will best show the filling defect in the renal artery.

**What is a key finding of renal artery thrombosis on Nuclear Medicine with MAG3 or DTPA?**
Asymmetric decreased renal uptake in the flow phase is a key finding in renal artery thrombosis on Nuclear Medicine with MAG3 or DTPA .

**How is renal trauma evaluated using computed tomography (CT)?**
The Organ Injury Scale (OIS) is the most widely used classification of renal injury. Grades I-III include nonexpanding hematomas or parenchymal laceration without collecting system injury. Grade IV includes a deep parenchymal laceration extending to the collecting system with extravasation of opacified urine on delayed imaging, or injury to the renal artery or vein with contained hemorrhage. Grade V is a shattered kidney with avulsion of the renal hilum. Delayed imaging may be helpful to demonstrate a urine leak. A subcapsular hematoma can compress the renal parenchyma.

**What is so-called Page kidney?**
Page kidney results from external compression of the kidney due to a subcapsular hematoma, urinoma, seroma, or other subcapsular collection. This results in renal function compromise and hypertension. Flank pain may be present. This may result from trauma or surgery with subscapular bleeding, rupture of an aneurysm, mass, or cyst. Imaging will show a subcapsular collection, and one may see elevated resistive indices within the renal artery on ultrasound and a delayed nephrogram on CT or MRI.

**What is a hallmark finding for acute renal transplant rejection on Nuclear Medicine with MAG3 or DTPA?**
A hallmark for acute renal transplant rejection is impaired blood flow, leading to delayed perfusion to the transplant kidney in the flow phase on Nuclear Medicine with MAG3 or DTPA. Both acute rejection and acute tubular necrosis can show delayed cortical transit and excretion.