

# Radiodiagnostic examination of the urinary tract

## Native nephrogram

A native image of the abdomen ranging from the cranial margin of the kidneys to the symphysis is used as a basic examination to rule out contrast urolithiasis, which appears as a shadow of calcification satiety during the excretory urinary tract. Very often, however, the picture is ambiguous, when it is not possible to distinguish, for example, phleboliths in the pelvis from urolithiasis. The image is often disturbed by the sum of the contents of the intestinal loops, when the contours of the kidneys may not even be visible and contrast urolithiasis cannot be reliably ruled out. Non-contrast stones (which do not contain calcium) cannot be displayed. A shadow of a filled bladder may be visible in the pelvis.



Nativní nefrogram: nefrolithiáza, kalcifikace v parenchymu ledvin (<http://atlas.mudr.org/Case-images-Nephrolithiasis-kidney-stones-calcified-splenic-artery-Chinese-dragon-sign-795>)



Nativní nefrogram: odlitková nefrolithiáza (<http://atlas.mudr.org/Case-images-Casting-renal-stones-nephrolithiasis-385>)

## Ultrasonography

The main and at the same time the most accessible examination method for the assessment of the urinary tract. Calcification in the hollow system of the kidney can be assessed with a certainty of about 5 mm, in smaller stones the certainty of the image decreases significantly. Ultrasound will confidently show the expansion of the hollow system during congestion, but erudition requires a distinction of mild degrees of congestion from anatomical variants - ampullary type of pelvis, common upper calyx. Ultrasound sensitivity is low in pyelonephritis, structural changes can be seen in more than 1/3 of cases in more advanced infection. The importance of ultrasound in pyelonephritis lies in the depiction of complications and the exclusion of congestion in the hollow system as the cause. The pyeloureteral junction and intramural part and their possible spread during congestion, reflux and ureterocele can usually be displayed from the ureter. It is rare to see a wedged stone in the intramural part of the ureter. The bladder wall can be evaluated by ultrasound well if it is sufficiently filled. Wall thickening is most often observed in trabecular hypertrophy, localized wall thickening with an obvious flow in the color record arouses suspicion of a tumor. The bladder content is normally anechogenic; sometimes it is possible to show sediment in the bladder that moves with a change in the position of the subject. Ultrasound the prostate can be seen well, but when it is enlarged, it is usually not possible to judge whether it is benign or malignant.



UZ ledvin: městnání v dutém systému (<http://atlas.mudr.org/Case-images-Hydronephrosis-568>)



UZ močového měchýře: ureterocoele (<http://atlas.mudr.org/Case-images-Ureterocoele-448>)



UZ ledvin: městnání v dutém systému, rozšířený proximální ureter (<http://atlas.mudr.org/Case-images-Hydronephrosis-mild-edema-of-kidney-569>)



UZ močového měchýře: trabekulární hypertrofie močového měchýře (<http://atlas.mudr.org/Case-images-Trabecular-hypertrophy-of-bladder-wall-634>)

## Excretory urography

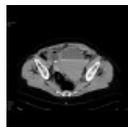
Contrast examination of the hollow system of the kidneys, ureters and bladder after intravenous administration of iodine contrast agent. The examination begins with the creation of a native nephrogram (see above). After administration of the contrast medium, the excretion of the contrast medium by the kidneys and the subsequent transport of the contrast urine through the urethra into the bladder is evident after about 3 minutes. Contours, placement, kidney size, structural changes in the calyx system (eg, "breakage" in parapelvic cysts, symptom of wilted lily in duplication of the calyx system), timeliness and adequacy of excretion (side comparison), urethral width, bladder filling before and after urination. In case of limited clarity, eg. when summation with intestinal contents, it is necessary to make tomograms. Today, the examination is gradually being replaced by CT excretory urography.

## Urinary urethrocytography

Retrograde filling of the urethra and bladder with iodine contrast agent. The shape and contours of the bladder, the residue after micturition, the course of micturition, the contours and the patency of the urethra are evaluated.

## Computed tomography (CT)

In addition to routine CT of the abdomen and pelvis, which is used, for example, in staging tumors, the following tests are used in the diagnosis of urinary tract diseases.



CT břicha a pánve: krvácení do močového měchýře (<http://atlas.mudr.org/Case-images-Bleeding-into-urinary-bladder-135>)

### CT nephrogram

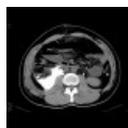
One of the few indications for native CT of the abdomen and pelvis is a native CT nephrogram to rule out urolithiasis. In addition to calculi in the urinary tract, which may not otherwise be seen on the native nephrogram, congestion in the hollow kidney system, cortical cysts of the kidneys, free fluid in the pelvis can be assessed. However, the evaluation of parenchymal organs of the abdominal cavity without the administration of a contrast agent is only quite indicative.



CT nefrogram: drobný konkrément zaklíněný v intramurální části ureteru (<http://atlas.mudr.org/Case-images-Intramural-ureterolithiasis-350>)

### CT excretory urography

The examination is usually performed as a delayed phase during a CT examination of the abdomen and small pelvis about 5 minutes after intravenous administration of an iodine contrast agent, when the urine and thus the excretory system are opacified. It is possible to distinguish the central cysts from the enlargement of the hollow system (cysts do not affect), developmental anomalies (doubling of the hollow system, ureter fissus, ureter duplex), mucosal pathology (especially urothelial carcinoma), urine leakage from the hollow system after traumas (urinoma).



CT vylučovací urografie: urinom (<http://atlas.mudr.org/Case-images-Urinoma-265>)



CT vylučovací urografie: zdvojený dutý systém, ureter fissus (<http://atlas.mudr.org/Case-images-Duplication-of-collecting-system-of-kidney-ureter-fissus-878>)



CT vylučovací urografie: parapelvické cysty ledvin (<http://atlas.mudr.org/Case-images-Parapelvic-cysts-of-kidney-Paramo%27s-syndrome-VRT-808>)

### CT of the bladder

CT of the bladder itself to prove its event. perforation (in case of trauma) or communication with other organs should be performed after filling it with a contrast agent via a urinary catheter.

## Magnetic resonance imaging (MRI)

### MR Urography

Native MR examination in strongly weighted T2 sequences displays urine in the excretory tracts as hypersignal. If a sufficient filling of, for example, the ureter is not achieved, its imaging can be improved after administration of a contrast agent, furosemide (diuretic) and antispasmodics. MR urography can be used to show the enlargement of the hollow kidney system (congestion), ureteral stricture, congenital anomalies, bladder diverticula, neovesicum (postoperative conditions), urothelial neoplasms. MR is not a suitable method for imaging ureterolithiasis due to poor spatial resolution.

# Links

## related articles

- Ledviny
- Vyšetření funkce ledvin
- Ultrazvuk/Diagnostické aplikace ultrazvuku

## Reference

## External links

- Degrees of hydronephrosis mudr.org (<http://www.mudr.org/web/hydronefroza-stupne>)
- Pictures atlas.mudr.org (<http://atlas.mudr.org/Radiology-images-system-and-organ-Urinary-tract-70>)

Kategorie:Radiodiagnostika Kategorie:Urologie Kategorie:Nefrologie