

Magnetic Resonance Imaging (MRI) – Urogram

What is a Magnetic Resonance Imaging (MRI) Urogram?

Definition

A Magnetic Resonance Imaging (an MRI) Urogram creates images of the kidneys, the ureters (tubes that transport urine from the kidneys to the bladder), and the bladder in order to evaluate their condition and to assist with the diagnosis and treatment of problems. An MRI Urogram is very similar to the procedure known as an Intravenous Pyelogram (both creates images of the kidneys, ureters, and bladder and are used to measure their functioning), but it is also different in several important ways (namely, that the Intravenous Pyelogram uses x-rays to create images, whereas an MRI Urogram uses magnetic waves to create its images). An MRI Urogram can be used for patients who are allergic to iodine or other materials used in the contrast dye for x-rays (because the contrast dye used in MRIs is gadolinium) and for patients with renal failure or renal transplant patients.

How It Works

During an MRI Urogram, a technician will inject a contrast material (dye) into the body via an IV (intravenous drip). The contrast material contains a magnetic substance. When the MRI equipment is put in motion, the contrast material reacts to the magnets to reveal the details of the structures within and around the area being examined, similar to the way x-rays create images of bones. The difference is an MRI uses a powerful magnetic field and radiofrequency pulses to create detailed pictures, whereas an x-ray uses radiation. Often, before an MRI Urogram a catheter is inserted through the urethra (opening through which urine leaves the body) into the bladder to make sure the bladder remains empty during the test, so the best possible images can be captured.

Common Uses

MRI Urograms are commonly used to diagnose:

- How well the patient's body is able to get rid of fluid waste
- Causes of blood in the urine
- Causes of pain in the patient's side or lower back
- Kidney stones
- Enlarged prostate
- Tumors in the kidneys, ureters, or bladder

Benefits and Risks

Benefits

- Magnetic resonance imaging (MRIs) can help identify causes of pain and help the patient make informed decisions about further treatment.
- Magnetic resonance imaging (MRIs) can produce much higher quality images of the body's internal structures than other methods, which can make a crucial difference in a doctor's ability to quickly and accurately evaluate the cause of the patient's discomfort.
- Magnetic resonance imaging is a non-invasive procedure.

- The patient is not exposed to any radiation during an MRI procedure.
- The contrast material (dye) used in MRIs is less likely to cause allergic reactions than those used for x-rays and CT scans.

Risks

- There is an extremely small risk of developing an infection (less than 1 in 1,000) at the site where the patient's skin is punctured to establish the intravenous drip (IV), which would require treatment with antibiotics if it were to arise.
- Medical devices inside the body that contain metal may cause problems during any MRI exam because they will be affected by the magnets in the MRI equipment.
- In extremely rare cases, patients with compromised kidney function who are injected with high doses of gadolinium contrast material (magnetic dye) during an MRI can develop nephrogenic systemic fibrosis.
- Other potential risks may vary from patient to patient; the patient should speak to his or her doctor before the procedure about any questions or concerns.

How Should I Prepare for My Appointment?

Restrictions on what a patient may eat or drink before an MRI procedure vary, based on the type of procedure to be performed and the facility's guidelines. In certain cases, the patient may be asked to fast (to avoid consuming any food or liquids aside from water) for 8-12 hours before the procedure. The patient should check with the facility to see if he/she can eat, drink, and take medication as usual before the procedure. If the patient is claustrophobic or a young child, the patient (or his/her guardians) might ask the doctor in advance to administer a mild sedative during the procedure. If the patient will be sedated (which is usually not the case), further restrictions on eating and drinking beforehand might apply. The patient should notify his or her doctor of any drugs or materials to which he/she is allergic and should notify doctor of pregnancy or of any other pertinent details of his or her medical history (prescriptions, recent illnesses or injuries, or serious health problems, etc.).

What Will Happen During the Procedure?

- The patient will be asked to remove any items of clothing, jewelry, or other accessories that might interfere with the procedure. The patient may be allowed to wear his or her own clothing if it is loose fitting and does not have metal parts, zippers, metal buttons, metal hooks, or other metal fasteners.
- If the patient is required to remove his or her clothing, a gown will be provided.
- The technician may insert a catheter through the patient's urethra into the bladder to keep the bladder empty during the test. If the patient is to be sedated as part of the procedure, the catheter would be inserted after sedation.
- The technician will insert a needle into a vein to establish an IV (a harmless saline solution would most likely be dripping from the IV bag until it is time to insert the contrast dye via the IV, after any initial scans).
- The technician may instruct the patient to lie down on the examination table and slide the table inside the cylindrical chamber to take some initial images of the body before the contrast material is introduced into the body's system (i.e., taking "before" photos).
- The patient will be positioned on the moveable examination table. Then, the examination table will be slid into position inside the cylindrical tube.

- The cylindrical tube houses a circular magnet, which will move and rotate around the patient's body on the exam table.
- The patient will need to remain very still while the MRI machine takes images of the body.
- The patient will be alone in the exam room (a parent or friend may be allowed to stay in the room), but the technician will be able to see and speak with the patient through a two-way intercom. The patient may feel slightly warm during the scan, and the MRI machine can be slightly noisy (it "thumps" and "hums" while the magnets inside move).
- After all the necessary images have been collected (sometimes several "runs" are necessary to obtain clear enough and detailed enough images of the body part or area in question), the exam table will be moved back out of the cylindrical tube and the patient may get up.
- If an IV or catheter was inserted, it would be removed after the procedure is complete.

What Should I Expect After the Procedure?

If the patient has been sedated as part of the MRI procedure, a short recovery period may be required; otherwise, the patient may generally go on with his or her normal routine and activities. A few patients may experience side effects from the contrast material such as nausea or localized pain in the part of the body that was under examination. The contrast material should leave the body through the urine after 24-48 hours; urine color should remain normal. A few patients may experience an allergic reaction to the contrast dye and should contact the facility or their primary care provider for assistance. There is conflicting research about whether or not breastfeeding mothers should continue nursing immediately after being injected with the contrast dye through an IV; the manufacturers of the contrast dye recommend mothers abstain from breastfeeding for 24 to 48 hours after the procedure (using a breast pump to store extra milk ahead of time and expressing and discarding their milk during that 24-48 hour time period).