Tests and procedures used to check function of the urinary system

There are many tests that can be done to check that the urinary system is functioning as well as possible. The tests vary from a simple blood test to more invasive procedures. All tests performed are done with your consent and should be fully explained to you beforehand. You may not necessarily have all the tests and or procedures performed.

Investigations

Urine tests (also called urinalysis)

Urine Microscopy – White and red blood cells and bacteria in the urine can indicate problems such as urine infection and stones.

Urine Culture and Sensitivity – This is where a sample of urine is taken to see if there are any harmful bacteria (germs) growing in it. The same sample can be used to find out what antibiotics will kill the bugs (sensitivity).

Creatinine Clearance – Urine is collected for a period of 24 hours then tested to measure the amount of creatinine in it. A blood sample is taken at the same time to compare levels. The creatinine levels are raised if there is advanced renal (kidney) disease because creatinine cannot be excreted (got rid of) by the kidneys which are seriously damaged.

Blood tests

Blood consists of plasma in which the blood cells are suspended. The most numerous cells are the red blood cells which help carry oxygen around your body. About a hundredth of the cells are white cells: their main job is to fight infection.
Blood is taken for the following tests:–

**Full Blood Count (FBC)** – This measures your haemoglobin (found in your red blood cells) levels to make sure you are not anaemic; the number size and shape of your red cells, to make sure they work properly, and the number of your white cells. If there are more white cells than normal, it may be a sign of infection somewhere.

**C-Reactive Protein** – The level in the blood rises if there is an infection, and drops again when the infection passes. CRP can be high for other reasons, such as just after an operation.

**Erythrocyte Sedimentation Rate (ESR)** – This is another test that can be used to look for infection. It measures the rate at which red cells settle out of suspension in blood plasma. If they settle more quickly than “normal”, infection may be present, though as with CRP it can be raised for other reasons.

**Urea and Electrolytes (U and E)** – Urea is the main end product of protein breakdown and is excreted by the kidneys. Urea rises if renal function is impaired. Electrolytes are a common name for the body’s salt, such as sodium. If you are dehydrated, the sodium and urea may be raised.

**Imaging tests**

Urodynamics – Urodynamics means the study of the pressure and flow of urine in the lower renal tract, (the bladder, and the tube through which you pass urine, called the urethra). A urodynamics study helps to determine if your current treatment is working for you, or if changes need to be made. The objective of a urodynamics study is to reproduce the patient’s complaints or symptoms. Video urodynamics may provide additional information that helps to further understand the problem. Urodynamics is used to answer three questions:

- At what pressure does the bladder store urine?

- Are there any abnormal dynamics such as overactivity or poor bladder compliance which can damage the kidneys?
How does the bladder empty?

Urodynamics are classified in two different categories: non-invasive, and invasive, and the procedure often varies among hospitals.

Prior to starting urodynamics, a detailed interview must be done by the healthcare team. The interview is important because it gives vital information about your medical history, home and school or work environment, attitude toward the urologic condition, and your willingness to cooperate with treatments.

Non-invasive or simple urodynamics is done to evaluate urine flow. You will usually be asked to go for the test with a full bladder if you can manage it. You will be asked to pass urine into a machine that looks like a toilet which can measure the rate at which your urine flows and the amount you pass. At least two free voids (wees) are necessary to understand the flow pattern. Also, some hospitals stick patches on the outer thighs and buttocks to measure muscle contractions while you urinate.

Afterwards, you will be asked to lie on a table while fully clothed, and an ultrasound image of the bladder will be performed. An ultrasound is a diagnostic test that uses sound waves to get an image of the bladder. It is used to measure the amount of urine remaining in the bladder. An ultrasound is done by gently moving an instrument (which looks like a microphone) over your lower tummy, which will be coated with a cool gel.

This appointment usually takes about half an hour, and when children are undergoing the procedure, parents usually stay in the room. No catheters are required for this procedure. Based on the results of the non-invasive study, the urologist will either be able identify the treatment you require, or will need to perform invasive urodynamics in order to get additional information that is only available from more detailed assessment.

Invasive Urodynamics requires the insertion of a catheter (into the bladder), usually in the suprapubic region. A suprapubic catheter is
normally inserted under anaesthesia 24 hours before the urodynamics study is done. For some people who have no sensation in the urethra, a urinary catheter may be used instead of suprapubic. However, that often produces anxiety and causes error in measurement. The catheter is used to fill and empty the bladder, and also to measure pressure in the bladder and urethra.

Another catheter is passed into your rectum (back passage); this measures abdominal pressure. Sometimes, a gastrostomy tube can be used instead; or for those with an ACE, the catheter can be inserted into the ACE channel. When the test is finished the catheters are removed. The whole test takes between half an hour to one hour. Since invasive urodynamics can cause anxiety, it is important to have a qualified and cohesive team of professionals. They will show you the testing environment before the assessment is done, answer any questions, and give detailed information about the test and what you can expect.

**Bladder Scan** – This measures the bladder volume, and can indicate whether the bladder is large or small. It is a non-invasive procedure which uses ultrasound waves. Gel is put on to your tummy and a small smooth instrument is pressed over the skin.

**Cystogram** – This is an x-ray examination where dye is put in the bladder through a catheter. This can be done to detect reflux (backward flow) of urine from the bladder up the ureters to the kidneys.

The following tests are rarely used:

**Cystoscopy** – An instrument which looks like a small telescope is passed into the bladder via the urethra (tube through which urine leaves the bladder) to have a look at the bladder.

**Diethylene Triamine Pentacetic Acid (DTPA) Scan** – A radio nuclide (DTPA) is injected into the body, and a special camera shows it flowing through the kidneys. This is a useful test to show if there are any stones in the kidneys. The DTPA scan is not used as much as a DMSA scan. A DMSA (Dimercaptosuccinic Acid) scan is similar to the DTPA scan.
Retrograde Pyelography – Under general anaesthetic, fine catheters are passed through the bladder, up the ureters into the pelvis of the kidneys (on the bottom edge of the kidney). Dye is injected directly into the renal pelvis and x-ray pictures are taken.

Loopogram – This is an injection of dye into the loop of a urostomy. It can show reflux back into the kidneys, how they empty, and if there is thinning of the tubes out of the kidney.

Intravenous Pyelogram (IVP) – A dye which shows up on x-rays is injected into a vein. When the dye has worked its way around the body, a succession of x-ray pictures are taken of the urinary tract. The IVP reveals details of the kidneys, ureters and bladder. It tests kidney function and reveals the presence of stones in the kidneys or ureters and other abnormalities of the urinary tract. It can take 15 to 20 minutes for the injected dye to reach the kidneys. After the test you may be asked to pass urine, and another x-ray taken to see if you have any urine left in your bladder.

Surgical procedures

Following the results of any tests that you have done, your doctor may decide that one or more of the following procedures is necessary. Once again, they will be carried out with your consent and should be fully explained prior to the start of the operation.

Vesicostomy – A small cut made in the tummy and into the bladder. This allows urine to drain from the bladder and relieves high pressure within the bladder.

Cystoplasty – See “Bladder Augmentation” information sheet.

Supra pubic Catheterisation – A catheter is passed into the bladder via a small incision (cut) on the tummy. A leg bag is attached and urine drains out continuously.

Indwelling Catheterisation – A catheter (tube) is passed into the bladder via the urethra to drain urine. The catheter remains in the bladder and a bag is attached to collect the urine. The bag is usually strapped to the leg, and is hidden.
by clothing. The catheter is usually changed about every 3 months.

**Intermittent Self-Catheterisation** – See “Intermittent Self Catheterisation” information sheet.

The following are rarely used:

**Ureterostomy** – Under general anaesthetic, a ureter is brought out on to the surface of the skin. Urine drains directly from the kidney into a suitable appliance, eg bag.

**Urethroplasty** – This is just another way of saying a surgical repair of the urethra.

**Ileal Conduit** – The ureter is implanted into a segment of bowel which is then opened out on to the surface of the skin to form a stoma. The urine can then drain from the kidney to a collection appliance (“stoma bag”) fixed over the stoma. This way the urine does not go into the bladder at all.

---

**Help us**

Shine relies on people’s generosity and support so we can help our clients who depend on us for help and advice - people with hydrocephalus, spina bifida, their families and carers. To donate to Shine please visit [www.shinecharity.org.uk](http://www.shinecharity.org.uk) or call 01733 421329.

This information has been produced by Shine’s medical advisers and approved by Shine’s Medical Advisory Committee of senior medical professionals.

Shine - Registered charity no.249338

To see our full range of information sheets and to find out how to donate to Shine please visit [www.shinecharity.org.uk](http://www.shinecharity.org.uk)