

Voiding Cystourethrogram

A voiding cystourethrogram (VCUG), or cystogram, is a radiology study to evaluate the structure and function of the urinary system. This study uses a small amount of radiation and an x-ray machine to take pictures of the urinary system while the bladder is filled with liquid contrast material. The radiology images are then projected onto a computer screen and evaluated by the radiologist and your child's medical provider.

Cystograms evaluate for concerns with the bladder, urethra (tube connecting the bladder to the outside of body), ureters (tubes connecting the bladder to the kidneys), and kidneys, including:

- Vesicoureteral reflux (VUR). See Vesicoureteral Reflux Handout for more information.
- Bladder structure and function, including; shape, capacity, and emptying.
- Bladder or urethral abnormalities/obstruction.

There are two types of cystograms: voiding cystourethrogram (VCUG)/fluoroscopic or radionuclide cystogram (RNC). Both tests use have similar preparation and procedure, but use different radiological technique.

Voiding Cystourethrogram (VCUG)/Fluoroscopic cystogram: Uses fluoroscopy and iodine based dye. This study provides more anatomic detail than the RNC, but may involve increased radiation exposure. If a cystogram is recommended for a child, VCUG is typically used for the initial study because it is more detailed and vesicoureteral reflux may be carefully graded on a scale of I-V.

Grade I: urine refluxes into the ureter only

Grade II: urine refluxes into the ureter and up to the kidney without dilation

Grade III: urine refluxes into the ureter and kidney and causes mild dilation

Grade IV: urine refluxes into ureter and kidney and causes dilation without twisting of the ureter

Grade V: urine refluxes into ureter and kidney and causes significant dilation with twisting of the ureter

Radionuclide cystogram (RNC): A nuclear medicine study which uses solution containing radioactive tracer. This study provides less anatomic detail than the fluoroscopic exam, and typically involves less overall radiation exposure. RNC's are usually used after initial VCUG examination to follow/monitor a patient's progress. VUR grading is less detailed with a RNC and is usually graded as: mild, moderate, or severe VUR.

Preparation:

Cystograms are performed in a private radiology room with an x-ray technician or nurse under physician supervision. There is no preparation for this test and no anesthesia is involved. Your child may be asked to change into a gown and to lay down on a table in a radiology room. A large radiology machine will hang over the patient table to take radiographic images, or pictures, of your child.

Please notify the technician if your child has any allergies, especially to contrast solution, or if you suspect anyone in the room is pregnant. X-rays are usually avoided during pregnancy due to the risk that radiation exposure may harm the developing fetus. If a parent would like to stay in

the room to comfort their child, then they will be asked to wear a lead apron to protect them from radiation exposure.

Your child may bring a special toy with them to the procedure if they would like to, and pacifiers/soothing toys are welcome. The procedure usually takes about 30-45 minutes.

Procedure:

The procedure involves the use of a catheter, or soft plastic tube, which will be inserted into the urethra and into the bladder. The radiology nurse will carefully clean the urethral opening and the catheter will be inserted into the urethra and into the bladder. The catheter is then taped in place against your child's leg. The catheter will then be attached to tubing filled with liquid contrast solution. The radiologist or nurse/technician will arrange the machine above the patient in order to take multiple radiographic images (pictures) of the abdomen and pelvis. The radiology nurse/technician will start the contrast fluid infusion and the contrast will then run into the bladder and fill the bladder. Multiple radiographic images will be taken during this time. Your child may be asked to shift carefully from one side to another to see different image angles. When your child feels the urge to urinate or the bladder is full, the contrast infusion will be discontinued and your child will be able to urinate into a container. Infants will urinate spontaneously. Radiographic images will also be taken during urinating. When your child feels they have completed urinating or the infant appears to be done, a final picture is taken and the catheter is removed.

What to expect:

After the procedure, your medical provider will analyze and discuss the results with your family.

Your child may experience some discomfort during insertion of the catheter or with beginning urination. After the procedure, there may be discomfort with the next several urination episodes and small blood spotting may be noted. If your child has continued pain and discomfort, or develops a fever or other concerns, please contact your medical provider.

Risks:

- Please notify your technician and provider if your child has an allergy to iodine as an allergic reaction may occur.
- There is a small risk of urinary tract infection after procedure. Please notify your provider for any signs/symptoms of infection, including pain with urination, urinary frequency, discomfort, or fever.
- There is ionizing radiation exposure with this test. Therefore a pediatric facility familiar with the latest recommended technique and minimal radiation exposure is recommended for this procedure.