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For patients

Pelvis Ultrasound

Ultrasound imaging of the pelvis uses sound waves to produce pictures of the structures and organs in the lower abdomen and pelvis. There are three types of pelvic ultrasound: abdominal, vaginal (for women), and rectal (for men). These exams are frequently used to evaluate the reproductive and urinary systems. Ultrasound is safe, noninvasive and does not use ionizing radiation.

This procedure requires little to no special preparation. You may be asked to drink water prior to the examination to fill your bladder. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.

What is Pelvic Ultrasound Imaging?

Ultrasound imaging is a noninvasive medical test that helps physicians diagnose and treat medical conditions. It is safe and painless. It produces pictures of the inside of the body using sound waves. Ultrasound imaging is also called sonography. It uses a small probe called a transducer and gel placed directly on the skin. High-frequency sound waves travel from the probe through the gel into the body. The probe collects the sounds that bounce back. A computer uses those sound waves to create an image. Ultrasound exams do not use radiation (x-rays). Because ultrasound captures images in real-time, it can show the structure and movement of the body's internal organs. The images can also show blood flowing through blood vessels.

There are three types of pelvic ultrasound:

- abdominal (transabdominal)
- vaginal (transvaginal/endovaginal) for women
- rectal (transrectal) for men

A Doppler ultrasound exam may be part of a pelvic ultrasound examination.

Doppler ultrasound is a special ultrasound technique that evaluates movement of materials in the body. It allows the doctor to see and evaluate blood flow through arteries and veins in the body.

What are some common uses of the procedure?

In women, a pelvic ultrasound is most often performed to evaluate the:

- uterus
- cervix
- ovaries
- fallopian tubes
- bladder

Pelvic ultrasound exams are also used to monitor the health and development of an embryo or fetus during pregnancy. *See the*

Obstetrical Ultrasound (https://www.radiologyinfo.org/en/info/obstetricus) page for more information.

Ultrasound examinations can help diagnose symptoms experienced by women such as:

- pelvic pain
- abnormal vaginal bleeding (https://www.radiologyinfo.org/en/info/vaginalbleeding)
- other menstrual problems
- infertility

Ultrasound exams also help identify:

- palpable masses such as ovarian cysts and uterine fibroids
- ovarian or uterine cancers

A transvaginal ultrasound is usually performed to view the endometrium (the lining of the uterus) and the ovaries. Transvaginal ultrasound also evaluates the myometrium (muscular walls of the uterus) and the fallopian tubes. Sonohysterography allows for a more in-depth investigation of the uterine cavity and Hysterosalpingo-Contrast-Sonography (HyCoSy) allows for assessment of patency of the fallopian tubes. Three-dimensional (3-D) ultrasound permits evaluation of the uterus and ovaries in planes that cannot be imaged directly. These exams are typically performed to detect:

- uterine anomalies
- uterine scars
- endometrial polyps
- fibroids
- cancer, especially in patients with abnormal uterine bleeding
- fallopian tube blockage
- ovarian cysts and masses

Some physicians also use 3-D ultrasound or sonohysterography or Hysterosalpingo-Contrast-Sonography (HyCoSy) for patients with infertility. In this setting, three-dimensional ultrasound provides information about the outer contour of the uterus and about uterine irregularities, as well as information about the fallopian tubes and ovaries. *See the Sonohysterography (https://www.radiologyinfo.org/en/info/hysterosono) page for more information.*

In men, a pelvic ultrasound is used to evaluate the:

- bladder
- seminal vesicles
- prostate

Transrectal ultrasound, a special study usually done to provide detailed evaluation of the prostate gland, involves inserting a specialized ultrasound transducer into a man's rectum. *See the Prostate Ultrasound (https://www.radiologyinfo.org/en/info/us-prostate) page for more information.*

In men and women, a pelvic ultrasound exam can help identify:

- kidney stones (https://www.radiologyinfo.org/en/info/stones-renal)
- bladder tumors
- other disorders of the urinary bladder

In children, pelvic ultrasound can help evaluate:

- pelvic masses
- pelvic pain
- ambiguous genitalia and anomalies of pelvic organs
- early or delayed puberty in girls

Pelvic ultrasound is also used to guide procedures such as needle biopsies, in which needles are used to extract a sample of cells from organs for laboratory testing.

Doppler ultrasound helps the doctor to see and evaluate:

- blockages to blood flow (such as clots)
- narrowing of vessels
- tumors and congenital vascular malformations
- reduced or absent blood flow to various organs, such as the testes or ovary
- increased blood flow, which may be a sign of infection

How should I prepare?

Wear comfortable, loose-fitting clothing. You may need to remove all clothing and jewelry in the area to be examined.

You may need to change into a gown for the procedure.

Ultrasound exams are very sensitive to motion, and an active or crying child can prolong the examination process. To ensure a smooth experience, it often helps to explain the procedure to the child prior to the exam. Bring books, small toys, music, or games to help distract the child and make the time pass quickly. The exam room may have a television. Feel free to ask for your child's favorite channel.

What does the equipment look like?

Ultrasound machines consist of a computer console, video monitor and an attached transducer. The transducer is a small hand-held device that resembles a microphone. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out inaudible, high-frequency sound waves into the body and listens for the returning echoes. The same principles apply to sonar used by boats and submarines.

The technologist applies a small amount of gel to the area under examination and places the transducer there. The gel allows sound waves to travel back and forth between the transducer and the area under examination. The ultrasound image is immediately visible on a video monitor. The computer creates the image based on the loudness (amplitude), pitch (frequency), and time it takes for the ultrasound signal to return to the transducer. It also considers what type of body structure and/or tissue the sound is traveling through.

Some ultrasound procedures, such as transvaginal or transrectal exams, require the doctor to insert the transducer into the body. In these cases, the doctor will cover the device with a sterile sheath and lubricate it.

How does the procedure work?

Ultrasound imaging uses the same principles as the sonar that bats, ships, and fishermen use. When a sound wave strikes an object, it bounces back or echoes. By measuring these echo waves, it is possible to determine how far away the object is as well as its size, shape, and consistency. This includes whether the object is solid or filled with fluid.

Doctors use ultrasound to detect changes in the appearance of organs, tissues, and vessels and to detect abnormal masses, such as tumors.

In an ultrasound exam, a transducer both sends the sound waves and records the echoing (returning) waves. When the transducer is pressed against the skin, it sends small pulses of inaudible, high-frequency sound waves into the body. As the sound waves bounce off internal organs, fluids and tissues, the sensitive receiver in the transducer records tiny changes in the sound's pitch and direction. A computer instantly measures these signature waves and displays them as real-time pictures on a monitor. The technologist typically captures one or more frames of the moving pictures as still images. They may also save short video loops of the images.

The same principles apply to transrectal and transvaginal ultrasound procedures. These exams require the doctor to insert a special transducer into the body.

Doppler ultrasound, a special ultrasound technique, measures the direction and speed of blood cells as they move through vessels. The movement of blood cells causes a change in pitch of the reflected sound waves (called the Doppler effect). A computer collects and processes the sounds and creates graphs or color pictures that represent the flow of blood through the blood vessels.

How is the procedure performed?

Transabdominal:

For most ultrasound exams, you will lie face-up on an exam table that can be tilted or moved. Patients may turn to either side to improve the quality of the images.

The radiologist (a doctor specifically trained to supervise and interpret radiology exams) or sonographer will position you on the exam table. They will apply a water-based gel to the area of the body under examination. The gel will help the transducer make secure contact with the body. It also eliminates air pockets between the transducer and the skin that can block the sound waves from passing into your body. The sonographer places the transducer on the body and moves it back and forth over the area of interest until it captures the desired images.

There is usually no discomfort from pressure as they press the transducer against the area being examined. However, if the area is tender, you may feel pressure or minor pain from the transducer.

Once the imaging is complete, the technologist will wipe off the clear ultrasound gel from your skin. Any portions that remain will dry quickly. The ultrasound gel does not usually stain or discolor clothing.

Transvaginal:

Doctors perform transvaginal ultrasound very much like a gynecologic exam. The doctor will insert the transducer into the vagina after you empty your bladder. The tip of the transducer is smaller than the standard speculum that a Pap test uses. The doctor places a protective cover over the transducer, lubricates it with a small amount of gel, and inserts about two to three inches of the transducer into the vagina. The doctor obtains images from different angles to get the best views of the uterus and ovaries. During transvaginal ultrasound, you will usually lie on your back, possibly with your feet in stirrups similar to a gynecologic exam.

Transrectal:

For a transrectal ultrasound, a protective cover is placed over the transducer. It is lubricated and then placed into the rectum.

Usually, you lie on your side, facing away from the examiner, with your knees and hips slightly flexed.

Doctors perform Doppler sonography with the same transducer.

When the exam is complete, the technologist may ask you to dress and wait while they review the ultrasound images.

What will I experience during and after the procedure?

For a transabdominal exam:

A clear water-based gel is applied to the abdomen. A transducer is moved back and forth over this area until the desired images are captured.

Most ultrasound exams are painless, fast, and easily tolerated.

For a transvaginal exam:

Doctors often use transvaginal ultrasound to look for a cause of pelvic pain. However, the sonogram itself should not be painful or significantly increase your discomfort. A vaginal sonogram is usually more comfortable than a manual gynecologic exam.

For a transrectal exam:

If no biopsy is necessary, transrectal ultrasound of the prostate is similar to or may have less discomfort than a rectal exam performed by your doctor.

If a biopsy is necessary, additional discomfort (due to the needle insertion) is usually minimal. This is because the rectal wall is relatively insensitive to the pain in the region of the prostate. A biopsy will add time to the procedure.

If the doctor performs a Doppler ultrasound exam, you may hear pulse-like sounds that change in pitch as they monitor and measure the blood flow.

These ultrasound examinations are usually completed within 30 minutes.

After an ultrasound exam, you should be able to resume your normal activities immediately.

Who interprets the results and how do I get them?

A radiologist, a doctor trained to supervise and interpret radiology exams, will analyze the images. The radiologist will send a signed report to the doctor who requested the exam. Your doctor will then share the results with you. In some cases, the radiologist may discuss results with you after the exam.

You may need a follow-up exam. If so, your doctor will explain why. Sometimes a follow-up exam further evaluates a potential issue with more views or a special imaging technique. It may also see if there has been any change in an issue over time. Follow-up exams are often the best way to see if treatment is working or if a problem needs attention.

What are the benefits vs. risks?

Benefits

- Most ultrasound scanning is noninvasive (no needles or injections).
- Occasionally, an ultrasound exam may be temporarily uncomfortable, but it should not be painful.
- Ultrasound is widely available, easy to use, and less expensive than most other imaging methods.
- Ultrasound imaging is extremely safe and does not use radiation.
- Ultrasound scanning gives a clear picture of soft tissues that do not show up well on x-ray images.
- Ultrasound is the preferred imaging modality for the diagnosis and monitoring of pregnant women and their unborn babies.

- Ultrasound provides real-time imaging. This makes it a good tool for guiding minimally invasive procedures such as needle biopsies and fluid aspiration.
- Pelvic ultrasound can help to identify and evaluate a variety of urinary and reproductive system disorders in both sexes without x-ray exposure.

Risks

- Standard diagnostic ultrasound has no known harmful effects on humans.

What are the limitations of Pelvic Ultrasound Imaging?

Ultrasound waves are disrupted by air or gas. Therefore, ultrasound is not an ideal imaging technique for the air-filled bowel or organs obscured by the bowel. Ultrasound is not as useful for imaging air-filled lungs, but it may be used to detect fluid around or within the lungs. Similarly, ultrasound cannot penetrate bone, but may be used for imaging bone fractures or for infection surrounding a bone.

Large patients are more difficult to image by ultrasound because greater amounts of tissue weaken the sound waves as they pass deeper into the body and need to return to the transducer for analysis.

Which test, procedure or treatment is best for me?

- *Adnexal Cyst Follow-Up (https://www.radiologyinfo.org/en/info/acs-adnexal-cyst-follow-up)*
- *Lower Urinary Tract Symptoms-Suspicion of Benign Prostatic Hyperplasia (https://www.radiologyinfo.org/en/info/acs-lower-urinary-tract-symptoms)*
- *Postmenopausal Subacute or Chronic Pelvic Pain (https://www.radiologyinfo.org/en/info/acs-postmenopausal-pelvic-pain)*

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