



## Sonohysterography

Hysterosonography, also called sonohysterography, uses sound waves to produce pictures of the inside of a woman's uterus and help diagnose unexplained vaginal bleeding. Hysterosonography is performed very much like a gynecologic exam and involves the insertion of the transducer into the vagina after you empty your bladder. Using a small tube inserted into the vagina, your doctor will inject a small amount of sterile saline into the cavity of the uterus and study the lining of the uterus using the ultrasound transducer. Ultrasound does not use ionizing radiation, has no known harmful effects, and provides a clear picture of soft tissues that don't show up well on x-ray images.

It is best to perform hysterosonography one week after menstruation to avoid the risk of infection. Little or no special preparation is required for this procedure. Inform your doctor if there's a possibility you are pregnant. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.

## What is Sonohysterography (Ultrasound of the Uterus)?

Ultrasound is safe and painless, and produces pictures of the inside of the body using sound waves. Ultrasound imaging, also called ultrasound scanning or sonography, involves the use of a small transducer (probe) and ultrasound gel placed directly on the skin. High-frequency sound waves are transmitted from the probe through the gel into the body. The transducer collects the sounds that bounce back and a computer then uses those sound waves to create an image. Ultrasound examinations do not use ionizing radiation (as used in x-rays), thus there is no radiation exposure to the patient. Because ultrasound images are captured in real-time, they can show the structure and movement of the body's internal organs, as well as blood flowing through blood vessels.

Ultrasound imaging is a noninvasive medical test that helps physicians diagnose and treat medical conditions.

Sonohysterography, also known as saline infusion sonography, is a special, minimally invasive ultrasound technique. It provides pictures of the inside of a woman's uterus.

A Doppler ultrasound study may be part of a sonohysterography examination.

Doppler ultrasound is a special ultrasound technique that evaluates blood as it flows through a blood vessel.

## What are some common uses of the procedure?

It is a valuable technique for evaluating unexplained vaginal bleeding that may be the result of uterine abnormalities such as:

- polyps
- fibroids
- endometrial atrophy
- endometrial adhesions (or scarring)
- malignant lesions/masses
- congenital defects

Sonohysterography is also used to investigate uterine abnormalities in women who experience infertility or multiple miscarriages.

Doppler ultrasound images can help the physician to see and evaluate:

- blockages to blood flow (such as clots).
- blood flow in polyps, tumors and congenital malformation.
- pelvic varicose veins and aneurysms.

## How should I prepare?

You should wear comfortable, loose-fitting clothing for your ultrasound exam. You may need to remove all clothing and jewelry in the area to be examined.

You may be asked to wear a gown during the procedure.

It is best to perform sonohysterography one week after menstruation to avoid the risk of infection. At this time in the menstrual cycle, the endometrium is at its thinnest, which is the best time to determine if the endometrium is normal. The timing of the exam may vary, however, depending on the symptoms and their suspected origins. Sonohysterography should not be performed if you are pregnant.

No special preparation is required prior to the exam. You may be advised to take an over-the-counter medication shortly before the procedure to minimize any potential discomfort.

## What does the equipment look like?

Ultrasound scanners consist of a console containing a computer and electronics, a video display screen and a transducer that is used to do the scanning. The transducer is a small hand-held device that resembles a microphone, attached to the scanner by a cord. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out high-frequency sound waves (that the human ear cannot hear) into the body and then listens for the returning echoes from the tissues in the body. The principles are similar to sonar used by boats and submarines.

The ultrasound image is immediately visible on a video display screen that looks like a computer or television monitor. The image is created based on the amplitude (loudness), frequency (pitch) and time it takes for the ultrasound signal to return from the area within the patient that is being examined to the transducer (the device placed on the patient's skin to send and receive the returning sound waves), as well as the type of body structure and composition of body tissue through which the sound travels. A small amount of gel is put on the skin to allow the sound waves to travel from the transducer to the examined area within the body and then back again. Ultrasound is an excellent modality for some areas of the body while other areas, especially air-filled lungs, are poorly suited for ultrasound.

For ultrasound procedures requiring insertion of the transducer, such as transvaginal or transrectal exams, the device is covered with a sheath and lubricated before insertion.

The saline is infused into the uterus by using a small, lightweight catheter.

## How does the procedure work?

Ultrasound imaging is based on the same principles involved in the sonar used by bats, ships and fishermen. 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 the object's size, shape and consistency (whether the object is solid or filled with fluid).

In medicine, ultrasound is used to detect changes in appearance, size or contour of organs, tissues, and vessels or to detect abnormal masses, such as tumors.

In an ultrasound examination, a transducer both sends the sound waves into the body and receives the echoing waves. When the transducer is pressed against the skin, it directs 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. These signature waves are instantly measured and displayed by a computer, which in turn creates a real-time picture on the monitor. One or more frames of the moving pictures are typically captured as still images. Short video loops of the images may also be saved.

The same principles apply to ultrasound procedures such as transrectal and transvaginal which require insertion of a special transducer into the body.

For sonohysterography, sterile saline is injected into the cavity of the uterus, distending or enlarging it. The saline outlines the endometrium (the lining of the uterine cavity) and allows for easy visualization and measurement. It also identifies any polyps or masses within the cavity. Saline and air may also be injected into the uterus so that the physician can look for air bubbles passing through the fallopian tubes, which would indicate patency of the fallopian tubes.

Doppler ultrasound, a special application of ultrasound, 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?

A baseline transvaginal ultrasound procedure is usually performed first to view the endometrium, or the lining of the uterus, including its thickness and any associated ovarian abnormality.

Transvaginal ultrasound is performed very much like a gynecologic exam and involves the insertion of the transducer into the vagina after you empty your bladder. The tip of the transducer is smaller than the standard speculum used when performing a Pap test. A protective cover is placed over the transducer, lubricated with a small amount of gel, and then inserted into the vagina. Only two to three inches of the transducer end are inserted into the vagina. The images are obtained from different orientations to get the best views of the uterus and ovaries. Transvaginal ultrasound is usually performed with you lying on your back, possibly with your feet in stirrups similar to a gynecologic exam.

Doppler sonography can also be performed through the transvaginal transducer. See the Pelvic Ultrasound page for more information.

Sonohysterography is then performed as a more in-depth investigation of the abnormalities and their potential causes. Determining the locations of certain abnormalities, such as fibroids or polyps, can be important when establishing a treatment or management strategy for a patient's particular condition.

Following the baseline exam, the transvaginal probe will be removed, and a sterile speculum will be inserted as you lie on your back with your knees bent or your feet in stirrups. The cervix will be cleansed, and a catheter will be inserted into the uterine cavity. Once the catheter is in place, the speculum will be removed, and the transvaginal probe will be re-inserted into the vaginal canal. Sterile saline will then be injected through the catheter into the uterine cavity as ultrasound is being performed.

This ultrasound examination is usually completed within 30 minutes.

## What will I experience during and after the procedure?

Ultrasound examinations are painless and easily tolerated by most patients.

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

During the sonohysterogram, you may feel occasional cramping as a result of the introduction of the saline. Over-the-counter medication should be sufficient to minimize any discomfort associated with the procedure. You may have vaginal spotting for a few days after the procedure, which is normal.

If a Doppler ultrasound study is performed, you may actually hear pulse-like sounds that change in pitch as the blood flow is monitored and measured.

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

## Who interprets the results and how do I get them?

A radiologist, a physician specifically trained to supervise and interpret radiology examinations, will analyze the images and send a signed report to your primary care physician, or to the physician or other healthcare provider who requested the exam. Usually, the referring physician or health care provider will share the results with you. In some cases, the radiologist may discuss results with you at the conclusion of your examination.

Follow-up examinations may be necessary. Your doctor will explain the exact reason why another exam is requested. Sometimes a follow-up exam is done because a potential abnormality needs further evaluation with additional views or a special imaging technique. A follow-up examination may also be necessary so that any change in a known abnormality can be monitored over time. Follow-up examinations are sometimes the best way to see if treatment is working or if a finding is stable or changed over time.

## 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 other imaging methods.
- Ultrasound imaging is extremely safe and does not use any ionizing radiation.
- Ultrasound scanning gives a clear picture of soft tissues that do not show up well on x-ray images.
- Sonohysterography is a simple, minimally invasive procedure that is well tolerated by patients and has very few complications.
- Sonohysterography is a relatively short procedure that provides an excellent view of the uterus and endometrial lining.
- Many uterine abnormalities that may not be seen adequately with routine transvaginal ultrasound may be viewed in detail with sonohysterography.
- Sonohysterography can prevent unnecessary surgery, and it can ensure that all polyps and fibroids are removed at surgery.

### Risks

- For standard diagnostic ultrasound, there are no known harmful effects on humans.

## What are the limitations of Sonohysterography?

Sonohysterography should typically not be performed in women with active pelvic inflammatory disease.

Sonohysterography may have a few limitations in certain clinical situations. In women with stenosis of the cervix, it may be somewhat difficult to insert the catheter into the cervical canal so that saline may be injected. Inadequate distension (expansion) of the uterine cavity from the saline injection may also

prevent good-quality ultrasound images from being obtained. This can occur especially with uterine adhesions (scarring) or large benign tumors called fibroids, which may partially obliterate the uterine cavity.

Also, sonohysterography is limited in the assessment of the patency, or openness, of the fallopian tubes because of their size and structure. In such cases where an abnormality of the fallopian tubes is suspected, a procedure such as hysterosalpingography might be recommended for further evaluation.

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