Pediatric Ultrasound - Abdomen



Children's (pediatric) ultrasound imaging of the abdomen uses sound waves to produce images of the inside of the body. It does not use radiation and has no known harmful effects. It is very useful for evaluating the causes of abdominal, pelvic or scrotal pain in children. Preparation will depend on the type of exam. When scheduling your child's ultrasound, ask if there are specific instructions for eating and drinking prior to the exam. Your child should wear loose, comfortable clothing and may be asked to wear a gown.

What is Abdominal 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 (http://www.radiologyinfo.org) . 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 (http://www.radiologyinfo.org) (x-rays (http://www.radiologyinfo.org)). 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.

Children's (pediatric) abdominal ultrasound imaging produces pictures of the abdominal organs.

In some instances, your doctor may also request Doppler ultrasound imaging along with the abdominal ultrasound to assess blood flow in specific abdominal arteries and veins.

Doppler ultrasound (http://www.radiologyinfo.org) 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?

Abdominal ultrasound may be performed to evaluate the size and appearance of the:

- appendix (http://www.radiologyinfo.org)
- stomach / pylorus (http://www.radiologyinfo.org)
- liver
- gallbladder
- spleen
- pancreas
- intestines
- kidneys
- bladder
- testicles
- ovaries

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- uterus

Abdominal ultrasound can also:

- help determine the source of abdominal pain, such as gallstones, kidney stones, abscesses or an inflamed appendix due to appendicitis
- help detect the presence and cause of an apparent enlarged abdominal organ
- identify the location of abnormal fluid in the abdomen
- help determine causes of vomiting in young infants

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

Doppler ultrasound can also help the doctor evaluate abnormal twisting (torsion) of a testicle or ovary. Torsion may limit proper blood flow into the testicle or ovary, resulting in scrotal or abdominal pain.

Because ultrasound provides real-time images, doctors may use it to guide procedures, including needle biopsies. Biopsies use needles to extract tissue samples for lab testing. Doctors also use ultrasound to guide insertion of a catheter or other drainage device. This helps assure safe and accurate placement.

How should we prepare for an abdominal ultrasound exam?

Your child should wear comfortable, loose-fitting clothing for an ultrasound exam.

When scheduling your child's examination please ask if there are any specific instructions regarding eating and drinking prior to the exam.

You may be asked to withhold food and drink for several hours before the exam to better visualize the gallbladder and upper abdominal organs.

On the other hand, your child may be asked to drink several glasses of water one to two hours prior to the exam and avoid urinating. This will ensure your child's bladder is reasonably full when the scan begins.

What does the ultrasound equipment look like?

Ultrasound machines consist of a computer console, video monitor and an attached transducer (http://www.radiologyinfo.org) . 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 ultrasound 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.

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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 (http://www.radiologyinfo.org) 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 ultrasound technologist typically captures one or more frames of the moving pictures as still images. They may also save short video loops of the images.

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?

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 ultrasound technologist applies a clear water-based gel to the body area under examination. This helps the transducer make secure contact with the body. It also helps eliminate air pockets between the transducer and the skin that can block the sound waves from passing into your body. The ultrasound technologist or radiologist places the transducer on the skin in various locations, sweeping over the area of interest. They may also angle the sound beam from a different location to better see an area of concern.

Doctors or ultrasound technologists will perform Doppler sonography at the same time with the same transducer.

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

An ultrasound exam is usually completed within 30 minutes.

What will my child experience during and after the procedure?

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

Your child will lie face-up on an examining table. The ultrasound technologist or radiologist (http://www.radiologyinfo.org) may ask the patient to roll side to side or maintain a face-down position for some portion of the exam. The radiologist or ultrasound technologist will spread warm gel on the skin, then press and move the transducer firmly against the abdomen. The transducer will be moved back and forth until the desired images are captured. There may be slight discomfort from pressure as the transducer is pressed against the area being examined.

If the area being scanned is tender, your child may feel pressure or minor pain.

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

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Once the exam is complete, the gel will be wiped off your child's skin.

After the exam, children should be able to resume their normal activities.

Who interprets the results and how do we 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 very useful for evaluating abdominal, pelvic or scrotal pain in children.

Risks

- Standard diagnostic ultrasound (http://www.radiologyinfo.org) has no known harmful effects on humans.

What are the limitations of Abdominal 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.

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