

Why is barium used with X-rays?

Barium is a dry, white, chalky, metallic powder that is mixed with water to make a thick, milkshake-like drink. Barium is an X-ray absorber and appears white on X-ray film. When swallowed, a barium drink coats the inside walls of the upper GI tract organs so that the swallowing motion, inside wall lining, function, size, and shape of these organs are visible on X-ray. This process shows differences that might not be seen on standard X-rays. Barium is used only for diagnostic studies of the GI tract.

The use of barium with standard X-rays contributes to the visibility of various characteristics of the esophagus, stomach, and duodenum. Some abnormalities of the upper GI tract that may be detected with an upper GI series include:

- Tumors
- Ulcers
- Hernias
- Diverticula (pouches)
- Strictures (narrowing)
- Inflammation
- Swallowing difficulties

In addition to barium, the radiologist may use a gas, such as air or a carbonated substance. You may be given a powder, tablet, or carbonated beverage that produces gas when swallowed. Alternately, you may drink the barium through a perforated straw so that you swallow air with the barium. Air or gas will appear black on X-ray film, contrasting with the barium's white image. The use of the two substances, barium and gas, is called a double contrast study. The radiologist may use the water-soluble contrast if you have a perforation (tear or hole) of the bowel or esophagus, or for other reasons determined by your physician.

The purpose of using two contrast substances is to achieve an enhancement of the inside wall lining of the esophagus, stomach, and duodenum. As the gas expands the organs (like blowing up a balloon), a barium coating is formed on the inner surface of the organs. This technique enhances visualization by sharpening the outline of the inner surface layer of the esophagus, stomach, and/or duodenum, and is useful in diagnosing structural and tissue abnormalities. Other related procedures that may be used to diagnose upper GI problems are barium swallow and esophagogastroduodenoscopy (EGD). Please see these procedures for additional information.

Before the procedure:

- You'll be asked to not eat or drink liquids for eight hours before the procedure, generally after midnight. In addition, if you smoke, you should refrain from smoking after midnight.
- If you're pregnant or suspect that you may be pregnant, you should notify your physician.
- Notify your physician if you are sensitive to or are allergic to any medications, latex, tape, and anesthetic agents (local and general).
- Notify your physician of all medications (prescribed and over-the-counter) and herbal supplements that you're taking. Your physician may advise you to withhold certain medications prior to the procedure.
- Notify the radiologist if you've had a recent barium or contrast X-ray or cholangiography procedure, as this may interfere with obtaining an optimal X-ray exposure of the upper GI area.
- Based upon your medical condition, your physician may request other specific preparation.

During the procedure

An upper GI series may be performed on an outpatient basis or as part of your stay in a hospital. Procedures may vary, depending on your condition and your physician's practices. Generally, an upper GI series follows this process:

- You'll be asked to remove any clothing, jewelry, or other objects that may interfere with the procedure.
- If you're asked to remove clothing, you'll be given a gown to wear.
- You will be positioned on an X-ray table that can tilt you from a horizontal to an upright position. You may be asked to change positions (for example, lying on your side, back, or stomach) at intervals during the procedure.
- Standard X-rays of the heart, lung, and abdomen may be performed first.
- The radiologist will ask you to take a swallow of a thickened contrast drink. The contrast is usually flavored, although it may not be very pleasant tasting.
- As you swallow the contrast, the radiologist will take single pictures, a series of X-rays, or a video (fluoroscopy) to observe the contrast moving through the pharynx.
- If you're having a procedure with barium, you'll be given a thinner barium drink to swallow. X-rays and/or video will be used to see the barium move down the esophagus. You may also be asked to swallow a barium pill, which can help see certain structural problems of the esophagus.

- The radiologist may press on your abdomen during the exam to help us see the stomach and aid in coating of the stomach wall.
- You will be asked to swallow a carbonated beverage, to drink the barium through a straw. Because the gas that's produced will expand and enhance the visualization of the inner surface of the upper GI organs, it will be important not to burp.
- Once all required X-rays have been taken, you'll be assisted from the table.

After the procedure

You may resume your normal diet and activities after an upper GI series, unless your physician advises you differently.

Barium may cause constipation or possible impaction after the procedure if it isn't completely eliminated from your body. You may be advised to drink plenty of fluids and eat foods high in fiber to expel the barium from the body. You may be given a laxative to help expel the barium. Since barium isn't absorbed into the body but passes through your entire gastrointestinal tract, your bowel movements may be lighter in color until all of the barium has been excreted. Water-soluble contrast such as Gastrografin may cause nausea, vomiting, and diarrhea.

Notify your physician to report any of the following:

- Difficulty with bowel movements or inability to have a bowel movement
- Pain and/or distention of the abdomen
- Stools that are smaller in diameter than normal

Your physician may give you additional or alternate instructions after the procedure, depending on your particular situation.