Barium meal / Barium swallow / Barium follow-through

Procedure: Xray
Bodypart: Abdomen
Patient Group: Female Male Child

Summary

Other terms: Upper Gastrointestinal Series, Upper GI Series, UGI Series, Upper GI Exam, Esophageal Radiography, Barium Esophagram

The stomach, like other parts of the gut, does not show up well on ordinary X-rays, for example, to allow a radiologist to diagnose small ulcers. However, if the lining of the stomach is coated with barium, a white liquid which shows up on X-rays, and if the stomach is also distended by extra gas, which shows up black, then much greater detail is obtained. This is called a barium meal. If the gullet, or oesophagus, is examined at the same time, which it often is, then the examination is called a barium swallow and meal. If the examination is extended to look at the small bowel, then it is known as barium meal and follow through.

Technique

What it is

Barium swallow

A barium swallow is a medical imaging procedure used to examine the upper GI (gastrointestinal) tract, which includes the esophagus, stomach, and small intestine.

The patient drinks a suspension of barium sulphate. X-rays are taken after the barium has been swallowed. The barium suspension appears white on the X-rays and reveals the outlines of the upper GI tract. Either still or moving images can be captured.

In a timed barium swallow, which is used to measure esophageal emptying, X-rays are taken at 1, 2, and 5 minutes after quickly drinking about 200 ml of thin barium sulphate solution.

Barium meal

Prepared Barium Sulfate suspension for oral consumption

A barium meal, also known as an upper gastrointestinal series is a procedure in which radiographs of the esophagus, stomach and duodenum are taken after barium sulfate is ingested by a patient. Barium meals are useful in the diagnosis of structural and motility abnormalities of the foregut.

The gastrointestinal tract, in common with all other soft-tissue structures throughout the body does not show clearly enough for diagnostic purposes on plain radiographs. Barium salts are completely radio-opaque, and therefore show very clearly on a radiograph. They are also wholly non-toxic, apart from a small risk of producing a disturbance in bowel function for 48 hours after ingestion. If barium is swallowed and radiographs are taken, the barium within the oesophagus, stomach or duodenum shows the shape of the lumina of these organs.

There are two varieties of barium meal, these being single and double contrast meals. A single contrast meal uses only barium, a radiopaque (or positive) contrast medium, to image the upper gastrointestinal tract while a double contrast meal uses barium
as well as a radiolucent (or negative) contrast medium such as room air, nitrogen, or carbon dioxide. The double contrast meal has the advantage of demonstrating mucosal details and is much more useful as a diagnostic test allowing the detection of small mucosal lesions such as diverticula or polyps.

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Barium follow-through

A barium follow-through procedure is a type of medical imaging technique. It is used to evaluate the presence of disease in a person's small intestine.

The person under investigation drinks a contrast medium containing barium sulphate. This contrast medium appears white on x-rays, and shows the outline of the internal lining of the bowel. X-rays are taken as the contrast moves through the intestine, commonly at 0 minutes, 20 minutes, 40 minutes and 90 minutes. A later x-ray may also be taken to examine the terminal ileum.

Esophageal radiography, also called a barium esophagram, is a study of the esophagus only, and is usually performed as part of the upper GI series. It is commonly used to diagnose the cause of difficulty in swallowing (dysphagia) and for detecting hiatal hernia. A barium sulfate liquid, and sometimes pieces of food covered in barium, are given to the patient to drink and eat while a radiologist examines the swallowing mechanism on a fluoroscopic screen. The test takes approximately 30 minutes.

How it works

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Purpose

An upper GI series is frequently requested when a patient experiences unexplained symptoms of abdominal pain, difficulty in swallowing (dysphagia), regurgitation, diarrhea, or weight loss. It is used to help diagnose disorders and diseases of, or related to, the upper gastrointestinal tract, including cases of hiatal hernia, diverticuli, ulcers, tumors, obstruction, enteritis, gastroesophageal reflux disease, Crohn's disease, and pulmonary aspiration.

Procedure

Persons

You will usually be cared for by a small team including a radiologist, a radiographer and perhaps a nurse. Whoever is doing the examination will be watching a television screen at the time, and taking separate X-ray films. Later on the radiologist will review the X-ray images and issue a report.

Preparation

Patients must not eat, drink, or smoke for eight hours prior to undergoing an upper GI examination. Longer dietary restrictions may be required, depending on the type and diagnostic purpose of the test. Patients undergoing a small bowel follow-through exam may be asked to take laxatives the day prior to the test. Upper GI patients are typically required to wear a hospital gown, or similar attire, and to remove all jewelry, so the camera has an unobstructed view of the abdomen.
Precautions

Because of the risks of radiation exposure to the fetus, pregnant women are advised to avoid this procedure. Patients with an obstruction or perforation in their bowel should not ingest barium (a radioactive substance used to show contrast in the images) for an upper GI, but may still be able to undergo the procedure if a water-soluble contrast medium is substituted for the barium.

Glucagon, a medication sometimes given prior to an upper GI procedure, may cause nausea and dizziness.

If you are diabetic

If you take insulin or tablets, you need to make sure you have enough to eat on the day before your appointment to prevent low blood sugars. You should follow the advice given by the Radiology Department.

If you are pregnant

This examination is not advisable for pregnant women, unless there are exceptional circumstances. Please advise the Department in advance if you think you are, or might be, pregnant.

Duration

This whole process should take about 10 - 15 minutes. Afterwards you will put on your dressing gown again and sit in the waiting area until the pictures have been developed, and the radiologist is satisfied that none of them have to be taken again (usually a 10 - 15 minutes wait). Some are stored straight onto computer so in this case there is no delay for developing film. After this, you should be free to dress and leave the department.

If a ‘follow through examination’ had been requested, this means that films need to be taken of the small bowel. In such a case, you will be required to stay in the department for 2 or 3 hours, while X-rays are taken at regular intervals.

Process

Upon collection

If you are diabetic or suffer from glaucoma, you must inform the radiographer, and all women who are pregnant, or believe they might be, must also inform the radiographer.

You will be shown to a private cubicle where you can undress. Watches can generally still be worn during the examination, but necklaces will need to be removed. As it is always very difficult to guarantee security in such situations, it is generally better not to wear expensive jewellery when attending.

You will be asked to put on the hospital gown and dressing gown provided. However, you may prefer to bring your own dressing gown if you wish. You will be asked to place your clothes and personal items in a locker, or a basket which you will keep with you.

You will be taken into the X-ray room and asked to take off the dressing gown but keep on the hospital gown. You will be asked to drink from a beaker containing the barium, a sticky white liquid which is mildly fruit flavoured, one or two mouthfuls at a time. This coats the lining of the gullet and stomach, so that they show up on the TV monitor and on the X-ray films. You will be positioned in front of the X-ray camera, often standing on a small step attached to the couch in its upright position.

You may then be asked to swallow a dessert spoon of granules followed by a dessert spoon of liquid. This temporarily enlarges your stomach and will make you feel as though you have had a fizzy drink. In order to prevent your stomach moving on the films, you may be given a small injection in your arm, although this is not always necessary. This may blur your eyesight for 30 minutes or so.

The radiologist watches the monitor and also takes pictures. Once the gullet has been studied, the machine will slowly tilt, so that you are lying horizontally, and more pictures are taken of the stomach. You will be asked to move into different positions and to hold your breath while the pictures are taken. You may also be asked to swallow lying down.

Experience

You will feel some minor discomfort from the pinprick of the injection, if you have it. You might feel a very slight discomfort from your stomach being full of air.

After procedure

You may continue to feel slightly bloated for a short while until the air in your stomach works its way out. You will be able to eat and drink normally straight away, and, for the first day or so, you should drink plenty of fluids, to help the barium pass out of your system. Your stools will look white and remain discoloured for the next day or so. Some people may get slightly constipated, and taking a mild laxative should help in this case. Barium stools are sometimes difficult to flush from the lavatory pan and may need repeat flushing.
If you had the stomach relaxing injection, you must be certain that your eyesight has returned to normal before driving your car. Otherwise you should be able to return to your normal lifestyle and work straight away.

Results
After the procedure, the images will be examined further by the radiologist, who will then write a report on the findings. This may take some time to reach your referring doctor, but it is normally available in less than 14 days. You could ask the radiographer or radiologist for some indication of timing.

Normal results
A normal upper GI series will show a healthy, functioning, and unobstructed digestive tract.

Abnormal results
Obstructions or inflammation, including ulcers of the esophagus, stomach, or small intestine; or irregularities in the swallowing mechanism are just a few of the possible abnormalities that may show up on an upper GI series.

Consideration
Importance
The diagnostic usage of barium studies has declined in recent years with the increasing use of the practice of endoscopy, which allows direct visual inspection of suspicious areas within the oesophagus, stomach and duodenum.

Risks
All X-ray procedures involve exposure to radiation in varying amounts. Although we are exposed to small amounts of background radiation from the environment throughout our lives, large amounts of radiation, either in one go or cumulatively, can add very slightly to the risk of developing cancer. The length and level of exposure to radiation from X-rays in medical procedures is strictly controlled and kept to the minimum possible. In this procedure you will need to be exposed to them for several minutes. This means you will be subject to an amount of radiation comparable to that which we receive naturally from the environment over a period of 12 to 18 months. However, as one in three of us is likely to develop a cancer at some stage during our lives, the added risk is very small. Also, the risks from missing a serious disorder by not having this investigation are considerably greater.

Citations
36 - "Royal College of Radiologists: Information for Adult Patients Having a Barium Meal (CRPLG/21), Issue November 2001 http://www.rcr.ac.uk/docs/patients/worddocs/leafletbmeal4-a.doc"