



BARIUM SWALLOW and BARIUM MEAL

2nd stage LECTUER 3

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MSc Radiographic Imaging**

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Indications: Suspected Oesophageal Pathology

1. Endoscopy negative dysphagia or odynophagia (painful swallow)
2. Motility disorders
3. Globus sensation
4. Assessment of tracheo-oesophageal fistulae
5. Failed upper GI endoscopy
6. Timed barium swallow to monitor achalasia therapies

Contraindications

None.

Contrast Medium

1. E-Z HD 200%–250% or Baritop 100% w/v, 100 mL (or more, as required)
 2. Water-soluble contrast agent if perforation is suspected (e.g. Conray, Gastrografin)
 3. LOCM (approx. 300 mg I mL⁻¹) is safest if there is a risk of aspiration
 4. Gastrografin should NOT be used for the investigation of a tracheo-oesophageal fistula or when aspiration is a **possibility. Use LOCM instead.**
 5. Barium should NOT be used initially if perforation is suspected. If perforation is not identified with a water-soluble contrast agent, then a barium examination should be considered
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Equipment

Rapid fluoroscopy images, rapid exposures (6 frames s⁻¹) or video recording may be required for assessment of the laryngopharynx and upper oesophagus during deglutition.

Patient Preparation

None (but as for barium meal if the stomach is also to be examined).

Technique

1-Start with the patient in the erect position, right anterior oblique (RAO) position to project the oesophagus clear of the spine. An ample mouthful of barium is swallowed and this bolus is observed under fluoroscopy for dynamic assessment to assess the function of the oesophagus. Then further mouthfuls with spot exposure(s) to include the whole oesophagus with dedicated anterior posterior (AP) views of the gastro-oesophageal junction.

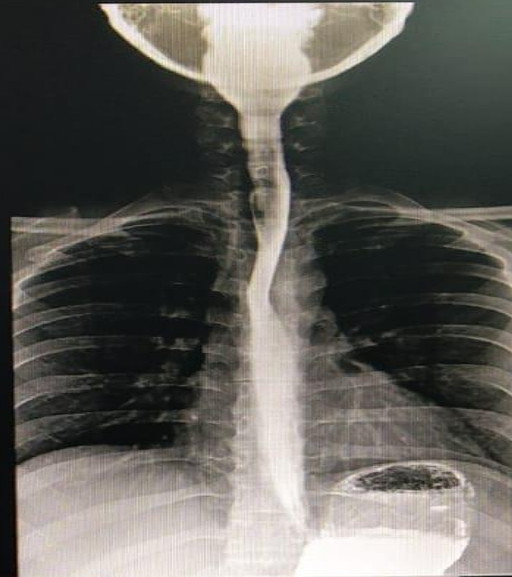
2- Dynamic coned views of the hypopharynx with a frame rate of 3–4 s⁻¹, in AP and lateral, and views during patient swallowing.

3- The patient is placed semiprone in a 'recovery position' in a left posterior oblique (LPO) position. A distended single-contrast view while drinking identifies hernias, subtle mucosal rings and varices.

4- Modifications may be required depending on the clinical indication.

- (a) If dysmotility is suspected, barium should be mixed with bread or marshmallow bolus and observed under fluoroscopy correlating symptoms with the passage of the bolus in the erect position.
 - (b) If perforation is suspected, a CT with quadruple strength oral contrast (100 mL Omnipaque 300 made up to 1 L with water) is more sensitive and provides improved anatomical location of perforation.
 - (c) To demonstrate a tracheo-oesophageal fistula in infants, a 'pull back' nasogastric tube oesophagogram may be performed if the standard oesophagogram is negative. This technique is particularly useful in patients known to aspirate or who are ventilated. Suction and nursing support should be available should aspiration occur. The patient is positioned prone with the arms up and the table may be tilted slightly head down. A nasogastric tube is introduced into the stomach and then withdrawn to the level of the lower oesophagus under lateral screening guidance. 10 to 20 mL of LOCM is syringed in to distend the oesophagus, which will force the contrast medium through any small fistula which may be present. The process is repeated for the upper and mid oesophagus. It is important to actively monitor for aspiration into the airway from overspill, which can lead to diagnostic confusion.
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CHITTARANJAN ECHO & USG CLINIC, BARDHAMAN

Aftercare

Eat and drink as normal but with extra fluids.

Complications

1. Leakage of barium from an unsuspected perforation .
 2. Aspiration.
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Methods

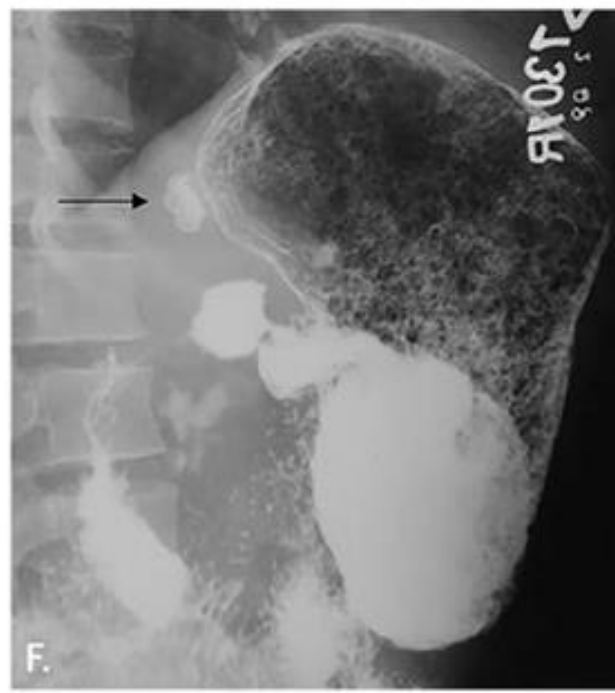
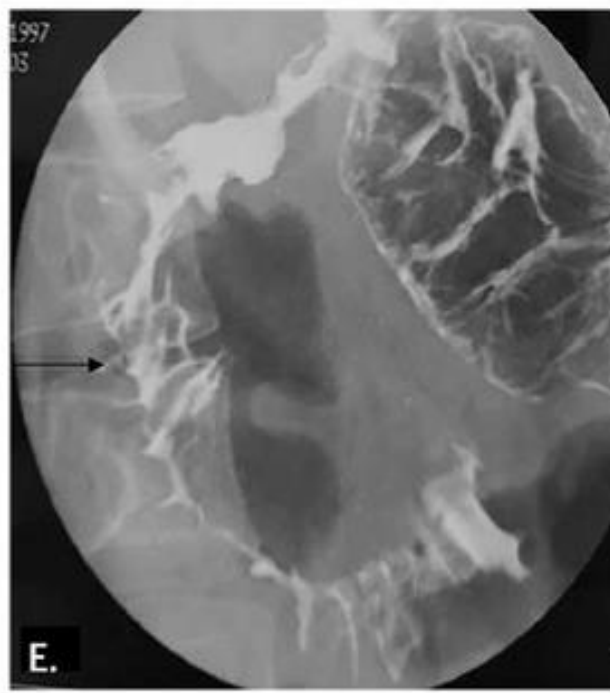
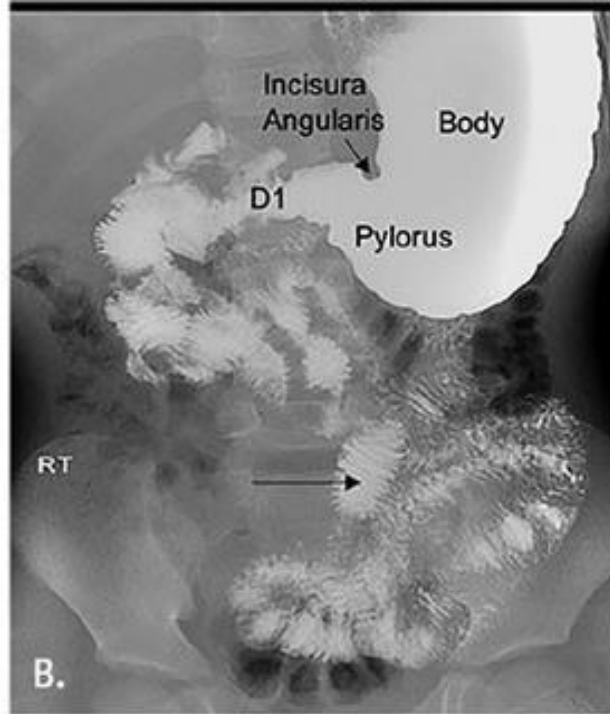
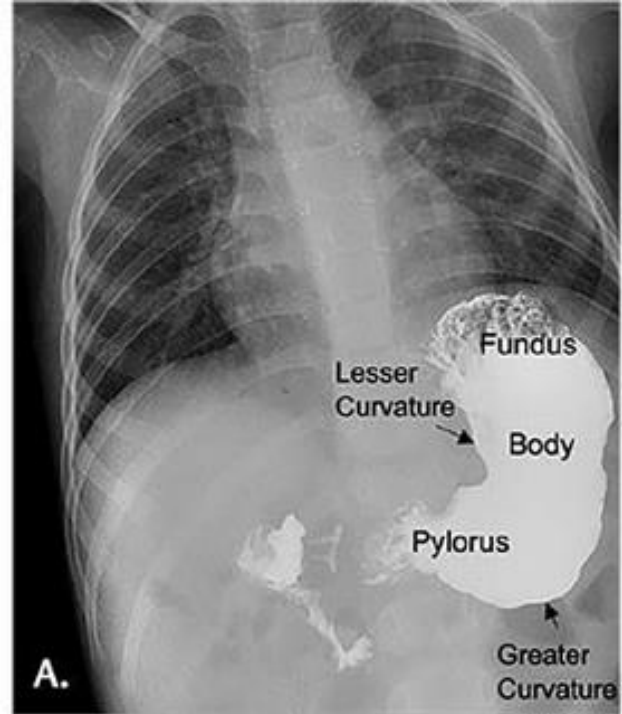
1. Double contrast. The method of choice to demonstrate mucosal pattern.
2. Single contrast. Uses include the following:
 - (a) Children—since it usually is not necessary to demonstrate mucosal pattern
 - (b) To demonstrate gross pathology only, typically very frail patients unable to swallow gas granules

Indications

1. Failed upper gastrointestinal endoscopy or patient unwilling to undergo endoscopy
2. Gastro-oesophageal reflux disease where lifestyle changes and empirical therapies are ineffective
3. Partial obstruction

Contraindications

Complete large-bowel obstruction.



Contrast Medium

1. E-Z HD 250% w/v 135 mL
2. Carbex granules (double contrast technique)

Patient Preparation

1. Nil orally for 6 h prior to the examination
2. Assess contraindications to the pharmacological agents used

Preliminary Image

None

Technique

The double contrast method:

1. A gas-producing agent is swallowed.
 2. The patient then drinks the barium while lying on the left side, supported by their elbow. This position prevents the barium from reaching the duodenum too quickly, thus obscuring the greater curve of the stomach.
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BARIUM MEAL

3- The patient then lies supine and slightly on the right side, to bring the barium up against the gastro-oesophageal junction. This manoeuvre is screened to check for reflux, which may be revealed by asking the patient to cough or to swallow water while in this position (the 'water siphon' test). Extreme provocation testing with the patient in a head down position during swallowing is nonphysiological. Clinically relevant reflux is assessed by 24 h pH probe monitoring and by endoscopic evidence of oesophagitis. If reflux is observed, images are taken to record the level to which it ascends.

4. An i.v. injection of a smooth muscle relaxant (Buscopan 20 mg or glucagon 0.3 mg) may be given to better distend the stomach and to slow down the emptying of contrast into duodenum. The administration of Buscopan has been shown to not affect the detection of gastro-oesophageal reflux or hiatus hernia.

5. The patient is asked to roll onto the right side and then quickly over in a complete circle, to finish in an RAO position. This roll is performed to coat the gastric mucosa with barium. Good coating has been achieved if the areae gastricae in the antrum are visible.

Images

Comprehensive documentation of the examination is provided by the following:

1. Spot exposures of the stomach (lying):
 - (a) RAO—to demonstrate the antrum and greater curve
 - (b) Supine—to demonstrate the antrum and body
 - (c) LAO—to demonstrate the lesser curve en face
 - (d) Left lateral tilted, head up 45 degrees—to demonstrate the fundus

From the left lateral position, the patient returns to a supine position and then rolls onto the left side and over into a prone position. This sequence of movements is required to avoid barium flooding into the duodenal loop, which would occur if the patient were to roll onto the right side to achieve a prone position.

2. Spot image of the duodenal loop (lying):
 - (a) Prone—The patient lies on a compression pad to prevent barium from flooding into the duodenum.

An additional view to demonstrate the anterior wall of the duodenal loop may be taken in an RAO position.

3. Spot images of the duodenal cap (lying):
 - (a) Prone
 - (b) RAO—The patient attains this position from the prone position by rolling first onto the left side, for the reasons mentioned previously.
 - (c) Supine
 - (d) LAO
 4. Additional views of the fundus in an erect position may be taken at this stage, if there is suspicion of a fundal lesion.
 5. Spot images of the oesophagus are taken, while barium is being swallowed, to complete the examination.
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Aftercare

1. The patient must not drive until any blurring of vision produced by the Buscopan has resolved. This usually occurs within 30 minutes.
2. The patient should be warned that their bowel motions will be white for a few days after the examination and may be difficult to flush away.
3. The patient should be advised to eat and drink normally but with extra fluids to avoid barium impaction. Occasionally laxatives may also be required.

Complications

1. Leakage of barium from an unsuspected perforation
 2. Aspiration
 3. Conversion of a partial large bowel obstruction into a complete obstruction by the impaction of barium
 4. Barium appendicitis, if barium impacts in the appendix (exceedingly rare)
 5. Side effects of the pharmacological agents used
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Barium meal sequence

A Roll quickly in a complete circle



to finish



Image	RAO	Supine	LAO	Left lateral tilted head up
Position				
Image				
Demonstrates	Antrum + greater curve	Antrum + body	Lesser curve en face	Fundus

Note in A, B, C and D, the patient position is depicted as if the operator were standing at the end of the screening table looking towards the patient's head.

C

Turn back from left lateral



to finish

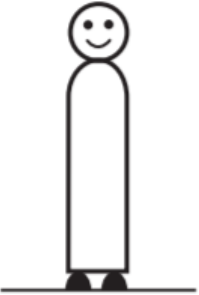
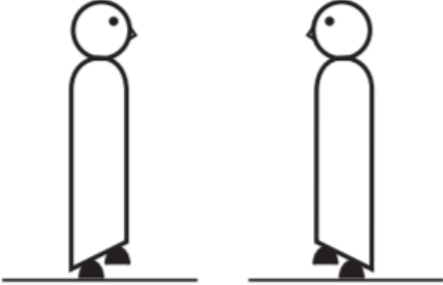
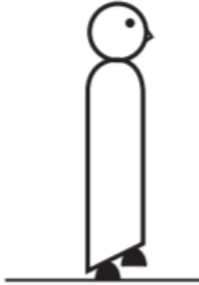





Compression pad

D

Image	Prone	Spot views of cap											
		Prone	RAO	Supine	LAO								
Position		<p>(a)</p>	<p>(b)</p>	<p>(c)</p>	<p>(d)</p>								
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(a)		(b)											
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Demonstrates	<p>Duodenal loop</p>	<p>Caps</p>											

E

Image	Erect	Erect caps RAO Steep LAO	Swallow RAO
Position			
Image			
Demonstrates	Fundus	Caps	Oesophagus



