Radiographic Procedures III (RAD 238)

Esophagography

Common Radiographic Procedures

1. Esophagogram (or barium swallow)
   • Purpose of esophagography
     • Study the form and function of the pharynx and the esophagus
2. Upper GI series (UGI)

Common Radiographic Procedures

1. Esophagogram (barium swallow)
2. Upper GI series (UGI)
   • Purpose of Upper GI
     • Study the form and function of the distal esophagus, stomach, and duodenum
Accessory Organs in Mouth
(Oral Cavity)

- Terms
  - Mastication
  - Deglutition
  - Peristalsis

Pharynx
(Three Parts)

Esophagus
Esophagus in Mediastinum

Summary of Mechanical Digestion

<table>
<thead>
<tr>
<th>Section</th>
<th>Events</th>
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<tbody>
<tr>
<td>Oral cavity</td>
<td>Mastication (chewing)</td>
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<tr>
<td></td>
<td>Deglutition (swallowing)</td>
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<tr>
<td>Pharynx</td>
<td>Deglutition</td>
</tr>
<tr>
<td>Esophagus</td>
<td>Deglutition</td>
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<tr>
<td></td>
<td>Peristalsis (waves of muscular contractions)</td>
</tr>
<tr>
<td>Stomach</td>
<td>Mixing</td>
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<tr>
<td></td>
<td>Peristalsis Chyme</td>
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Esophagraphy & UGI Procedures

- Contrast medium required
- Increases or decreases tissue density
Barium Sulfate
- Positive or radiopaque
- Chalk-like substance
- Absorbs more x-rays
- $\text{BaSO}_4$

Colloidal Suspension
- Never dissolves in water
- Rate of separation varies by brand
- Contraindications: perforated viscus or presurgical procedure

Barium
Thick Barium
- 3:1 or 4:1 ratio of $\text{BaSO}_4$ to water

Thin Barium
- 1:1 ratio of $\text{BaSO}_4$ to water
Water-Soluble Iodinated Contrast Media

- Indications
  - Perforated viscus
  - Presurgical procedure

- Contraindications
  - Hypersensitivity to iodine

UGI

Single-Contrast UGI
- Barium sulfate

Double-Contrast UGI
- Barium sulfate
- Carbon dioxide gas or room air

Fluoroscopy

- Ability to view and record anatomy in motion (evaluate function and form)
Digital Fluoroscopy

- Computer based
- No cassettes required
- Multiple framing
- Image manipulation (post-processing)

Radiation Protection
Fluoroscopy Exposure Patterns

Bucky Slot Shield Fully Extended

Shield in position
Lead Apron with Thyroid Shield and Protective Eyewear

Clinical Indications for Esophagogram
- Anatomic anomalies
- Esophageal reflux
- Esophageal varices
- Foreign body obstruction
- Impaired swallowing mechanism
- Form and function distal esophagus
- Carcinoma of esophagus

Foreign Body in Esophagus
- Soft Tissue
  - Lateral Neck
- Fish bone
Esophagography: Radiographer’s Responsibilities

1. Prepare fluoroscopy room.
2. Prepare contrast media.
3. Obtain clinical history.
4. Explain procedure.
5. Introduce self
6. Verify patient
7. Pregnancy, LMP
8. Allergies
9. Verify patient prep
10. Gowning instructions
11. Post-exam instructions

Esophagography & UGI Patient Preparation

- NPO 8 hours prior to study
- No gum chewing
- No smoking
- Determine pregnancy

Fluoroscopy

Introduce and assist the fluoroscopist.
Assist the patient.
Fluoroscopy

- Room preparation
- Variable table positions, assist patient

RAO: Projection Commonly Taken During Esophagography

RAO Esophagram
Upper and Mid Esophagus
Diagnosis of Esophageal Reflux

1. Breathing exercises (two types)
2. The water test
3. Compression paddle technique
4. The toe-touch test

Breathing Exercises

- Valsalva maneuver
  - Patient takes in deep breath and holds in breath while bearing down as if trying to move the bowels.

- Mueller maneuver
  - Patient exhales, then tries to inhale against closed glottis.

Water Test

Positive if barium regurgitates into esophagus (LPO position, swallow water through straw)
Compression Paddle

- Paddle inflated under stomach with patient in prone position
- Pressure applied to stomach region to create reflux

Toe-Touch Maneuver

- Effective for reflux and hiatal hernia

Postfluoroscopy Projections

- Esophagogram
  - Routine
    - RAO (35°-40°)
    - Lateral
    - AP (PA)
  - Special
    - LAO
    - Soft tissue lateral
RAO Esophagogram

- 35°-40° oblique
- CR to T5-T6 (1 inch [2.5 cm] inferior to sternal angle)

Evaluation Criteria
RAO Esophagogram

- Entire esophagus demonstrated
- Esophagus midway between spine and heart
- Optimal exposure factors

Lateral Esophagogram

- True lateral
- CR to T5-T6
  - Mid-Coronal Plane
Upper Esophagus

- Swimmer’s lateral (for better visualization of proximal esophagus)

Evaluation Criteria

Lateral Esophagogram

- Entire esophagus demonstrated
- Esophagus midway between spine and heart
- Arms not superimposing esophagus
- True lateral position
- Optimal exposure factors

AP (PA) Esophagogram

- AP (PA) projection
- CR to T5-T6
  - 3" below jugular notch
Evaluation Criteria (AP Esophagogram)

- No rotation
- Optimal exposure factors

LAO Esophagogram

- 35° - 40° oblique
- CR to T5-T6

Evaluation Criteria LAO Esophagogram

- Entire esophagus demonstrated
- Esophagus midway between spine and hilar region
- Optimal exposure factors

Arrows indicate region of possible pathology
Additional Imaging Procedures

- Video Esophagraphy
  - Swallowing dysfunction
- Computed Tomography
  - Tumor staging
- Magnetic Resonance Imaging
  - Varices
- Ultrasound
  - Tumors
  - Varices
  - Polyps
- Nuclear Medicine
  - Reflux
  - Barrett’s

Lab Script

Speak with a CI; bring the following information written or transcribed to esophagram lab

- Fluoro room set up requirements
- Patient gowning instructions
- All patient questions asked by technologist prior to procedure
  - Protocol questionnaire if available
- Exam explanation
- Contrast media types used & exact preparation
- Positioning protocol for esophagram (Overhead images)
- Post exam instructions given to patient