Radiographic Procedures III (RAD 228)

UGI and Small Bowel

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

Anatomy of Distal Esophagus and Stomach

[Image of anatomy diagram]
Stomach Orientation

- **Fundus:** most posterior
- **Body:** anterior/inferior to fundus
- **Pylorus:** posterior/distal to body

Air-Barium Distribution

Black = Air  White = Barium

Coronal Sectional View of Stomach Mucosal Folds on UGI
Body Habitus

1. Hypersthenic (massive) 5%
2. Sthenic (average) 50%
3. Hyposthenic (slender) 35%
4. Asthenic (very slender) 10%

Body Habitus
(Stomach and Large Intestine Locations)

<table>
<thead>
<tr>
<th>Hypersthenic</th>
<th>Sthenic</th>
<th>Hyposthenic/ Asthenic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach:</td>
<td>High and transverse</td>
<td>J-shaped</td>
</tr>
<tr>
<td>Duodenal bulb/GB:</td>
<td>T11-T12</td>
<td>L1-L2</td>
</tr>
</tbody>
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Hypersthenic:
- Duodenal bulb: To right of midline
- Level of T11-T12

Sthenic:
- Duodenal bulb: Slightly to right of midline
- Level of L1-L2

Hyposthenic/ Asthenic:
- Duodenal bulb: At midline
- Level of L3-L4
UGI Series Contrast Media

- Single Contrast
  - Barium sulfate
    - Adult, Geriatric, Pediatric dosage
      - 2 - 4 oz  NB – 1 yr
      - 4 - 6 oz  1 – 3 yrs
      - 6 - 12 oz 3 - 10 yrs
      - 12 - 16 oz >10 yrs
  - Water soluble iodinated solution

- Dual Contrast
  - Air/Carbon dioxide
  - Barium sulfate

UGI

Single-Contrast UGI
- Barium sulfate

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

UGI, Small Bowel Radiographer's Responsibilities

1. Prepare fluoroscopy room.
2. Prepare contrast media.
3. Obtain clinical history.
4. Explain procedure.
   (Reflux demo as necessary)
5. Assist patient.
6. Assist Radiologist.
Upper GI Clinical Indications

1. Peptic ulcer
2. Hiatal hernia
3. Diverticula
4. Gastritis
5. Tumor
6. Bezoar

Upper GI Patient Preparation

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

Summary of Positioning and Procedure Tips for Upper GI

| 1. Clinical history: | Review clinical history with patient and documentation |
| 2. Body habitus: | Affects positioning |
| 3. Fluoroscopy: | Identify positioning landmarks |
| 4. High kV: Analog and digital systems | 100-125 (90-100 for double-contrast procedure) |
| Short exposure time: | Control voluntary motion |
Upper GI Series

Routine
SCOUT ABDOMEN
- RAO
- PA
- Right lateral
- LPO
- AP

RAO Upper GI

- 40°-70° oblique
- CR to L1

Evaluation Criteria
RAO Upper GI

- Entire stomach and duodenum demonstrated
- Body and pylorus barium filled
- Duodenal bulb and C-loop in profile
- Optimal exposure factors
PA Upper GI

- No rotation
- CR to L1

Evaluation Criteria
PA Upper GI

- Entire stomach and duodenum demonstrated
- Body and pylorus barium filled, air in fundus
- Optimal exposure factors

Right Lateral Upper GI

- True lateral
- CR to L1
**Evaluation Criteria**

**Right Lateral Upper GI**
- Entire stomach and duodenum demonstrated
- Retrogastric space demonstrated
- Vertebrae in true lateral perspective
- Optimal exposure factors

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**LPO Upper GI**
- 30°-60° oblique
- CR to L1

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**Evaluation Criteria**

**LPO Upper GI**
- Entire stomach and duodenum demonstrated
- Fundus filled with barium
- Optimal exposure factors
**AP Upper GI**

- No rotation
- CR to L1

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**Evaluation Criteria**

**AP Upper GI**

- Entire stomach and duodenum demonstrated
- Fundus is barium filled
- Optimal exposure factors

![AP supine](image1)
![AP Trendelenburg](image2)

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**Small Bowel Series**

**Purpose:** Radiographic examination of the small intestine

- Frequently follows upper GI series
- Requires oral contrast media
Quadrant Location of Small Intestine

- Duodenum: RUQ and LUQ
- Jejunum: LUQ and LLQ
- Ileum: RUQ, RLQ, and LLQ
- Ileocecal valve: RLQ

Sectional Differences of Small Intestine

- Duodenum
  - Shortest and widest part
  - Retroperitoneal
- Jejunum
  - Fewer folds
  - Fewer indentations
  - Small bowel diameter
- Ileum
  - More folds
  - More indentations
  - Smaller diameter

4 Parts of Duodenum

- Duodenal bulb (cap)
- Pylorus of stomach
- Second (descending) portion, receiving common bile and pancreatic ducts
- Third (horizontal) portion
- Fourth (ascending) portion
Clinical Indications
Small Bowel Series

- Enteritis or gastroenteritis
- Meckel's diverticulum
- Neoplasm
- Malabsorption syndrome
- Ileus
  - Mechanical
  - Adynamic or paralytic

Contraindications

- Contraindications to BaSO₄
  - Presurgical patients
  - Perforated hollow viscus
  - Large intestine obstruction
- Contraindications to water-soluble iodinated contrast media
  - Young or dehydrated patients
  - Sensitivity to iodine

Upper GI/Small Bowel Combination

- Routine upper GI first (note time of first cup ingestion)
- Ingest second cup
- 30-minute interval radiographs
- 1-hour interval radiographs (if needed)
- Spot ileocecal valve (optional)
Patient Preparation
- NPO—8 hours
- Low-residue diet—48 hours
- No gum chewing
- No smoking
- Ask about pregnancy

Small Bowel Series
- Routine
  - PA
- Special
  - Enteroclysis
  - Intubation

PA Projection
- 15- to 30-minute radiographs
- CR 2 inches (5 cm) above iliac crest
- Hourly radiographs
- CR to iliac crest
**Evaluation Criteria**

**PA projection**

<table>
<thead>
<tr>
<th>30 minutes</th>
<th>1 hour</th>
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<tbody>
<tr>
<td>● Entire small intestine demonstrated</td>
<td>● Time interval markers visible</td>
</tr>
<tr>
<td>● Note: intestinal parasite</td>
<td>● Optimal exposure factors</td>
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**Enteroclysis Procedure**

- Catheter advanced to duodenjejunal flexure
- Thin barium mixture injected
- Air or methylcellulose instilled
- Fluoro and radiographic images taken
- Intubation tube removed

**PA**

- PA—2 hr
- PA ileocecal spot

**PA abdomen-enteroclysis**
Intubation Procedures

- Therapeutic intubation
- Diagnostic intubation (small bowel enema)

PA abdomen-intubation method

Lab Script

- Speak with a CI; bring the following information written or transcribed to UGI/SB lab
  - Fluoroscopic room set up requirements
  - Patient gownsning 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 UGI/SB (Post fluoroscopy images)
  - Post exam instructions given to patient