Handout - Upper Digestive System Exams

PROJECTIONS of the esophagus

The projections used to visualize the anatomical structure of the esophagus include:

1. PA or AP projection of the esophagus
2. RAO or LPO position of esophagus
3. Lateral view of esophagus

1. *Factors required to perform a PA or AP projection of the esophagus*

Patient Position

It is preferred to place the patient in the recumbent position for the esophagus exam because it allows for a more complete filling of the esophagus, especially the proximal portion of the esophagus.

- Patient in supine or prone position without any body rotation
- Patient's arms should be comfortably above their head or at sides
- Patient's head turned slightly to assist with drinking the barium mixture

Central Ray

- CR will be at the level of T5-T6 and midline (8 cm from jugular notch)

Respirations

- Radiologist will instruct the patient and expose on expiration

Shielding

- Shield the gonads

Structures Shown

- Barium-filled esophagus will be superimposed over the thoracic spine

Contrast Agents

- Positive contrast used only or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam

Body Habitus

- The PA or AP projection is not influenced by the body habitus

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2. ***Factors required to perform an RAO position of the esophagus***

Patient Position

The RAO oblique is used because there is a wider space between the heart and spine to demonstrate the esophagus on the oblique view.

- Patient's body is rotated 35-40 degrees from the IR
- Support the patient's head and elevated side when in the oblique position if patient is unable to maintain position on their own
- Patient's one arm should be down beside the same side of the body that is in contact with the table
- The other arm should be bent and supporting the elevated side of the body

Central Ray

- The CR will be at the level of T5-T6 (8 cm from jugular notch)

Respirations

- Radiologists will instruct the patient as to how and when to hold their breath for the exposure

Shielding

- Shield the gonads

Structures Shown

- Esophagus will be demonstrated between the vertebrae and the heart

Contrast Agents

- Positive contrast used only, or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam

Body Habitus

- The degree of obliquity will depend on the body habitus
- Hypersthenic person requires less obliquity compared to Hyposthenic

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3. ***Factors required to perform a lateral position of the esophagus***

Patient Position

- Patient's body is turned into a true lateral position
- Patient's arms brought forward away from their body

Central Ray

- The CR will be at the level of T5-T6 (8 cm from jugular notch) and in the midcoronal plane

Respirations

- The radiologist will instruct the patient as to how and when to hold their breath for the exposure

Shielding

- Shield the gonads

Structure Shown

- Esophagus should be seen without interference of the patient's arms, especially the proximal portion of the esophagus.
- Esophagus is seem between heart and thoracic spine
- The ribs posterior to the vertebrae should be superimposed.

Contrast Agents

- A positive contrast used only, or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam.

Body Habitus

- Lateral projection is not influenced by the body habitus.

Stomach and Duodenum

The projections/positions used to visualize the anatomical structure of the stomach include:

1. PA or AP projection of the stomach
2. RAO position of the stomach
3. LPO position of the stomach
4. Lateral view of the stomach

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1. *Factors required to perform a PA or AP projection of the stomach and duodenum*

It is preferred to place the patient in the recumbent position for the stomach and duodenum exam. If the relative position of the stomach needs to be shown, than the patient may be placed in the upright position at the beginning of the exam.

Patient Position

- No rotation of the patient.
- Patient's arms can be by their side, or up above their head on the PA projection to allow for patient comfort, or at their sides for AP.

Central Ray

- Patient in Prone position – Center about 1-2 inches (2.5-5 cm) above the lower rib margin at the level of L1-L2 and 1 inch (2.5 cm) to the left of the vertebral column.
- Patient in supine position - Center about 1-2 inches (2.5-5 cm) above the lower rib margin at the level of L1-L2 and midway between the midline and left lateral margin of abdomen
- CR is perpendicular to IR.

Respirations

- Suspend at the end of expiration unless otherwise requested.

Shielding

- Shield the gonads.

Structures Shown

- PA projection – the entire stomach must be demonstrated with body and pylorus portion of stomach filled with barium. The duodenum and duodenal loop are demonstrated.
- AP projection – the entire stomach must be demonstrated with the fundus of the stomach filled with barium. Diaphragm and lower lung fields are demonstrated for possible hiatal hernia. The AP projection shows the retrogastric portion of the duodenum and jejunum.

Contrast Agents

- Positive contrast used only, or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam.

Body Habitus

- Place sponges underneath Asthenic patients in the prone position to prevent the stomach or duodenum from pressing against the vertebrae resulting in pressure-filling defects of the stomach or duodenum.

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- Greatest visceral movement of the stomach between erect and prone patients occurs in Asthenic patients.
- **Asthenic** recumbent patients require an adjustment in the location of the central ray. The CR location is about 2 inches below level of L1.
- **Hypersthenic** recumbent patients require an adjustment in the location of the central ray. The CR location is about 2 inches above level of L1 and nearer the midline of the patient.

2. ***Factors required to perform a RAO position of the stomach and duodenum***

Patient Position

- Patient in recumbent prone position.
- Rotate 40 to 70 degrees with right anterior body against the IR.
- Patient's right arm down and left arm flexed at elbow and up by the patient's head.
- Flex left knee for support.
- RAO position is used for serial studies for the pyloric canal because peristalsis is usually more active when the patient is in the RAO position.

Central Ray

- CR is perpendicular and centered about 1-2 inches above L3 at the level of L1-L2, midway between the spine and upside lateral border of the abdomen.

Respirations

- Suspend at the end of expiration unless otherwise requested.

Structures Shown

- The pyloric canal and duodenal bulb in profile are demonstrated.
- Entire stomach and c-loop of duodenum should be demonstrated.

Contrast Agents

- Positive contrast used only, or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam.

Body Habitus

- Hypersthenic patients require a greater degree of rotation than do sthenic and asthenic patients.
- Asthenic patients should have the CR 2 inches below level of L1 and sagittal plane nearer the midline.
- Hypersthenic patients should have the CR 2 inches above level of L1.

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3. ***Factors required to perform a LPO position of the stomach and duodenum***

Patient Position

- Patient in recumbent supine position.
- Rotate 30 to 60 degrees with left posterior body against the IR.
- Extend left arm from body and raise the right arm high across chest. Patient might need the table to hold on to.
- Right knee flexed for support.

Central Ray

- CR is perpendicular and centered about 1-2 inches above L3 at the level of L1-L2 and midway between midline of body and left lateral margin of abdomen.

Respirations

- Suspend at the end of expiration unless otherwise requested.

Shielding

- Shield the gonads.

Structures Shown

- The entire stomach and duodenum are visualized.
- The fundus of the stomach filled with barium.
- During a double contrast study the body of the stomach and pylorus and sometimes the duodenal bulb are filled with air.

Contrast Agents

- Positive contrast used only, or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam.

Body Habitus

- Hypersthenic patients require a greater degree of rotation than do sthenic and asthenic patients.
- Asthenic patients should have the CR 2 inches below level of L1 and sagittal plane nearer the midline.
- Hypersthenic patients should have the CR 2 inches above level of L1.

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4. ***Factors required to perform a Lateral position of the stomach and duodenum***

Patient Position

- Patient in right lateral position.
- Shoulders and hips should not be rotated.
- Place arms up by the patient's head with knees flexed.
- Recumbent right lateral position will show the right retrogastric space.
- Upright left lateral position will show the left retrogastric space.

Central Ray

- CR is perpendicular and passes 1 to 1.5 inches anterior to the midcoronal plane.
- CR at the level of L1-L2 for recumbent position.
- CR at the level of L3 for erect position.

Respirations

- Suspend at the end of expiration unless otherwise requested.

Shielding

- Shield the gonads.

Structures Shown

- The anterior and posterior aspects of the stomach visualized.
- Retrogastric space is demonstrated

Contrast Agents

- Positive contrast used only, or positive and negative contrast in combination can both be used together. When both agents are used, it is called a double contrast exam.

Body Habitus

- Asthenic patients should have the CR 2 inches below level of L1 and sagittal plane nearer the midline.
- Hypersthenic patients should have the CR 2 inches above level of L1.

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SMALL BOWEL EXAMINATIONS

Small Bowel Series

A small bowel series exam is performed to evaluate the small intestine. Often this exam is performed in combination with an upper GI series. Before the exam is performed, a plain radiograph can be done at the radiologist's discretion to ensure that the patient has been prepped correctly and to landmark the location of the bowel.

A small bowel series exam is also known as a small bowel follow through (SBFT). The patient drinks the barium and a series of images are taken at set time intervals to demonstrate the small bowel. The amount of barium and the time at which the images are produced can vary depending on patient history, the radiologist, or the site. Each radiograph of the small intestine is identical to the previous other than the time interval and should be marked correctly.

Fluoroscopic images may be performed by the radiologist as well. The patient can be placed in the prone or supine position. The supine position takes advantage of the superior and lateral shift of the barium-filled stomach for visualization of the retrogastric portions of the duodenum and jejunum.

The prone position takes advantage of the body's own weight providing compression to the abdominal contents and increasing the radiographic quality. Under fluoroscopy, the radiologist may use the compression paddle or lead glove to separate the loops bowel for better visualization of the ileo-cecal region. If the patient has hypomotility, the radiologist may request the patient to drink a glass of ice water, tea or coffee to stimulate peristalsis.

Other methods include administering peristaltic stimulants every 15 minutes through the transit time. Only after 3-4 hours of administrating barium are the peristaltic stimulants given.

Equipment

- Time markers
- Compression paddle
- Lead glove
- Thin barium

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