CAR Standard for Performance of Contrast Studies of the Adult Upper Gastrointestinal Tract

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I. INTRODUCTION

Contrast studies of the upper gastrointestinal tract are established procedures for the evaluation of the thoracic oesophagus, stomach and duodenum. Structural, mucosal and some functional abnormalities of these structures can be diagnosed and, in many instances, reliably excluded.

II. DEFINITION

The *upper gastrointestinal series or barium meal* is a multi-phasic fluoroscopic study of the oesophagus, stomach and duodenum, using oral contrast media.

The term *0.S.D.* (oesophagus - stomach - duodenum) is also used.

The term barium swallow, however, refers to a study of the swallowing mechanism and oesophagus (see Guidelines for Performance of Contrast Studies of the Pharynx and Oesophagus in the Adult).

III. INDICATIONS

The most common indications are suspicion of gastro-oesophageal reflux disease, peptic ulcer disease and neoplasia. Heartburn, lower dysphagia, dyspepsia, epigastric pain and anemia are among the most frequent signs and symptoms.

IV. PHYSICIAN QUALIFICATIONS

That Physicians involved in the performance, supervision and interpretation of contrast studies of the adult upper GI tract should be Diagnostic Radiologists and must have a Fellowship or Certification in Diagnostic Radiology with the Royal College of Physicians and Surgeons of Canada and/or the Collège des médecins du Québec. Also acceptable are foreign Specialist qualifications if the Radiologist so qualified holds an appointment in Radiology with a Canadian University.

As new imaging modalities and interventional techniques are developed additional clinical training, under supervision and with proper documentation, should be obtained before radiologists interpret or perform such examinations or procedures independently. Such additional training must meet with pertinent provincial/regional regulations. Continuing professional development must meet with the requirements of the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

V. RADIOLOGIC TECHNOLOGISTS

The medical radiation technologist must have Canadian Association of Medical Radiation Technologists certification or be certified by an equivalent licensing body recognized by the CAMRT.

Under the overall supervision of the radiologists, the technologist will have the responsibility for patient comfort and safety, for examination preparation and performance, and for image technical evaluation and quality and applicable quality assurance.

The training of technologists engaged in specialty activities shall meet with applicable and valid national and provincial specialty qualifications.

Continued education of technologists is encouraged by the C.A.M.R.T. and should meet pertinent provincial regulations.

VI. EQUIPMENT AND QUALITY CONTROL

Examinations should be performed with fluoroscopic and radiographic equipment meeting all applicable federal and provincial radiation standards.
Each imaging facility should have documented policies and operations for monitoring and evaluating the effective management, safety and operation of imaging equipment. The quality control program should be designed to minimize patient, personnel and public radiation risks and maximize the quality of the diagnostic information.

At least annually or as required by provincial law, equipment performance should be monitored and a quantitative dose determination should be conducted by a qualified medical radiation physicist or a qualified designated substitute.

VII. EXAMINATION PRELIMINAIRES

A. A written request from the referring physician, including the reason for consultation and appropriate medical and surgical history, should be available.

B. Patients are kept fasting and should be discouraged from smoking and chewing gum so as to decrease pharyngeal and gastric mucosal secretions and improve barium coating.

C. The medical chart of hospitalized patients should accompany the patient to the fluoroscopic unit.

VIII. CHOICE OF MODALITY AND CONTRAST MEDIUM

All radiologists who examine the gastrointestinal tract should be able to perform and interpret multiphasic contrast studies of the upper gastrointestinal tract. The choice of contrast medium and the decision to use a modifying agent (e.g. antispasmodic) is that of the radiologist whose judgement must be based on the established literature, the condition of the individual patient, and the clinical problem to be solved. However, single contrast studies should be reserved for unusual situations (section X B).

The following recommendations and section IX are designed to guide the radiologist in making these choices so that diagnostic high quality studies may be obtained in the vast majority of cases.

A. <u>Strongly recommended</u>

1. High density barium (e.g. 250% weight/volume) which will provide good or excellent coating of mucosal surfaces.

2. Effervescent agent which releases approximately 300-400 c.c. of gas in the stomach without leaving undissolved residue.

3. An antispasmodic to decrease secretions and thereby improve mucosal coating, to prevent flooding of the small bowel, and to promote better distension and faster filming of traditionally spastic areas such as the duodenum.

B. <u>Optional</u>

1. Medium density barium for evaluation of the lower oesophageal sphincter and for single contrast examinations of debilitated patients.

2. A variety of means may be used to test for gastro-oesophageal reflux and to assess oesophageal clearance.

3. Solid material such as barium tablets or marshmallows for evaluation of lower oesophageal sphincter caliber.

4. Water soluble contrast medium when there is suspicion of perforation or surgical anastomotic leak.

5. Propulsive agent to accelerate sluggish gastric emptying.

IX. EXAMINATION TECHNIQUE

The following multiphasic technique may be modified at the discretion of the radiologist, as required by the clinical situation, the condition of the patient, and findings during fluoroscopy.

A. <u>Suggested procedure</u>

1. An antispasmodic is given, preferably intravenously or intramuscularly early in the examination..

2. One mouthful of high density barium (250% weight/volume)

3. An effervescent agent is given with a small amount (10 c.c. or less) of water or barium, quickly followed by the rest of the barium (approx. 120 c.c. total).

4. Upright double contrast films of the oesophagus may be taken at this stage, or at the end of the examination, by using more barium and gas granules.

5. The stomach and duodenum are then examined in the recumbent position. When positioning the patient and devising a film sequence, the radiologist must consider the following:

The actions of the commonly used antispasmodics differ widely, and their effect will also depend on the route of administration.

i) The effect on the duodenum may be short-lived and double contrast views of the duodenal loop should be obtained early in the examination.

ii) When the pylorus is open and atonic, care should be taken not to flood the duodenum and upper jejunum, thus overlapping the body of the stomach.

iii) Some agents may induce pylorospasm so that the antispasmodic concerned can be injected only after barium has entered the duodenum, or films of the duodenum can be performed later.

iv) Mucosal coating by barium is best achieved by repeated "washings" by the barium pool so that the patient must be turned repeatedly and rocked to and fro.

6. Compression technique must be used extensively and appropriately on accessible portions of the stomach and duodenum. This can be done at several points during the examination: before gastric distension; in the prone position; in the upright and semi-recumbent positions, using the spine as a pressure point.

B. <u>Suggested films</u>

1. Undistended view of the stomach after one mouthful of barium. Many carry out compression in the upright position; some perform this film in the supine position; some omit this phase entirely. This mucosal relief view has a useful role in detecting shallow anterior wall ulcers, and changes of gastritis and effects of Helicobacter pylori.

2. Views of the entire thoracic oesophagus in double contrast, in two complementary positions, and without spinal overlap on one view.

3. Each portion of the stomach should be demonstrated in double contrast in at least two projections if feasible.

4. Every portion of the stomach must be demonstrated in single contrast projection.

5. The accessible portion of the stomach should be examined with compression.

6. The duodenal bulb should be demonstrated in double contrast in prone and supine projections, and should be examined by compression when the patient's physique permits.

7. The whole of the duodenal loop and first few centimeters of the jejunum should be examined.

8. Oesophageal motility should be assessed with the patient horizontal. If gastro-oesophageal reflux is a clinical concern, the patient can be tested for reflux and oesophageal clearance.

C. <u>Quality controls specific to this study are:</u>

1. All portions of the upper gastro-intestinal tract should be well distended with gas. In the stomach, distal to the angularis, effacement of rugal folds should be achieved, while in the oesophagus no longitudinal folds should be seen.

2. All mucosal surfaces should be well coated with barium. On double contrast views, areae gastricae should be visible in about half the patients, the duodenal bulb should reveal a fine reticular pattern in about one third of cases, the valvulae of the duodenal loop should be well displayed, the ampulla of Vater should be clearly visible in about half the patients and the minor papilla should be visible in about 10% of patients.

3. Compression views should reveal fold patterns well enough to disclose protruding anterior wall lesions.

4. There are five conventional double contrast views of the stomach; Supine, RAO,LAO, right lateral and erect.

5. The entire oesophagus and all four portions of the duodenum should be documented.

X. SITUATIONS REQUIRING MODIFIED TECHNIQUE
Such situations are numerous but many are rarely encountered. Radiologists should be familiar with them and should consult the pertinent literature when necessary.

Two of the most frequently encountered are:

A. <u>Perforation or suspected post-operative anastomotic leak.</u>
Water soluble contrast medium must be used, followed cautiously by medium-density barium, should the initial study be negative.

B. <u>Debilitated and relatively immobile patients.</u>
Endoscopy should be considered but if inadvisable or impossible, some useful information may be obtained with a single contrast study using medium density barium and extensive compressive technique in accessible portions of the stomach and duodenum.

XI. QUALITY CONTROL
The following controls should be applied to all examinations of the upper gastro-intestinal tract.

A. Once the examination is completed, the images must be checked by the radiologist before the patient is permitted to leave the department.

B. An attempt should be made to resolve questionable findings before the patient leaves.

C. Radiologic findings should be correlated with endoscopic, surgical and pathologic findings where available.

XII. QUALITY IMPROVEMENT
Procedures should be systematically monitored and evaluated as part of the overall quality improvement program of the facility. Monitoring should include the evaluation of the accuracy of radiologic interpretation as well as the appropriateness of the examination.

The incidence of complications and adverse events should be recorded and periodically reviewed in order to identify opportunities to improve patient care.

The data should be collected in a manner which complies with statutory and regulatory peer review procedures in order to protect the confidentiality of the peer review data.

XIII. THE REPORT
This should conform with the C.A.R. standards for communication in diagnostic radiologyunication in diagnostic radiology.