



Standard for Performance of Adult Barium Enema Examinations

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The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical high-quality physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

I. INTRODUCTION

Examination of the colon by barium enema is a proven and useful procedure for evaluation of the large bowel. It can exclude the presence of disease or determine its nature and extent with the aid of studies of good diagnostic quality, while keeping patient discomfort and radiation doses at a minimum. The following standards are for performance of barium enema in adult patients.

II. INDICATIONS

The major indications for a radiological examination of the colon are: suspected neoplasm, diverticular disease and inflammatory bowel disease. However, the barium enema may be helpful in diagnosing many other disease states intrinsic or extrinsic to the colon. Pertinent history and symptoms serving as indications for the barium enema examination include diarrhea, constipation, bleeding, anaemia, intestinal obstruction, personal or family history of previous colonic neoplasm, weight loss and fever.

III. PHYSICIAN QUALIFICATIONS

Physicians involved in the performance, supervision and interpretation of adult barium enemas 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 equivalent foreign Radiologist qualifications if the Radiologist is certified by a recognized certifying body and holds a valid provincial license.

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.

IV. 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 CAMRT and should meet pertinent provincial regulations.

V. 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.

VI. EXAMINATION PRELIMINARIES

- A.** A written request from the referring physician, including the reason for consultation and appropriate past medical and surgical history, should be available.
- B.** Colon preparation should consist of any effective combination of dietary restriction, hydration, osmotic laxatives, contact laxatives, cleansing enemas and per oral colonic lavage. In certain clinical situations, such as suspected perforation or obstruction, preparation may be limited or omitted.
- C.** The medical chart of hospitalized patients should ideally accompany the patient to the fluoroscopic unit.
- D.** A barium enema tip conforming with Canadian Health Protection Branch Standards should be inserted by the radiologist, a trained technologist or registered nurse. Should a retention cuff be necessary, it should be inflated, under fluoroscopic control, by the radiologist or technologist (supervised by the radiologist), to a capacity not exceeding the manufacturer's recommendations.
- E.** Colostomy enema:
 - 1.** Proximal colostomy - one of two approaches is suggested:
 - a.** Depending on whether a single or double contrast examination is planned a two or three-way Foley type of catheter is inserted gently but deeply into the colon, and, after a small of contrast has been introduced, the balloon may be slowly inflated by the radiologist or technologist under direct fluoroscopic control while asking the patient to report any discomfort.
 - b.** A catheter is passed through a rubber nipple and then inserted into the colostomy until the nipple lies snugly against the stoma. This is then usually held in place by the patient.
 - 2.** Distal colostomy or mucous fistula:
 - a.** From above, a colostomy is approached as outlined in 1a or b. For a mucous fistula, a soft catheter can be introduced, neither balloon nor nipple usually being necessary.
 - b.** From below, a small rectal catheter can be used, but leakage from the proximal orifice may be difficult to control.
 - 3.** A small rectal catheter can be used to examine a rectosigmoid colon which has been surgically closed from above.

VII. CHOICE OF CONTRAST MEDIUM AND EXAMINATION

All radiologists should be skilled in the performance and interpretation of single and double contrast barium enemas. The choice between the two is the prerogative of the radiologist and is an educated decision based on the established literature, the condition of the individual patient, and the clinical problem to be solved.

The following are given as guidelines for making these choices:

- A.** The single contrast barium enema is preferable for the very young, the very old, the seriously ill and very disabled patient. Such patients are usually unable to stand on their own or to turn 360° when lying down. The method is often used for suspected obstruction, fistulization, and evaluation of the distal colon after colostomy.
- B.** The double contrast barium enema is preferable in patients in patients suspected of having or known to have inflammatory bowel disease, and in the search for the etiology of anaemia, weight loss or hematochezia. In radiologic screening programs for colorectal cancer, and in patients with a family or personal history of colon neoplasia, the double contrast enema should be used exclusively.
- C.** The use of biphasic examinations (a double contrast examination followed immediately after evacuation by low density barium or a limited double contrast evaluation of a difficult segment identified in single contrast) should be considered when a given examination is incomplete or equivocal (see Sec. 9C).
- D.** Water soluble contrast medium should be used for patients with suspected perforation and patients with suspected anastomotic leak.

VII. EXAMINATION TECHNIQUE

The following may be modified by the radiologist so as to consistently produce examinations of good quality. Clinical circumstances, the condition of the patient, the presence of a colostomy, and findings during fluoroscopy should dictate any subsequent modifications.

A. Single Contrast Examination

1. Suggested procedure:

- a. Barium suspension of approximately 15-20% weight/ volume.
- b. Kilovoltage of 100Kvp or more, depending on patient size, during filming.
- c. Manual or mechanical compression of accessible segments of the colon during fluoroscopy is recommended, especially as applied to the caecum.
- d. Intravenous or intramuscular smooth muscle relaxing agents may be used to counteract colonic spasm, minimize incontinence, and decrease patient discomfort.

2. Suggested overhead and fluoroscopic spot films:

- a. Spot films as required to demonstrate those segments of the colon usually not well demonstrated on the overhead films.
- b. Overhead large format films including frontal and oblique views of the entire filled colon.
- c. An angled beam view of the sigmoid colon.
- d. A post-evacuation frontal film.

3. Quality controls specific to this study are:

- a. Each segment of the colon is seen without overlap.
- b. The entire colon is examined as documented by filling of the appendix, the

terminal ileum or unequivocal visualization of the ileocaecal valve.

c. Radiographic technique should ensure radiographic penetration of all segments of the barium-filled colon.

d. The colon should be free of fecal material (except for minor mobile debris) in over 90% of patients undergoing the procedure.

e. The post-evacuation view shows the entire evacuated surface of the colon.

B. Double Contrast Examination

1. Suggested procedure:

a. High density (80% weight/volume or greater) barium suspension.

b. Kilovoltage of 90Kvp or more, depending on patient size, during filming.

c. Barium suspension and room air or carbon dioxide are introduced under fluoroscopic control to achieve adequate coating and distension of the entire colon.

d. Intravenous or intramuscular smooth muscle relaxing agents may be used to counteract colonic spasm, minimize incontinence, facilitate bowel distension and decrease patient discomfort.

2. Suggested overhead and fluoroscopic spot films:

a. Fluoroscopic spot films of the rectum, sigmoid colon, flexures, and caecum in double contrast in the upright or recumbent positions.

b. Overhead large format films including prone, supine and upright views of the entire colon.

c. Angulated views of the sigmoid colon.

d. Both lateral decubitus views of the entire colon using a horizontal beam and wedge filter.

3. Quality controls specific to this study are:

a. Complete barium coating of the entire colon has been achieved.

b. The colon is well distended with gas.

c. The entire colon is examined, as documented by filling of the appendix, the terminal ileum, or unequivocal visualization of the ileocaecal valve.

d. Each segment of the colon is well seen in double contrast, on at least two radiographs taken in different positions, whenever possible.

e. The colon should be free of fecal material (except for minor mobile debris) and excess fluid in over 90% of patients undergoing the procedure.

IX. QUALITY CONTROL

The following controls should be applied to all barium enema examinations:

A. Once examinations are completed, films must be checked by the radiologist before the patient is permitted to leave the department.

B. Poorly exposed, inadequately centered or positioned films and blurred films should be repeated as necessary.

C. An attempt should be made to resolve questionable radiologic findings before the patient leaves. Repeat fluoroscopy, biphasic examinations and gas insufflation should be performed as necessary (see Sec. 7C).

D. Where sufficient follow-up information can be obtained, the following is suggested for a quality control program:

1. Correlate radiologic, endoscopic, surgical and pathologic findings where available.
2. For colorectal cancer, the detection rate should be not less than 90%.
3. For polyps greater than 1 cm, the detection rate should be approximately 80%.

X. 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. Periodic or ongoing double reading of double contrast films is recommended when feasible.

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.

XI. THE BARIUM ENEMA REPORT

This should conform with the CAR Standards for communication in diagnostic radiology already set forth.