The American College of Radiology, with more than 30,000 members, is the principal organization of radiologists, radiation oncologists, and clinical medical physicists in the United States. The College is a nonprofit professional society whose primary purposes are to advance the science of radiology, improve radiologic services to the patient, study the socioeconomic aspects of the practice of radiology, and encourage continuing education for radiologists, radiation oncologists, medical physicists, and persons practicing in allied professional fields.

The American College of Radiology will periodically define new practice parameters and technical standards for radiologic practice to help advance the science of radiology and to improve the quality of service to patients throughout the United States. Existing practice parameters and technical standards will be reviewed for revision or renewal, as appropriate, on their fifth anniversary or sooner, if indicated.

Each practice parameter and technical standard, representing a policy statement by the College, has undergone a thorough consensus process in which it has been subjected to extensive review and approval. The practice parameters and technical standards recognize that the safe and effective use of diagnostic and therapeutic radiology requires specific training, skills, and techniques, as described in each document. Reproduction or modification of the published practice parameter and technical standard by those entities not providing these services is not authorized.

Revised 2014 (Resolution 12)*

ACR–SAR PRACTICE PARAMETER FOR THE PERFORMANCE OF AN ENTEROCLYSIS EXAMINATION IN ADULTS

PREAMBLE

This document is an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner in light of all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology subsequent to publication of this document. However, a practitioner who employs an approach substantially different from the guidance in this document is advised to document in the patient record information sufficient to explain the approach taken.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based

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1 Iowa Medical Society and Iowa Society of Anesthesiologists v. Iowa Board of Nursing, ___ N.W.2d ___ (Iowa 2013) Iowa Supreme Court refuses to find that the ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures (Revised 2008) sets a national standard for who may perform fluoroscopic procedures in light of the standard’s stated purpose that ACR standards are educational tools and not intended to establish a legal standard of care. See also, Stanley v. McCarver, 63 P.3d 1076 (Ariz. App. 2003) where in a concurring opinion the Court stated that “published standards or guidelines of specialty medical organizations are useful in determining the duty owed or the standard of care applicable in a given situation” even though ACR standards themselves do not establish the standard of care.
on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of this document is to assist practitioners in achieving this objective.

I. INTRODUCTION

This practice parameter was developed collaboratively by the American College of Radiology (ACR) and the Society of Abdominal Radiology (SAR).

Although other imaging modalities [1-3] are being used for small bowel evaluation, such as per-oral small bowel series, computed tomography (CT) enterography, and magnetic resonance (MR) enterography, radiologic examination of the small intestine by barium infused through an enteric catheter remains a proven and useful procedure for evaluating the small bowel [4-8]. Its advantages include optimal distention of the small bowel lumen and delineation of mucosal detail [9]. One of its main advantages over CT and MR enteroclysis is the ability to identify subtle mucosal abnormalities [3]. This facilitates evaluation of ulceration, small polyloid filling defects, constricting lesions, and adhesive bands. Enteroclysis enables visualization of all dilated small bowel loops simultaneously and assists in determining fold thickness. As an interactive examination that employs “live” fluoroscopy, enteroclysis also may provide useful information about mechanical small bowel function such as abnormalities of regional peristalsis (another advantage over CT enteroclysis and MR enteroclysis unless dynamic MR sequences are obtained). This distinguishes it from all other cross-sectional examinations at discrete time points. The choice among multiple small bowel imaging modalities depends on the radiologist’s experience and opinion about which test is best in each clinical circumstance. Rapidly evolving technologies and each practitioner’s skills affect the decision. This practice parameter is for performing fluoroscopic enteroclysis examination in adult patients.

The goal of this procedure is to establish the presence or absence and the nature of small bowel disease by producing a diagnostic quality study at the minimal radiation dose necessary.

II. INDICATIONS AND CONTRAINDICATIONS

Clinical indications and contraindications for radiographic enteroclysis include, but are not limited to, the following [10-12]:

A. Indications
   1. Suspected or known small bowel obstruction, especially with recurrent obstructions
   2. Neoplasms or polyps
   3. Inflammatory bowel disease
   4. Unexplained weight loss or gastrointestinal (GI) bleeding
   5. Anemia
   6. Abdominal pain
   7. Malabsorption
   8. Diagnosing or re-evaluating almost all other disease states intrinsically or extrinsically affecting the small bowel
   9. Clarifying the findings of a preceding oral study

B. Contraindications
   1. The inability to pass the enteroclysis catheter, as well as the patient’s inability to tolerate the catheter, is a contraindication to enteroclysis. If feasible, moderate (conscious) sedation can eliminate this contraindication.
   2. Pregnancy is a relative contraindication to enteroclysis.

For the pregnant or potentially pregnant patient, see the ACR–SPR Practice Parameter for Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing Radiation.
III. QUALIFICATIONS OF PERSONNEL

See the ACR–SPR Practice Parameter for General Radiography.

Additionally, physicians performing this procedure should have documented formal training in the performance and interpretation of GI fluoroscopy as part of an accredited residency training program.

Radiologist assistants registered by The American Registry of Radiologic Technologists (ARRT), registered radiologist assistants as described by the ACR and the American Society of Radiologic Technologists (ASRT) Joint Statement on the Radiologist’s Assistant, Roles, and Responsibilities, may perform specific fluoroscopic procedures under the direct supervision of a radiologist. They should have formal training in radiation management and should undergo a formal credentialing process administered by the facility for fluoroscopically guided interventional procedures.

Other ancillary personnel who are qualified and duly licensed or certified under applicable state law may, under supervision by a radiologist or other qualified physician, perform specific interventional fluoroscopic or other imaging-guided procedures. Supervision by a radiologist or other qualified physician must be direct or personal and must comply with local, state, and federal regulations. Individuals should be credentialed for specific fluoroscopic and other imaging-guided interventional procedures and should have received formal training in radiation management and/or application of other imaging modalities as appropriate.

IV. SPECIFICATIONS OF THE EXAMINATION

The written or electronic request for an enteroclysis examination should provide sufficient information to demonstrate the medical necessity of the examination and allow for its proper performance and interpretation.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). Additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider. The accompanying clinical information should be provided by a physician or other appropriately licensed health care provider familiar with the patient’s clinical problem or question and consistent with the state’s scope of practice requirements. (ACR Resolution 35, adopted in 2006)

A. Patient Preparation

An appropriate medical history should be available, including results of laboratory tests and imaging, endoscopic, and surgical procedures as applicable.

1. The patient should have nothing by mouth after midnight before the procedure. A laxative (eg, magnesium citrate, bisacodyl, or castor oil) may be taken during the early afternoon of the day preceding the examination. Small bowel distension during the examination may produce a reflex to evacuate a full colon at a critical point in the examination. However, the presence of feces in the colon should not preclude a good diagnostic result for the enteroclysis. In certain clinical situations (intestinal obstruction), this preparation is omitted.

2. The enteroclysis catheter should be inserted by a physician, registered radiologist assistant, trained radiologic technologist, or other ancillary personnel under the direct supervision of a qualified licensed physician. The tip should be positioned several centimeters beyond the ligament of Treitz and an occlusion balloon should be inflated under fluoroscopy to minimize contrast reflux back into the stomach.
3. Frequently used medications include anesthetic jelly and/or lubricant in the nasal orifice and anesthetic spray in the posterior oropharynx. Conscious sedation (midazolam and fentanyl) may also be administered prior to the examination, and if these are used, patients must not drive for the remainder of the day following the examination [8]. A family member or friend should drive them home, and arrangements must be made at the time of scheduling the examination [13].

B. Examination Technique

The following examination descriptions may be modified by the physician as warranted by clinical circumstances and the condition of the patient [10].

1. Single-contrast examination

   a. A medium-density barium suspension should be administered via enteroclysis tube at a rate sufficient to maintain small bowel distention.
   
   b. During fluoroscopy all accessible segments of the small bowel should be manually or mechanically compressed with a suitable external compression device, including special maneuvers used to attempt to isolate pelvic small bowel loops (ie, lateral or prone views of the pelvis when small bowel is located in the deep, posterior pelvis). Rotation and palpation, as in routine small bowel barium examinations, remains the most efficacious method of examining the small bowel.
   
   c. Images suitable for documentation of the examination should demonstrate any abnormal small bowel loops or representative segments of normal small bowel if no abnormality is detected. Large-format images should be obtained when the entire small bowel is adequately filled and distended. Different projections are helpful and complement each other since both fluoroscopy and radiography techniques inherently result in superimposition of anatomic structures. Digital imaging equipment, postprocessing of images [14], and labeling of anatomy and abnormal findings aid in interpretation and subsequent consultation.

2. Double-contrast examination [15]

   a. High-density barium suspension commercially prepared specifically for this examination should be administered.
   
   b. A 0.5% solution of hydroxypropyl methylcellulose, Volumen, CO₂, or room air should be introduced under fluoroscopic guidance to achieve double-contrast mucosal coating and distention of the entire small bowel. Rates of infusion of barium and double-contrast agents should be constantly adjusted to obtain uniform distention of the entire small intestine without overwhelming peristaltic capacity. Care should be taken to avoid reflux of large amounts of this fluid into the stomach as it can cause nausea and sudden vomiting.
   
   c. Appropriate compression images of all accessible small bowel segments should be obtained during the course of infusion of barium and methylcellulose. Digital imaging equipment, postprocessing of images [14], and labeling of anatomy and abnormal findings aid in interpretation and subsequent consultation. Images should demonstrate any abnormal small bowel loops or representative segments of small bowel if no abnormality is detected. Large-format images should be obtained when the entire small bowel is adequately filled and distended.

3. Quality control

   The following quality controls should be applied to all enteroclysis examinations:
   
   a. When examinations are completed, patients should be held in the fluoroscopic area until the physician has reviewed all images.
   
   b. An attempt should be made to resolve questionable radiologic findings before the patient leaves. Repeat fluoroscopy of segments in question should be performed as necessary.
   
   c. Each accessible segment of the small bowel should be visualized in compression during fluoroscopy.
d. Radiographic techniques sufficient to penetrate barium-filled small bowel loops should be used.

V. DOCUMENTATION

Reporting should be in accordance with the ACR Practice Parameter for Communication of Diagnostic Imaging Findings.

VI. EQUIPMENT SPECIFICATIONS

Examinations should be performed with fluoroscopic image intensification and radiographic equipment meeting all applicable federal and state radiation standards.

Equipment should provide diagnostic fluoroscopic image quality and recording (radiograph, video, or digital) capability. Kilovoltage of 100 kVp or greater should be achievable. Equipment necessary to compress and isolate accessible regions of the small bowel should be readily available.

Where digital imaging is used, the equipment should meet the specifications described in the ACR–AAPM–SIIM Technical Standard for Electronic Practice of Medical Imaging.

VII. RADIATION SAFETY IN IMAGING

Radiologists, medical physicists, registered radiologist assistants, radiologic technologists, and all supervising physicians have a responsibility for safety in the workplace by keeping radiation exposure to staff, and to society as a whole, “as low as reasonably achievable” (ALARA) and to assure that radiation doses to individual patients are appropriate, taking into account the possible risk from radiation exposure and the diagnostic image quality necessary to achieve the clinical objective. All personnel that work with ionizing radiation must understand the key principles of occupational and public radiation protection (justification, optimization of protection and application of dose limits) and the principles of proper management of radiation dose to patients (justification, optimization and the use of dose reference levels) http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1578_web-57265295.pdf.

Nationally developed guidelines, such as the ACR’s Appropriateness Criteria®, should be used to help choose the most appropriate imaging procedures to prevent unwarranted radiation exposure.

Facilities should have and adhere to policies and procedures that require varying ionizing radiation examination protocols (plain radiography, fluoroscopy, interventional radiology, CT) to take into account patient body habitus (such as patient dimensions, weight, or body mass index) to optimize the relationship between minimal radiation dose and adequate image quality. Automated dose reduction technologies available on imaging equipment should be used whenever appropriate. If such technology is not available, appropriate manual techniques should be used.

Additional information regarding patient radiation safety in imaging is available at the Image Gently® for children (www.imagegently.org) and Image Wisely® for adults (www.imagewisely.org) websites. These advocacy and awareness campaigns provide free educational materials for all stakeholders involved in imaging (patients, technologists, referring providers, medical physicists, and radiologists).

Radiation exposures or other dose indices should be measured and patient radiation dose estimated for representative examinations and types of patients by a Qualified Medical Physicist in accordance with the applicable ACR Technical Standards. Regular auditing of patient dose indices should be performed by comparing the facility’s dose information with national benchmarks, such as the ACR Dose Index Registry, the NCRP Report No. 172, Reference Levels and Achievable Doses in Medical and Dental Imaging: Recommendations for the United States or the Conference of Radiation Control Program Director’s National

VIII. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL, AND PATIENT EDUCATION

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control, and Patient Education appearing under the heading Position Statement on QC & Improvement, Safety, Infection Control, and Patient Education on the ACR website (http://www.acr.org/guidelines).

Equipment performance monitoring should be in accordance with the ACR Technical Standard for Diagnostic Medical Physics Performance Monitoring of Radiographic and Fluoroscopic Equipment.

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REFERENCES


*Practice parameters and technical standards are published annually with an effective date of October 1 in the year in which amended, revised or approved by the ACR Council. For practice parameters and technical standards published before 1999, the effective date was January 1 following the year in which the practice parameter or technical standard was amended, revised, or approved by the ACR Council.

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