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Each practice guideline 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, requiring the approval of the Commission on Quality and Safety as well as the ACR Board of Chancellors, the ACR Council Steering Committee, and the ACR Council. The practice guidelines 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 guideline and technical standard by those entities not providing these services is not authorized.

Revised 2006 (Res. 50,17,34,35,36)\*

## **ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF THE MODIFIED BARIUM SWALLOW IN ADULTS**

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### **PREAMBLE**

These guidelines are an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. They 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 cautions against the use of these guidelines 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 physician or medical physicist in light of all the circumstances presented. Thus, an approach that differs from the guidelines, 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 the guidelines 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 the guidelines. However, a practitioner who employs an approach substantially different from these guidelines 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 these guidelines 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 on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of these guidelines is to assist practitioners in achieving this objective.

### **I. INTRODUCTION**

The modified barium swallow (MBS) is a proven and useful procedure for evaluating the oral and pharyngeal phases of swallowing in the adult patient. It is used primarily for evaluation of function, although structural abnormalities will also be revealed and may be the cause of swallowing dysfunction. Although a tailored MBS study focusing primarily on function is often performed alone, a complete study may also include spot films of the pharynx for structural assessment and an esophagram, as symptoms of dysphagia are often poorly localized. This guideline focuses on assessment of the pharynx. For evaluation of the esophagus, see the [ACR Practice Guideline for the Performance of Esophagrams and Upper Gastrointestinal Examination in Adults](#).

The MBS may be performed because of known or suspected swallowing dysfunction or because of the presence of conditions that are strongly associated with swallowing dysfunction. The MBS should be performed only for a valid medical reason and with the minimum radiation dose necessary to achieve an optimal study. Additional or specialized examinations may be required.

While it is not possible to detect all structural and functional swallowing abnormalities using the MBS,

adherence to the following guideline will maximize the probability of their detection.

## II. INDICATIONS

Indications for the MBS include, but are not limited to:

1. Oropharyngeal dysphagia.
2. Coughing, choking, or drooling with swallowing.
3. Known or suspected aspiration pneumonia.
4. Neurologic disorders likely to affect swallowing.
5. Myoneural junction disorders likely to affect swallowing.
6. Myopathy involving the pharynx and cervical esophagus.
7. Masses of the tongue, pharynx, larynx, or retropharyngeal region that may affect swallowing.
8. Postoperative and/or postradiation therapy evaluation of the mouth, pharynx, larynx, or retropharyngeal area.
9. Follow-up of known oropharyngeal swallowing dysfunction.
10. Assessment of dietary restrictions and protective maneuvers to limit or prevent aspiration.

For the pregnant or potentially pregnant patient, see the [ACR Practice Guideline for Imaging Pregnant or Potentially Pregnant Adolescents and Women with Ionizing Radiation](#).

## III. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

### A. Physician

Examinations must be performed by or under the supervision of a licensed physician at the site and interpreted by a physician with the following qualifications:

1. Certification in Radiology or Diagnostic Radiology by the American Board of Radiology, the American Osteopathic Board of Radiology, the Royal College of Physicians and Surgeons of Canada, or Le College des Medecins du Quebec.  
or
2. Completion of an Accreditation Council for Graduate Medical Education (ACGME) approved residency program or an American Osteopathic Association (AOA) approved residency program and shall have spent a minimum of 3 months of documented formal training in the performance and interpretation of gastrointestinal fluoroscopy, including MBS.

and

3. The physician shall have documented training in and understanding of the physics of diagnostic radiology and the equipment needed to produce the images. This should include conventional radiography, fluoroscopy, screen-film combinations, conventional and digital image processing, and the processing and development of films. In addition, the physician must demonstrate training in the principles of radiation protection, the hazards of radiation exposure to both patient and radiographic personnel, and the monitoring requirements.

and

4. The physician shall have documented training in and understanding of the value of MBS examinations relative to other medical imaging procedures (general radiography, fluoroscopy, computed tomography, ultrasound, magnetic resonance imaging, and nuclear medicine) in order to best evaluate a patient's clinical symptoms.

### Continuing Medical Education

The physician's continuing medical education should be in accordance with the [ACR Practice Guideline for Continuing Medical Education \(CME\)](#).

### B. Registered Radiologist Assistant

A registered radiologist assistant is an advanced level radiographer who is certified and registered as a radiologist assistant by the American Registry of Radiologic Technologists (ARRT) after having successfully completed an advanced academic program encompassing an ACR/ASRT (American Society of Radiologic Technologists) radiologist assistant curriculum and a radiologist-directed clinical preceptorship. Under radiologist supervision, the radiologist assistant may perform patient assessment, patient management and selected examinations as delineated in the Joint Policy Statement of the ACR and the ASRT titled "Radiologist Assistant: Roles and Responsibilities" and as allowed by state law. The radiologist assistant transmits to the supervising radiologists those observations that have a bearing on diagnosis. Performance of diagnostic interpretations remains outside the scope of practice of the radiologist assistant. (ACR Resolution 34, adopted in 2006)

### C. Radiologic Technologist

Qualifications of technologists performing GI radiography should be in accordance with the current

ACR policy statement for fluoroscopy<sup>1</sup> and with the operating procedures or manuals at the imaging facility. Fluoroscopy technologists assisting in modified barium swallow examinations should be thoroughly trained in GI radiography.

Certification by the American Registry of Radiologic Technologists (ARRT) or unrestricted state licensure is required.

#### D. Speech-Language Pathologist

The speech-language pathologist should have specific education and training related to the indications for and the performance of the MBS, and it is recommended that he or she hold the Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP) from the American Speech-Language-Hearing Association. The speech-language pathologist should have knowledge of the patient's medical condition and current cognitive and mental status.

### IV. SPECIFICATIONS OF THE EXAMINATION

The written or electronic request for a modified barium swallow 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

<sup>1</sup>The American College of Radiology approves of the practice of certified and/or licensed radiologic technologists performing fluoroscopy in a facility or department as a positioning or localizing procedure only, and then only if monitored by a supervising physician who is personally and immediately available\*. There must be a written policy or process for the positioning or localizing procedure that is approved by the medical director of the facility or department/service and that includes written authority or policies and processes for designating radiologic technologists who may perform such procedures. (ACR Resolution 26, 1987 – revised in 2007, Resolution 12-m)

\*For the purposes of this guideline, “personally and immediately available” is defined in manner of the “personal supervision” provision of CMS—a physician must be in attendance in the room during the performance of the procedure. Program Memorandum Carriers, DHHS, HCFA, Transmittal B-01-28, April 19, 2001.

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 Selection, Preparation, and Positioning

The patient must have sufficient cognitive awareness to cooperate with the study. The patient should have nothing by mouth for several hours prior to the study and should not smoke or chew gum for the same period of time. The oral and pharyngeal regions are usually evaluated initially in the lateral plane with the patient upright. Special chairs are available to assist with patient positioning but are not necessary to perform an adequate study. Patients who cannot be placed upright may be examined with cross-table lateral fluoroscopy or in the lateral decubitus position.

#### B. Personnel

The examination may be performed by a physician alone for diagnostic evaluation or by a physician and a speech-language pathologist for both diagnosis and assessment of therapy to promote swallowing without aspiration.

#### C. Method of Recording

For functional assessment, the fluoroscopic portion of the examination should be recorded on high-resolution videofluorographic (VF) recording medium. Rapid spot films are not adequate for functional assessment. For morphologic assessment, spot films with double-contrast or single-contrast technique should be used.

#### D. Examination Technique

##### 1. Complete examination

A complete examination should include evaluation of oral and pharyngeal function and morphology in the lateral projection. Evaluation in the frontal projection is frequently useful, since different areas are best evaluated in each projection. An esophagram may be required.

##### a. Videofluorographic Recording Medium

Videofluorographic recording is performed while the patient swallows a variety of consistencies of barium or barium-impregnated food with varying bolus volumes. Assessment includes all phases of swallowing from the preparatory oral phase through the oral transfer phase and pharyngeal phase. The esophageal phase may be assessed on other swallows. The

viscosity and volume of each bolus may be varied by the clinical judgment of the speech-language pathologist or the radiologist based on the patient's presenting symptoms. If aspiration occurs, the patient's response to aspiration and ability to clear the aspirated materials and his or her response to protective and therapeutic maneuvers should be assessed wherever possible.

b. Spot radiographs

Spot radiographs are not needed for all patients. When obtained, double-contrast spot radiographs of the pharynx may include lateral views during both suspended respiration and phonation, and frontal views during both suspended respiration and modified Valsalva maneuver. Single-contrast radiographs may be substituted if warranted by the patient's clinical condition.

c. Esophagram

For evaluation of the esophagus, see the [ACR Practice Guideline for the Performance of Esophagrams and Upper Gastrointestinal Examinations in Adults](#). In cases of significant aspiration, the esophagram may be performed with injection of barium directly into the esophagus through a tube.

2. Tailored examination

The method of examination will often vary based on the patient's history, the clinical questions to be answered, and the findings during the study. Many institutions tailor the majority of examinations to VF in the lateral projection to assess for the presence or absence of aspiration and the effects of protective maneuvers to limit aspiration. The examination may need to be terminated prematurely if the patient demonstrates severe aspiration (such as aspiration below the sternal notch) and does not respond to protective or therapeutic maneuvers.

3. Protective and therapeutic maneuvers

When aspiration does occur, the effect of maneuvers to limit or prevent aspiration may be assessed. These may include changes in neck or body position or other special maneuvers. Additional consistencies of food may be assessed based on the patient's usual or expected diet.

4. Provocative maneuvers

When the patient's symptoms are not explained by the basic examination, provocative or helpful maneuvers based on the history may be needed. Changes in body position may be used to evoke subtle swallowing dysfunction, including the

supine and prone oblique positions and head extension.

E. Radiographic Quality Control

Proper functioning of the VF equipment should be assured prior to beginning the examination. If spot films are obtained, image quality should be checked by a qualified technologist or physician before the patient is dismissed. Films not of diagnostic quality should be repeated as necessary. Provision should be made for tracking fluoroscopy time.

## V. DOCUMENTATION

Comparison to prior MBS studies should be performed when relevant, particularly when the examination is performed to follow up previously demonstrated abnormalities. Patient identity (using name and/or a unique identifying number) and examination date should be recorded on the VF recording medium. Each institution should develop a policy on retention of videotapes consistent with applicable state or federal policies.

Reporting should be in accordance with the [ACR Practice Guideline 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. The equipment should provide diagnostic fluoroscopic image quality and recording (video and film or digital) capability. The equipment should be capable of producing kilovoltage greater than 100 kVp. In selected cases, patient monitoring (e.g., pulse oximetry) may be desirable. However, most patients do not require any additional monitoring other than that which may already be in use.

## VII. RADIATION SAFETY IN IMAGING

Radiologists, medical physicists, radiologic technologists, and all supervising physicians have a responsibility to minimize radiation dose to individual patients, to staff, and to society as a whole, while maintaining the necessary diagnostic image quality. This concept is known as "as low as reasonably achievable (ALARA)."

Facilities, in consultation with the medical physicist, should have in place and should adhere to policies and procedures, in accordance with ALARA, to vary examination protocols to take into account patient body habitus, such as height and/or weight, body mass index or lateral width. The dose reduction devices that are

available on imaging equipment should be active or manual techniques should be used to moderate the exposure while maintaining the necessary diagnostic image quality. Periodically, radiation exposures should be measured and patient radiation doses estimated by a medical physicist in accordance with the appropriate ACR Technical Standard. (ACR Resolution 17, adopted in 2006 – revised in 2009, Resolution 11)

## 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 elsewhere in the ACR Practice Guidelines and Technical Standards book.

Equipment performance monitoring should be in accordance with the [ACR Technical Standard for Diagnostic Medical Physics Performance Monitoring of Radiologic and Fluoroscopic Equipment](#).

### ACKNOWLEDGEMENTS

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### Suggested Reading

1. ACR ASRT joint statement. Radiologist assistant roles and responsibilities. In: *Digest of Council*

*Actions*. Reston, Va: American College of Radiology; 2008:147.

2. ACR practice guideline for communication of diagnostic imaging findings. In: *Practice Guidelines and Technical Standards*. Reston, Va: ACR; 2005:5-9.
3. ACR practice guideline for the performance of esophagrams and upper gastrointestinal examinations in adults. In: *Practice Guidelines and Technical Standards*. Reston, Va: ACR; 2005:233-237.
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\*Guidelines and 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 guidelines and standards published before 1999, the effective date was January 1 following the year in which the guideline or standard was amended, revised, or approved by the ACR Council.

#### Development Chronology for this Guideline

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