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The American College of Radiology will periodically define new practice guidelines 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 guidelines and technical standards will be reviewed for revision or renewal, as appropriate, on their fifth anniversary or sooner, if indicated.

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.

1994 (Res. 3)
Amended 1995 (Res. 24, 53)
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ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF MYELOGRAPHY AND CISTERNOGRAPHY

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 on 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

Myelography has been an important diagnostic modality for a wide range of spinal disease processes for more than 80 years. Cisternography using intrathecal contrast has also been used for many years in the diagnostic evaluation of disease processes involving the basilar cisterns and skull base.

Myelography can be performed in the cervical, thoracic, and/or lumbar regions or as a cisternogram in the form of:

1. Conventional myelogram.
2. Conventional myelogram followed by a CT myelogram.
3. CT myelogram without preceding conventional myelogram.
4. CT cisternogram.

Institutions offering myelography should insist on documentation of appropriate training, demonstrated competence, and maintenance of skills for all physicians who receive privileges to perform these procedures.

II. INDICATIONS

Although myelography and cisternography have frequently been superseded by the development of high resolution computed tomography (CT) and magnetic resonance imaging (MRI), there remain the following indications:

1. Demonstration of spinal fluid leaks (rhinorrhea or otorrhea).
2. Surgical planning – particularly in the evaluation of lateral recess stenosis.
3. Diagnostic evaluation of spinal or basal cisternal disease.
4. Nondiagnostic MRI studies.
5. Poor correlation of physical findings with MRI studies.
6. Use of MRI precluded because of:
 - a. Claustrophobia
 - b. Technical issues, e.g., patient size
 - c. Safety reasons, e.g., pacemaker
 - d. Surgical hardware

All imaging facilities should have policies and procedures to reasonably attempt to identify pregnant patients prior to the performance of any examination involving ionizing radiation. If the patient is known to be pregnant, the potential radiation risks to the fetus and clinical benefits of the procedure should be considered before proceeding with the study. (1995, 2005 - ACR Resolution 1a)

III. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

A. Physician

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, and the performance of myelography with acceptable success and complication rates.

or

Completion of an Accreditation Council for Graduate Medical Education (ACGME) approved residency or fellowship training program or an American Osteopathic Association (AOA) approved residency program during which there is evidence of training and competency in myelography. Adequate training should include the performance of enough myelographic procedures to become facile in the technique.

and

Instruction in all of the following areas should be substantiated by the director of the training program:

1. Anatomy, physiology, and pathophysiology of the central and peripheral nervous systems.
2. Physics of radiation, including an understanding of its production, detection, and risks, and of techniques to minimize radiation exposure.
3. Pharmacology and dosage of contrast agents used in myelography. (Use of only those agents approved for intrathecal use should be emphasized.)
4. Indications for myelography.
5. Preprocedural assessment of the patient.
6. Conduct of the myelographic examination. This includes spinal puncture, patient positioning, and fluoroscopic and filming techniques.
7. Conduct of the post-myelogram CT examination. This includes timing, patient positioning, and technical factors.
8. Post-procedural patient management, especially the recognition and initial management of complications.
9. Interpretation of lumbar, thoracic, and cervical myelograms and cisternograms, as well as interpretation of post-myelogram CT scans.
10. Contraindications to myelography.
11. Knowledge of the drugs that can increase risk of myelographic adverse events.

Maintenance of Competence

To maintain privileges, physicians must perform a sufficient number of myelographic procedures to maintain their skills with acceptable success and complication rates.

Continuing Medical Education

Continuing 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. (2006 - ACR Resolution 34)

C. Radiologic Technologist

Certification by the American Registry of Radiologic Technologists or unrestricted state licensure is required. Continuing education programs and on-the-job training under the supervision of qualified physicians should be available.

IV. EQUIPMENT SPECIFICATIONS

A. Myelographic Facility

The minimum requirements for the facility are:

1. High-quality imaging equipment, film or digital records of the examination, and a tilt table. A CT scanner to perform post-myelogram CT studies must be available. Multiplanar reconstruction capability for CT is desirable.
2. An adequate selection of needles and appropriate nonionic contrast agents approved for intrathecal use.
3. Appropriate facilities and equipment for treatment of adverse reactions (e.g., seizures, vasovagal reactions, and/or cardiorespiratory collapse).
4. Appropriately trained personnel to provide proper patient care and operation of the equipment.

B. Surgical and Emergency Support

Although serious complications of myelography are infrequent, there should be prompt access to surgical and interventional management of complications.

V. SPECIFICATIONS OF THE EXAMINATION

A. Preprocedural Patient Care

The written or electronic request for myelography 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 scope of practice requirements. (2006 - ACR Resolution 35)

The clinical history and findings are to be reviewed by the performing physician. The patient should be asked specific questions about relevant medications, prior seizures, prior allergic reactions, and clotting ability.

1. Informed consent should be obtained and documented.
2. The patient should be adequately hydrated.
3. If utilized, sedation should be administered in accordance with the [ACR Practice Guideline for Adult Sedation/Analgesia](#) or the [ACR Practice Guideline for Pediatric Sedation/Analgesia](#).

B. Relative Contraindications to Myelography

1. Known significant intracranial process with mass effect.
2. Historical or laboratory evidence of coagulopathy.
3. Previous myelography performed within 1 week.
4. Generalized septicemia.
5. History of significant adverse reaction to iodinated contrast media.
6. History of seizures (patient may be premedicated).
7. Grossly bloody spinal tap (may proceed when benefit outweighs risk).
8. Localized infection at region of puncture site.
9. Pregnancy.
10. Medications known to decrease seizure threshold.

C. Procedure

1. Proper support devices for securing the patient on the table should be available.
2. For myelography, pertinent findings should be documented on film or digital media.

D. Post-Procedural Care

1. The patient should be adequately hydrated.
2. The patient should be observed following the examination.
3. If the myelogram is performed on an outpatient basis, the patient should be properly instructed

regarding limitations following the procedure (e.g., driving).

4. Instructions regarding post-procedural care, including warning signs of adverse reactions and the possibility of persistent headaches, should be given to the patient by a trained professional. The instructions should include a recommendation that the patient should be in the company of a responsible adult for 12 hours following the procedure.
5. A physician should be available to answer questions and provide patient management following the procedure.

VI. DOCUMENTATION

A written report should be generated and communicated to the referring physician in accordance with the [ACR Practice Guideline for Communication of Diagnostic Imaging Findings](#).

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 is the concept “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. Patient radiation doses should be periodically measured by a medical physicist in accordance with the appropriate ACR Technical Standard. (2006 - ACR Resolution 17)

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

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 Concerns appearing elsewhere in the ACR Practice Guidelines and Technical Standards book.

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