Clinical Considerations of the ACR MRI Accreditation Program

Tuesday, July 28, 2009

ACR MRI Accreditation Program – The Basics

1. Create a “Core Team”
2. Read and understand MRI Accreditation Program Documents
3. Evaluate your facility’s MRI protocols and equipment
4. Apply for accreditation in online database “ACRedit”
5. Gather images for submission
6. Submit documents and images to ACR for review

ACR MRI Accreditation Program – The Basics

Step 1: Create a “Core Team”:
The entire facility should be involved with accreditation, but your “core team” will be the instrumental people ensuring success.

- Supervising Physician
- Medical Physicist/MR Scientist
- Lead MRI Technologist
- Administrator
ACR MRI Accreditation Program – The Basics

Step 2: Read and understand MRI Accreditation Documents

The most important thing a facility can do to prepare for accreditation is read all of the documents for MRI Accreditation. You can find all relevant documents on the ACR website at:

http://www.acr.org/accreditation/mri/mri_qc_forms.aspx

ACR MRI Accreditation Program – The Basics

Step 3: Evaluate your facility’s protocols and equipment

Make adjustments/corrections if needed

1. Evaluate all facility protocols (not only exams to be submitted)
2. Only required sequences are scored (listed in Clinical Image Quality Guide)
3. Service to equipment if needed
4. Action limits, Instructions on tech QC if needed

ACR MRI Accreditation Program – The Basics

Step 2: Read and understand MRI Accreditation Documents

All members of the core team should read all of the documents on the testing and QC forms page of the website. Start by reading the following:

1. DMAP Overview
2. MRAP Program Requirements
3. MRAP Clinical Guide
4. MRAP Testing Instructions
ACR MRI Accreditation Program – The Basics

Step 3: Evaluate your facility’s protocols and equipment
Choose modules/examinations for submission
1. Modules performed **routinely**
2. Examinations performed **routinely**

**Note:**
Examinations that fail will have to be repeated – you cannot change examinations after a fail. Choose carefully!

ACR MRI Accreditation Program – The Basics

Emergency Use of Units
(From Program Requirements)
10 or more examinations from a module within any 30 day period
Or
50 or more examinations from a module within any 12 month period

ACR MRI Accreditation Program – The Basics

Step 4: Apply for accreditation in online database
“ACRedit”

https://acredit.acr.org

- New Facility – Register
- Existing facility – use mailed instructions with renewal notice or call ACR
- Best results have been when the lead technologist is the account “owner”
ACR MRI Accreditation Program – The Basics

Step 4: Apply for accreditation in online database

“ACRedit”

- Start by reading Home page
- Read each screen completely before continuing to the next
- Extra information by clicking on the icons

ACR MR I Acc re ditatio n Pr og ram – The Basics

Step 5: Gather images for submission

- Phantom – can be scanned by technologist
- Clinical – within one month before or after phantom scanning

ACR MRI Accreditation Program – The Basics

Step 5: Gather images for submission

- Use blank generic forms from ACR website to gather data if needed. (Not for submission)
- Examples of your facility’s best work
ACR MRI Accreditation Program – The Basics

Step 6: Submit documents to ACR for review
- Technologist QC Form
- Annual System Performance Evaluation Form
- Clinical Test Image Data Forms
- Phantom Data Form
- Contact ACR with any needed changes before submission of online testing package
- Print all forms for submission after completion
- Label all forms and images last

ACR MRI Accreditation Program – The Basics

Step 6: Submit images to ACR for review
- Check Clinical images (one set of hard copy films, or two identical CDs in DICOM format with embedded viewer)
- Check Phantom images (one CD, raw, uncompressed DICOM images, no embedded viewer)
- Documents (printed from ACRedit testing package)
- Annual System Performance Evaluation (hard copy or uploaded into online testing package)

ACR MRI Accreditation Program – The Modules

1. Head
2. Spine
3. Musculoskeletal (MSK)
4. Body
5. MR Angiography (MRA)
6. Cardiac

ACR MRI Accreditation Program – The Modules

- Specialty and Routine Examination choices
- One specialty per module required (No exceptions)
- No volunteers
- Additional modules/units can be added mid-cycle
- Must use your facilities routine protocols
- Routine protocols must meet minimum requirements
ACR MRI Accreditation Program – The Modules

**Head Module**
- Brain for Transient Ischemic Attack (TIA)
- Internal Auditory Canal (IAC/Temporal Bone) for hearing loss
- Brain for Suspected Demyelinating Disease (MS)*
- Pituitary with dynamic contrast enhancement*
- Orbits for vision loss*

**Spine Module**
- Lumbar Spine
- Thoracic Spine
- Cervical Spine*
- Cervical Spine with contrast for intramedullary disease*

**Musculoskeletal Module (MSK)**
- Knee such as for internal derangement
- Shoulder such as for internal derangement
- Wrist such as for internal derangement*
- Elbow such as for internal derangement*
- Forefoot for Morton’s Neuroma*

**Body Module**
- Male pelvis such as for prostate cancer
- Renal
- Hepatobiliary to include MRCP*
- Female pelvis such as for uterine or adnexal disease*
ACR MRI Accreditation Program – The Modules

**MRA Module**
- Brain
- Carotid
- Thoracic aorta
- Distal peripheral runoff
- High resolution arch and carotid*
- Abdomen for renal artery stenosis*

**Cardiac Module**
- Black Blood
- Basic
- Delayed enhanced cine 1
- Delayed enhanced cine 2
- Delayed enhanced cine plus black blood*

---

**ACR MRI Accreditation Program – The Examinations**

**Basic Assumptions**
- Best images
- All units/ all modules routinely performed
- No volunteers
- As little pathology as possible
- Submit entire examinations

**Scoring Categories**
- A: Pulse Sequences and Image Contrast
- B: Filming Technique (same for all exams)
- C: Anatomic Coverage and Imaging Planes
- D: Spatial and Temporal Resolution
- E: Artifacts (same for all exams)
- F: Exam Identification (same for all exams)
**ACR MRI Accreditation Program – The Examinations**

**Category A: Pulse Sequences and Image Contrast**
- Specific sequence types
- Total examination time for required sequences
- Required sequences (if missing, automatic failure)
- Localizers

**Category A: Pulse Sequences and Image Contrast (cont)**
- Fat suppression
- Bright fluid
- Dark fluid

**Category B: Filming Technique**
- Hard copy submissions only
- Film format (20 on 1 maximum)
- Density
- Fog
- Contrast
- Magnification factor

**Category C: Anatomic Coverage and Imaging Planes**
- Automatic Failure
- Sequence specific
ACR MRI Accreditation Program – The Examinations

Category D: Spatial and Temporal Resolution
- Not an automatic failure
- Sequence specific
- Pixel area/voxel volume formulae
- Rectangular field of view

Category E: Artifacts
- Not an automatic failure
- Excessive artifacts
- Listed in Clinical Guide

Category F: Exam Identification
- Missing information
- On Images
- In DICOM header (easily accessible)
- Clinical Test Image Data Sheet
- Watch for bold and italics in list – indicates automatic failure
Coronal Oblique Bright Fluid Fail:
• Coverage (barely covers base of metatarsals)
• Trabeculae and cortex not sharply defined
• 3 of 5 required sequences were over the required slice thickness

Coronal Dark Fluid Pass

Coronal Dark Fluid Fail
• Excessive ghosting (3 of 5 submitted sequences had excessive ghosting in this case.)

ACR MRI Accreditation Program – The Examinations

Tips for success
• Team approach – communication
• Read all documents before applying
• Assess the practice for modules/exams
• Assess protocols (Clinical Image Quality Guide)
  ▪ Required Sequences
  ▪ Spatial Resolution
Tips for success
- Read and understand online application before submission of application
- Submit entire exams
- Check CDs before submission
- Assess personnel for training needs
- Contact ACR with questions before submission of images and online testing package.

Common reasons for clinical failure
- Core team communication
- CDs not checked before submission by core team
- Modules/exams chosen not appropriate for facility
- Documents not read/understood by core team

What is the best preparation for facilities planning to apply for ACR MRI Accreditation?
- Fill out the online application (2%)
- Gather clinical images (0%)
- Read documents for MRI Accreditation (98%)
- Purchase a new scanner (0%)
- Perform the annual system performance evaluation (0%)
What is the best preparation for facilities planning to apply for ACR MRI Accreditation?

3. Read documents for MRI Accreditation
   - Provides a foundation of knowledge of the accreditation process
   - All information needed to successfully achieve accreditation is available before submission
   - Allows facilities to correct any problems prior to submission – avoids repeat fees

Who should read the MRI Accreditation documents?

5. Medical Physicist, Lead MRI Technologist, Supervising Physician
   - Allows the core team to be more effective in working together if protocol modification is needed
   - Mistakes are less likely if everyone on the core team knows minimum requirements

A facility can change examination choices:

2% 1. Any time
0% 2. Never
0% 3. After a deficiency or fail report
98% 4. Before the testing package is submitted
0% 5. After the testing package is submitted
ACR MRI Accreditation Program – The Basics

4. Before the testing package is submitted
   - Score sheets are based on examination choices in application
   - Clinical Test Image Data sheets are examination specific
   - If your facility fails a clinical examination, that examination must be repeated

A Medical Physicist/MR Scientist should check the clinical images before submission:

2. Before submission, with other members of the core team
   - Less chance of missing something if the whole team checks the images
   - Medical Physicist/MR Scientist can help with artifact detection, parameter selection, etc.
   - Medical Physicist/MR Scientist can help with DICOM problems

The annual system performance evaluation must be submitted:

1. Along with initial, renewal, reinstate application
2. Along with the testing package, uploaded or mailed
3. Every year
4. Never
5. Only on random on site surveys
The annual system performance evaluation must be submitted:

2. Along with the testing package, either uploaded or mailed
   - Allows facilities time to look at criteria, and fix any problems after application is submitted
   - All document review is performed with testing package, not with application

The Medical Physicist/MR Scientist should analyze the phantom images:

5. Before submission, using K-PACS
   - Reviewers use K-PACS or OSIRIX
   - Allows you to see exactly what reviewer will see

References

ACR MRI Accreditation Testing and QC forms. Available at: http://www.acr.org/accreditation/mri/mri_qc_forms.aspx
