Implementation of a Protocol for Non-Conditional Cardiac Implantable Electronic Devices

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Introduction

• Increasing needs of MR for CIEDs that do not carry FDA labeling as MR conditional
  • MR conditional generators that have been combined with nonconditional leads or MR conditional systems implanted in patients that do not meet all specified conditions of use
• Multiple pilot studies were reviewed that demonstrated safety of CIEDs that are appropriately screened and programmed into a prespecified protocol
• Evaluation of patient is performed by EP cardiology after it is determined MR is the best imaging modality and no alternative is available
Qualifiers

- Device has been implanted at least 6 weeks
- Patient needs to be alert and responsive
- Patient be scanned on 1.5T scanner and monitored by ACLS trained staff
- Risk-benefits discussion with the patient should be performed and patient education given
Limitations

- Excluded permanent epicardial, abandoned or fractured leads.
- Device must not be near end of life
- Limited to the scans protooled on the specific machines
  - Unable to perform breast or cardiac MRIs
Conditional CIED Workflow

Order for MRI indicating CIED present is placed

At time of appointment request, Scheduling obtains device information

Radiology Nurse, MRI technologist or MD determines if device is conditional or non-conditional

If conditional device, Radiology nurse obtains cardiology order form from patient’s cardiologist or UCI cardiology

Patient scheduled in pacemaker slot once cardiology order form is obtained
Non-conditional CIED Workflow

Order for MRI indicating CIED present is placed

At time of appointment request, Scheduling obtains device information

Radiology Nurse, MRI technologist or MD determines if device is conditional or non-conditional

If nonconditional device, radiologist is notified to discuss potential alternative imaging with ordering provider

If MRI is determined to be the most appropriate imaging, patient is notified that they must be evaluated by UCI EP cardiology to determine if patient can undergo scanning under the non-conditional protocol

EP Evaluation:
EP provider determined if a CIED was appropriate for scanning and documented program parameters. Has discussion with patient regarding risk vs. benefits, and provides education handout to patient

On day of scan:
ACLS trained healthcare provider is present for monitoring, CIED programming provider is available for the entirety of the scan, external defibrillator is available for the scan. Programming provider interrogates and programs the device into MRI safe mode

Patient is monitored intra-mri: on telemetry. Pulse, oxygenation and blood pressure are closely monitored. Immediately after MRI, device is interrogated again and setting changed back to pre-MRI settings
Scheduling Requests for MRI with CIED

CIED requests, April 2021 - April 2022

- Conditional, 183, 81%
- Non-conditional, 43, 19%

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Outcome of Non-conditional CIED Requests

Non-conditional CIED Requests

- Completed: 15
- Alternate imaging recommended: 7
- Patient declined: 6
- Insurance denied: 5
- No response: 3
- Excluded from protocol: 3
- Scan done offsite: 2
- Provider cancelled: 2
• Expanded MRI capability to 6.64% of the sample population who initially did not qualify for MRI
• All patients were scanned with out any adverse clinical incident and no parameter changes, resets or limitations in programming were noted in any CIEDs scanned
References
