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Department Manager:		Revision Date:
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PROTOCOL: GUIDELINES FOR ADVANCE PRACTICE PROVIDER (APP) REVIEW OF MRI CONDITIONAL DEVICES PRIOR TO MRI

SCOPE:

Alaska Heart and Vascular Institute

PURPOSE: Standardize APP MRI conditional device review prior to scheduling.

1. Review the implant note to determine the following:
 - a. Implant site – must be right or left pectoral region (pre-pectoral or sub-pectoral)
 - i. *see special cases section below
 - b. Implant date – MRI to be scheduled more than 6 weeks post implant.
 - c. Device model
 - d. Lead model(s)
 - e. Pin plugs – Per Dr. Compton and Dr. Willcox: OK to MRI patients with pin plugs.
 - f. Abandoned pacing lead – OK to proceed with MRI **with APP present** for capped leads (Will not see a cap on CXR). **Becomes a Non-MRI Conditional Device. Follow that protocol even if the lead model is MR-conditional.**
 - g. Epicardial leads – **Becomes a Non-MRI Conditional Device. Follow that protocol even if the lead model is MR-conditional.**
 - h. Fractured intact leads – **Becomes a Non-MRI Conditional Device. Follow that protocol even if the lead model is MR-conditional.**
 - i. Conditional generator and leads but with a mixed system - now considered “MR Conditional” and may proceed with MRI with device representative only (no EP APP needed).
 - j. If updating an old “MRI Worksheet” and adding an append for the current review, make SURE that ALL hardware is the same (compare with most recent op-note as well as MURJ). If not, start a new MRI Worksheet.
2. Check the appropriate website to confirm MRI status for leads and device
 - a. Boston Scientific: [bostonscientific.com/imageready/en-US/home.html](https://www.bostonscientific.com/imageready/en-US/home.html)
 - b. Medtronic: [medtronic.com/mriverify/search/device](https://www.medtronic.com/mriverify/search/device)
 - c. Abbott: [mri.merlin.net](https://www.mri.merlin.net) (on this site, you will need to plug in the model numbers to see if the device/leads are MRI conditional)
 - d. Biotronik: <https://www.promricheck.com/spring/main?execution=e1s1> (on this site, you will need to plug in the model number or serial number to check to see if the device/leads are MRI conditional. More accurate to use serial numbers here.)

3. Review recent device checks for the following:
 - a. Lead impedances are stable and between 200 – 3000 ohms (200 – 1500 ohms for Advia device).
 - b. If ICD: defib impedance is stable and between 20 – 200 ohms
 - c. Capture thresholds do not exceed 2V @ 1 ms in atrial / RV leads; 2.5V @ 1 ms in LV lead.
 - d. If the patient has high impedances or thresholds, review with Dr. Compton or Dr. Willcox. **If MRI is OK'd MD must also decide if APP should be present for the MRI scan (becomes non-MR Conditional).**
 - e. Patients must have had an in-clinic device check with threshold testing within the past year and either a remote or clinic check within the past 3 months.
4. If implant or generator change was done outside of AHVI then the most recent chest X-ray or CT scan obtained since date of last implant / revision / generator change must be reviewed for:
 - a. Leads are intact with no obvious fractures or dislodgements.
 - b. Note if there are capped abandoned leads → **becomes MRI non-conditional device.**
 - c. No MRIs for patients with uncapped abandoned lead(s).
 - d. Identify epicardial (surgically implanted) leads → **becomes MRI non-conditional device.**
5. Complete the MRI worksheet and send a flag to the MRI / device scheduling in Athena.
6. If device is deemed “NO MRI” for any reason put a pop-up note in the AHVI medical record. Include date of review & reason denied. Document same in MURJ in the “patient notes” section.
7. A device representative will need to be present for the MRI. No EP APP is needed.
8. Place **recommendations** for device programming on the MRI worksheet.
9. Programming guidelines
 - a. Pacemakers
 - i. If patient has an underlying rhythm and paces <5%, can program OOO, ODO, or OVO
 - ii. Usually, the best choice is to program in a non-sensing mode (DOO, VOO, AOO) 10-20 bpm faster than the patients programmed rate or the patient’s intrinsic rate (whichever is faster)
 - iii. Program pacing outputs to 5V @ 1ms in RA/RV leads (only leads that are pacing need to have outputs changed). LV lead voltage is left to provider / representative discretion due to potential for PNS.
 - iv. In Boston Scientific devices remember to turn off magnet mode or the patient’s device will go into magnet mode at 100 bpm.
 - v. Do not end the session and leave the programmer on. This way, when the scan is complete, you can just hit “program initial values” to restore all previous programming. (Print or save to a thumb drive a copy of initial settings in case of power outage or other unforeseen issue.)
 - b. ICDs
 - i. Pacing reprogramming as above
 - ii. **Program all detections and therapies off.**
10. Special Cases:
 - a. Boston Scientific S-ICD

- i. These devices are MRI conditional. The APP will not need to be present during the scan. A device representative will be present for the scan.
- b. Medtronic LINQs
 - i. These devices are MRI conditional. They do not need to be interrogated before or after the scan, so **no representative** needs to be present.
- c. Abbott Confirm
 - i. These are MRI conditional devices: They need to be interrogated before and after the scan, so the **Abbott representative will need to be notified**.
- d. Boston Lux
 - i. These devices are MRI conditional. They do not need to be interrogated before or after the scan, so **no representative** needs to be present.
- e. BIO ILR
 - i. These devices are MRI conditional. They do not need to be interrogated before or after the scan, so **no representative** needs to be present.
- f. Medtronic MICRA
 - i. These devices are MRI conditional. They need to be interrogated before and after the scan and may need to be reprogrammed, so the **Medtronic representative will need to be notified**.
- g. Cardiac Contractility Modulator devices (CCM) are MRI conditional. See separate policy.

11. Patients with MR conditional devices having non-cardiac MRIs are OK to have their MRIs done outside of AHVI.

12. Stress MRI & ICDs: Per Dr Skolnick, even with new software cannot do stress MRI with an ICD; only function and viability and must be done in the Anchorage MRI (12/27/21). Only need EP APP for non-conditional ICDs for these studies.