Implanted Cardiac Pacemaker and Defibrillator Management

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

All patients with an implantable cardiac device and scheduled for procedure or therapeutic radiation, are to be seen at the Cardiopulmonary Center.

1 Device check not needed if completed within the last 3 months and with documented NORMAL battery, impedances, and pacing safety margins. Device to be rechecked when transitioning from one treatment to another (Radiation, Surgery). After 5pm, weekends and holidays, cardiology service on-call can be contacted for emergency device checks.
2 Recommend all surgical procedures to be scheduled early AM.
3 Abdominal implants: If surgery between thorax and pelvis refer to above the waist; if outside thorax and pelvis refer to below the waist.
4 Follow pacemaker clinic recommendations note.
5 Conditions under which postoperative interrogation is not necessary. (See Appendix A on page 6)
6 Refer to magnet application page for proper application. (See Appendix B on page 6)

All patients need to follow-up with their physician.

See Page 2 for Central Line
See Page 3 for Radiation
See Page 4 for MRI
See Page 5 for Advanced Care Planning for Patients with Pacemaker and Defibrillator
This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

Implanted Cardiac Pacemaker and Defibrillator Management

1Special Circumstance:
If ICD or Pacemaker implanted less than 6 weeks ago, other planning for venous access device should be considered.

2Refer to magnet application page for proper application. (See Appendix B on page 6)
Implanted Cardiac Pacemaker and Defibrillator Management

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

THERAPEUTIC RADIATION

Patient to be scheduled for radiation

Pacemaker or Defibrillator

Pacemaker Clinic consult

High risk - device exposure?

Yes

Multidisciplinary Conference to discuss treatment plans along with other options - Clinician to clinician communication

Start radiation treatment

Refer to Pacemaker management plan in ClinicStation and follow up as clinically indicated

At completion of radiation, patient scheduled with Cardiology for final pacemaker/ICD assessment

No

Treatment Plan by Radiation- AM radiation treatment appointment recommended

1 Radiation dose specification documented in clinic note recommended prior to pacemaker clinic consult.
This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

**Implanted Cardiac Pacemaker and Defibrillator Management**

**Department of Clinical Effectiveness V3**

Approved by the Executive Committee of the Medical Staff on 07/28/2015

---

**PRIOR TO MRI**

Consult to Pacemaker Clinic noting patient to be scheduled for MRI and has a CIED

- Pacemaker consult:
  - Informed consent
  - Arrange special equipment:
    - Cardiac Monitoring
    - Pulse oximetry
    - Ability to reprogram the device

**AT THE TIME OF MRI**

Cardiology to collaborate with Diagnostic Imaging faculty regarding clinical indication of MRI

- Monitors applied:
  - Cardiac Monitoring
  - Pulse oximetry
  - MRI approved and scheduled

MRI completed

**FOLLOWING MRI**

Pacemaker / CIED checked

- Reprogrammed as needed

Follow-up less than or equal to 3 months or as noted in the Pacemaker management note in ClinicStation

---

1 There will be an appropriate, qualified and credentialed clinician to monitor patient during procedure.

2 CIED = Cardiovascular Implantable Electronic Device
This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

PATIENTS WITH DO NOT RESUSCITATE (DNR) STATUS

Implanted Cardiac Pacemaker and Defibrillator Management

- It is recommended to turn OFF shock therapy
- An order must be placed by the physician to turn OFF the shock therapy
  - Contact pacemaker clinic during business hours
  - Notify manufacturer representative after 5PM and weekends

1 The Advance Care Planning discussion with the patient/family member should clearly include and document whether or not shock therapy will be turned off.

2 Manufacturer’s Information may be obtained in the following manner:
   - Pacemaker Clinic Progress Note
   - Patient/Family member has manufacturer’s card

No need for any intervention

Continue Advance Care Plan

Advance Care Planning has been established. Patient is DO NOT Resuscitate status with an implanted cardiac device

Implanted Defibrillator

Pacemaker

1

2
APPENDIX A: CONDITIONS UNDER WHICH POSTOPERATIVE INTERROGATION IS NOT NECESSARY

1. Device check preoperatively and found to be working correctly, and
2. No programming of device took place perioperatively, and
3. No monopolar electrosurgery used (Bipolar is acceptable), and
4. No blood transfused, and
5. No hemodynamic issues noted
6. Procedures not involving electrosurgery (e.g. endoscopic ultrasonography)

APPENDIX B: MAGNET APPLICATIONS

### Pacemaker Magnet Application

<table>
<thead>
<tr>
<th>Pacemaker Manufacturer</th>
<th>Most Common Magnet Effect</th>
<th>Programmable (On-Off)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotronik</td>
<td>No sustained asynchronous pacing</td>
<td>Yes</td>
</tr>
<tr>
<td>Boston Scientific/Guidant CPI</td>
<td>Asynchronous pacing at 100 or 90 bpm</td>
<td>Yes</td>
</tr>
<tr>
<td>Intermedics</td>
<td>No sustained asynchronous pacing</td>
<td>No</td>
</tr>
<tr>
<td>Medtronic</td>
<td>Asynchronous pacing at 85 bpm</td>
<td>No</td>
</tr>
<tr>
<td>Sorin</td>
<td>Asynchronous pacing at 85 - 96 bpm</td>
<td>No</td>
</tr>
<tr>
<td>St. Jude Medical/Pacesetter</td>
<td>Asynchronous pacing at 86 - 100 bpm</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Defibrillator Magnet Application

<table>
<thead>
<tr>
<th>Defibrillator Manufacturer</th>
<th>Most Common Magnet Effect</th>
<th>Magnet Confirmation</th>
<th>Programmable (On-Off)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotronik</td>
<td>Disables tachy therapy</td>
<td>none</td>
<td>No</td>
</tr>
<tr>
<td>Boston Scientific/Guidant CPI</td>
<td>Disables tachy therapy</td>
<td>Defibrillator will beep with each R wave or 1/second</td>
<td>Yes</td>
</tr>
<tr>
<td>Medtronic</td>
<td>Disables tachy therapy</td>
<td>none</td>
<td>No</td>
</tr>
<tr>
<td>Sorin</td>
<td>Disables tachy therapy</td>
<td>Change pacing rate to 90bpm</td>
<td>No</td>
</tr>
<tr>
<td>St. Jude Medical/Pacesetter</td>
<td>Disables tachy therapy</td>
<td>none</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Implanted Cardiac Pacemaker and Defibrillator Management

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

SUGGESTED READINGS

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson’s specific patient population; MD Anderson’s services and structure; and MD Anderson’s clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

This practice consensus algorithm is based on majority expert opinion of the Pacemaker work group for the management of Implanted Cardiac Pacemaker and Defibrillator at the University of Texas MD Anderson Cancer Center. It was developed using a multidisciplinary approach that included input from the following medical, radiation and surgical oncologists.

Jean-Bernard Durand, MD  
Daniel Gomez, MD  
Kaveh Karimzad, MD  
Darla Labasse, RN, BSN  
Nada Memon, MD  
Elie Mouhayar†, MD  
Marc Rozner, MD, PhD  
Dilip Thakar, MD  
Jeremy Viles, RN, MBA

† Physician Lead