

KAPC Practice Guideline

Title: Perioperative Management of Patients with Cardiac Pacemakers

Date Approved: 6/6/2016

Definitions:

EMI – electromechanical interference

EMI Sources – electrocautery (including bipolar), radio frequency (RF) ablation, magnetic resonance imaging (MRI), radiation therapy (XRT), ECT, TURP, GI endoscopy using electrosurgery, TENS units, lithotripsy

Policy Overview: The general approach to perioperative management of patient's with cardiac pacemakers is to accurately characterize the patient's underlying rhythm and the pacemaker's function preoperatively, to minimize EMI and monitor the patient's cardiac rhythm intraoperatively, and to ensure normal pacemaker function postoperatively. As always, clinical circumstances may require variation from this policy. Also, with appropriate information and support from a physician familiar with and responsible for a patient's device, it may be reasonable to forgo or modify specific portions of this policy.

An expert consensus statement recently published by the Heart Rhythm Society in conjunction with the ASA, and a separate practice advisory published by the ASA, have clarified some previously confusing issues. These clarifications are incorporated into this policy update.

Policy Steps

Preoperative

Elective Procedure: the following information should be obtained:

1. Brand and model of pacemaker
2. Date of last device and battery check (should be within 12 months of procedure for pacemakers, and 6 months for ICDs)
3. Original indication for pacemaker
4. Patient's underlying rhythm
5. Whether or not patient is or was "pacemaker dependent" as of most recent evaluation
6. Pacemaker magnet response, including whether or not preoperative settings will automatically resume upon magnet removal

KAPC makes available on its website a tool which allows efficient communication of this information, as well as an opportunity for the responsible electrophysiologist to provide additional input and decision making if he / she so desires. Optimally, this information will have been obtained and made available to the anesthesiologist prior to the preanesthetic evaluation.

Nonelective procedure, or preop evaluation unavailable:

1. Assume patient is pacemaker dependent if any of the following are true:
 1. History of syncope leading to pacemaker implantation
 2. History of successful AV node ablation leading to pacemaker implantation
 3. Presence of pacemaker spikes with all or nearly all beats on EKG rhythm strip
2. Assume preoperative pacemaker settings will resume upon magnet removal, as this is by far the most common device setting.

Intraoperative:

1. A magnet and external pacing device should be readily available if an EMI source will be used during a procedure.
2. Reprogramming or magnet application is generally UNnecessary if :
 1. The patient is not pacemaker dependent, or
 2. EMI source is below the umbilicus, and pacemaker location and patient position would allow magnet placement during procedure if necessary, or
 3. Only bipolar electrocautery is planned, as ophthalmologic procedures, or
 4. No EMI source will be used during the procedure
3. Consider Reprogramming Pacemaker to DOO or Magnet Placement if:
 1. Patient is pacemaker dependent, and
 2. EMI source is below the umbilicus, and
 3. Pacemaker location and patient position would preclude magnet placement during procedure, i.e., lateral or prone procedure
4. Reprogram Pacemaker to DOO or Place Magnet Preoperatively if:
 1. Patient is pacemaker dependent, and
 2. Monopolar EMI source is above the umbilicus
5. If pacemaker is reprogrammed to DOO, or magnet is applied, consider placing external pacing pads preoperatively

Postoperative:

The purpose of a post-procedure device interrogation is, generally, to rule out “reset.” This may be done at the bedside or remotely. Some situations will require interrogation prior to discharge from PACU or other monitored location, while other situations may only require interrogation within 1 month or even no extra interrogation.

1. Interrogate device prior to PACU or monitored site discharge if:
 1. Pacemaker was electively set to asynchronous pacing prior to or during surgery, using either reprogramming or magnet placement, or
 2. Monopolar electrocautery was used above the umbilicus, regardless of whether device was reprogrammed, or
 3. “Hemodynamically challenging surgery” was performed, identified as major vascular procedures including abdominal aortic surgery
 4. Significant intraoperative events occurred, such as cardiac arrest, defibrillation, or cardiopulmonary resuscitation
 5. Patient is deemed unlikely to follow up with pacemaker clinic within one month (see #2)
2. Interrogate device within 1 month of procedure if:
 1. Device was not reprogrammed, and magnet was not placed, prior to or during surgery, and
 2. Monopolar EMI source was limited to below the umbilicus
3. No specific device interrogation is indicated if:
 1. Device was not reprogrammed, and magnet was not placed, prior to or during surgery, and
 2. Only bipolar electrocautery was used, or
 3. No EMI source was used, or
 4. Hysteroscopic endometrial ablation was performed without monopolar electrocautery, or
 5. Upper or lower endoscopy was performed without monopolar electrocautery

Specific situations:

Common Surgical Procedures

1. Ophthalmologic surgery using only bipolar electrocautery: no need to reprogram pacemaker preop or to interrogate device postop
2. Upper GI endoscopy:
 1. Monopolar electrocautery planned: reprogram to asynchronous pacing or apply magnet preop; interrogate device prior to discontinuing EKG monitoring postop
 2. Monopolar electrocautery not planned and not used: have magnet available; do not reprogram pacemaker preop; no need for device interrogation postop
3. Laparoscopic cholecystectomy:
 1. Non-pacer dependent: have magnet available intraoperatively
 2. Pacer dependent: reprogram to asynchronous pacing or apply magnet preop; interrogate device prior to discontinuing EKG monitoring postop.
3. Hip surgery, lateral position:
 1. Non-pacer dependent: do not reprogram device; have magnet available intraoperatively; interrogate device postoperatively
 2. Pacer dependent: reprogram to asynchronous pacing if possible; acceptable to not reprogram and to have magnet available intraoperatively; interrogate device prior to discontinuing EKG monitoring postop

Magnet vs. Reprogramming

Advantages and disadvantages exist for both methods of altering an ICD's function. The main advantage of magnet placement is that it is readily reversible. The disadvantages of magnet placement include the following:

1. difficulty in verifying correct magnet placement, particularly in obese patients,
1. difficulty in assuring that the magnet stays in place once it is properly positioned,
2. the unlikely possibility that the magnet response of a particular ICD has been programmed to something other than "suspend tachyarrhythmia detection,"
3. the unlikely possibility that the device does not resume tachyarrhythmia detection upon magnet removal; this concern is addressed by the policy of interrogating any device which has been reset by magnet placement prior to PACU discharge

The main disadvantages of reprogramming an ICD include the need for the presence of specialized equipment and personnel, both preoperatively and, more importantly, postoperatively.