CARDIAC DIAGNOSTICS LABORATORY

CLINICAL PROCEDURE

PROTOCOL FOR PERI-OPERATIVE MANAGEMENT OF ELECTROMAGNETIC INTERFERENCE AND CARDIAC PACEMAKERS/DEFIBRILLATORS IN NON-CARDIAC SURGICAL PATIENTS

Staff this document applies to:

- All Cardiology Staff including doctors and Cardiac physiologists, Electrophysiologists, Peri-operative team (including Surgical liaison nurses, Surgical doctors, Anaesthetists).

State any top used related Austin Health policies, procedures or guidelines:

Patient identification policy

Hand Hygiene

Pacing Department and Clinic Protocol

Purpose:

The purpose of this protocol is to outline the principle and procedures regarding peri-operative management of patients with cardiac devices.

Overview:

Electromagnetic interference (EMI) during surgical procedures, particularly from diathermy, can potentially alter the function of implanted cardiac devices.

In a pacemaker, EMI can lead to inhibition of pacing. Increasingly pacemakers have inbuilt "noise reversion" algorithms that are designed to detect EMI and pace in an asynchronous mode whilst noise is present.

In a defibrillator, (ICD) EMI can lead to inappropriate shocks and inhibition of pacing.

Implantable cardiac device technology changes at a rapid rate and no protocol can cover all possible device / surgery combinations. This protocol will enable safe and effective management of patients with cardiac devices.

The management of requests to increase heart rates in cardiac device patients is beyond the scope of this protocol. These concerns are patient specific and should be discussed between the Anaesthetist and the managing Electrophysiologist or Electrophysiology Fellow.

Device reprogramming when required out of hours is performed at the discretion of the relevant device company representative. This is a gesture of goodwill and not an obligation.

Protocol:

Patient device information should be obtained from the patient's usual pacemaker clinic.

Contacting the follow up clinic is preferable to contacting the implanting physician listed on the patient ID card.

Patients without appropriate device information should be referred to the Austin pacemaker clinic prior to surgical booking.

All pacemakers should be checked within 12 months and ICDs 6 months prior to elective surgery.

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Any required re-programming should be performed as close as possible to the time of surgery, typically within the Anaesthetic Bay and post-operatively in the recovery room. A full printout of all device settings should be made before any reprogramming, and any parameter alterations should be clearly marked on the printout to facilitate restoration of all usual parameters post-operatively. Any alterations to device parameters should be noted (with time and date) in the patient medical record (Cerner) and ward staff advised.

Asynchronous pacing modes increase the risk of ventricular arrhythmias and all patients who have an asynchronous pacing mode programmed or have ICD detections disabled must have **continuous ECG monitoring and observation** until post-operative restoration of usual programming.

Pacemakers

- **Generally, pacemakers do not require reprogramming for non-cardiac procedures.**
- If significant pacing inhibition occurs during diathermy, the Anaesthetist should apply a magnet directly over the device. This will cause the device to function in an asynchronous (VOO / DOO) mode whilst the magnet remains over the device. The device will return to normal function when the magnet is moved or removed. It is advisable to tape the magnet on the top of the device to ensure it stays in position.
- In circumstances where magnet application is not practical (for example, prone patients, pacemaker within the surgical field), reprogramming may be considered for pacing dependent patients. These cases should be discussed at the time of surgical booking with the Cardiac device Physiologists.
- Activity sensors and other rate responsive algorithms do not routinely require disabling.

ICDs

- For operations/procedures where EMI is expected to affect the ICD, tachyarrhythmia detections should be disabled to prevent inappropriate shocks.
- The risk of EMI is low with diathermy only below the umbilicus and reprogramming is typically not performed.
- For non-elective surgery, when EMI above the umbilicus is planned, the Anaesthetist should apply a magnet directly over the device. This will inhibit the tachyarrhythmia detections and prevent inappropriate shocks whilst the magnet remains over the device. The device will return to normal function when the magnet is moved or removed. It is advisable to tape the magnet on the top of the device to ensure it stays in position. Generally, magnets cause therapy suspension in ICDs but do not alter pacing.
- For all patients with an ICD undergoing an elective procedure, it is recommended that the pacemaker department is contacted using the attached form.

The Cardiac device Physiologists will recommend one of the following:

- No programming required.
- Magnet application if pacing inhibition occurs.
- Magnet application throughout the procedure or during diathermy.
- Programming required – pacemaker department should be notified of date, time and location of the procedure.

Requests from anesthetists for specific programming outside the parameters of this protocol should be directed to the senior pacing Physiologist or the Electrophysiology Unit. (Fellow or Consultant)

Emergency Surgery:

In an emergency, when no information is available about the device, the above protocol can be used. When the type of device is unknown, it can usually be differentiated on palpation alone - an ICD is generally 3 times larger than a pacemaker. Further differentiation is beyond the scope of this protocol.

In the case of a pacemaker, a magnet should be available in case of significant inhibition of pacing by diathermy.

Most patients with cardiac devices generally respond normally to medications that increase and decrease heart rates and blood pressure.

In the case of an ICD with diathermy above the umbilicus a magnet should be applied over the device to prevent inappropriate shocks.

In the case of an ICD where magnetic application is not possible, device reprogramming is recommended.

Notes for Surgeons/Anaesthetists:

- When using diathermy, grounding plates MUST NOT be placed within 15cm of any device – this has the potential to cause damage to the device, loss of output (even with magnet application), induction of arrhythmias or damage to cardiac tissue at the lead tissue interface.
- Bipolar diathermy is preferable to unipolar diathermy.
- Short diathermy bursts are preferable to minimize pacing inhibition.

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Review 2023:

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REQUEST FOR PERI-OPERATIVE CARDIAC DEVICE MANAGEMENT
(please print to M 16 form)

Patient Details: _____ Date of request: _____
*(Name, DOB and UR no. **or attach label here**)*

Requesting Unit: _____

Contact Details:_____Fax number: _____

Date and Time of Procedure: _____

Proposed Surgical Procedure and site of procedure (eg – RIGHT shoulder replacement, Open nephrectomy via flank incision): _____

IF THE PATIENT IS NOT FOLLOWED UP WITH AUSTIN HEALTH - PLEASE PROVIDE THE FOLLOWNG INFORMATION BEFORE SENDING THE REQUEST:

* **THE DEVICE MODEL NAME AND NUMBER**
* **LASTEST CHECK REPORT FROM FOLLOW-UP CENTRE**

FOR ALL PACEMAKERS: MONITOR THE ECG THROUGHOUT THE PROCEDURE. HAVE A MAGNET ON STANDBY IF PACING INHIBITION OCCURS.

FOR ALL ICDs: WHEN MAGNET IS APPLIED, ALL TREATMENT THERAPIES ARE OFF. PATIENT MUST HAVE CONTINUOUS CARDIAC MONITORING.

RECOMMENDATIONS: (To be completed by Cardiac Physiologist)

- NO PROGRAMMING REQUIRED PRE-OPERATIVELY.
- APPLY MAGNET IF PACING INHIBITION IS SEEN.
- APPLY MAGNET THROUGHOUT PROCEDURE OR DURING DIATHERMY.
- REPROGRAMMING REQUIRED.

PHYSIOLOGIST: _____ DATE: _____

PACING DEPARTMENT, CARDIOLOGY EX: 4822 / 5527
Email (preferred): Pacemaker@austin.org.au Or FAX: 94966630

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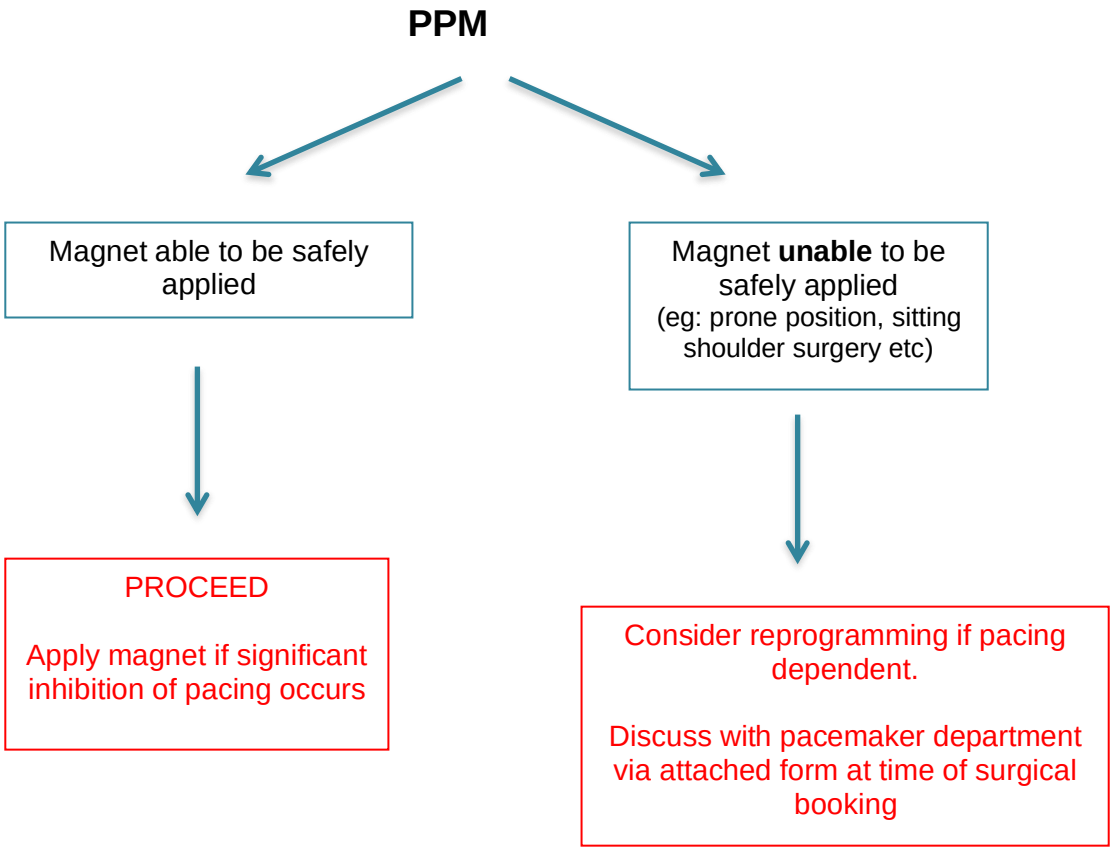
AUSTIN HEALTH
PERI-OPERATIVE CARDIAC DEVICE MANAGEMENT FLOW CHART



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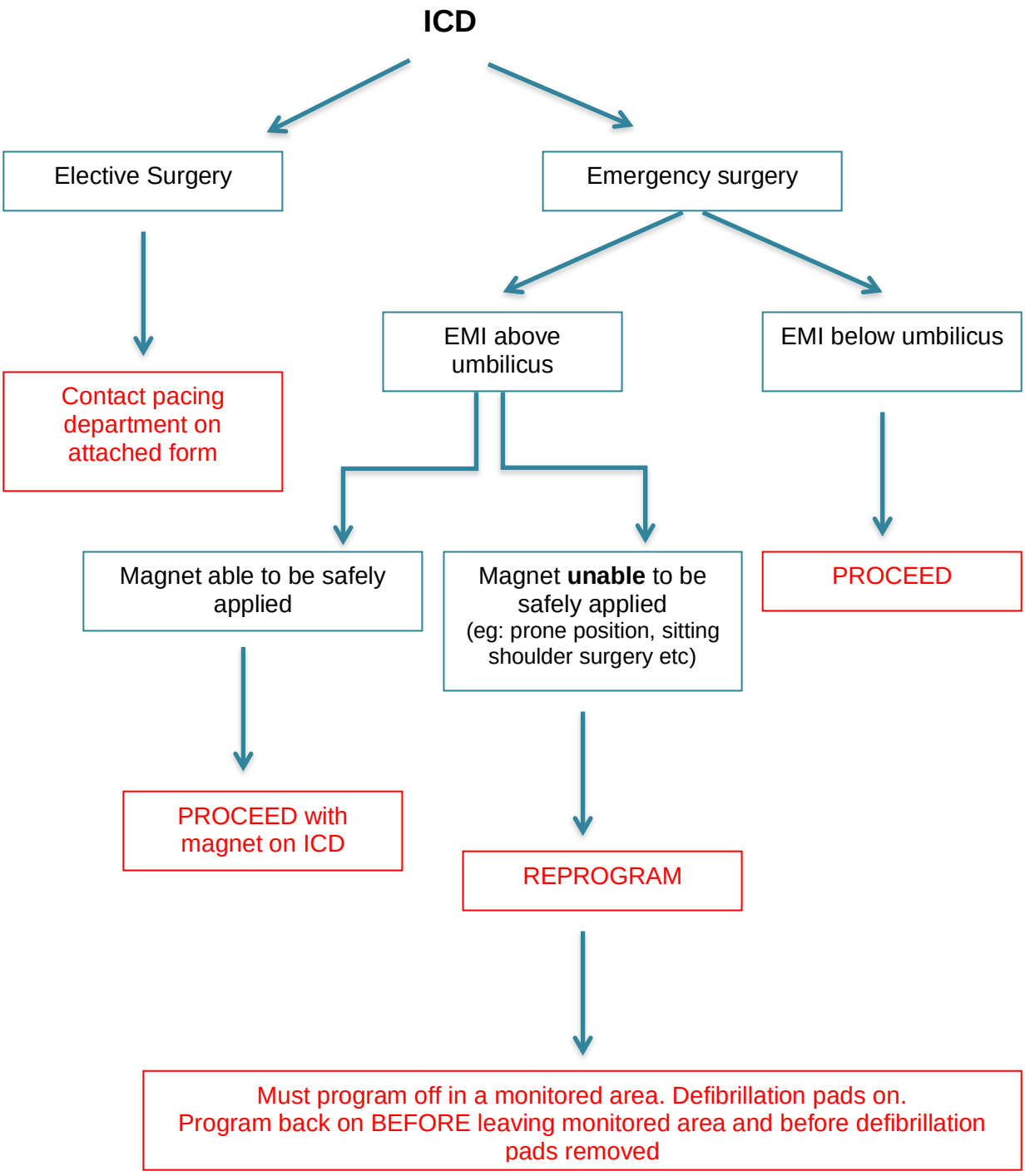

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