Guideline Title: Epicardial Pacing Wire Removal

Summary: Patients admitted to the ICU who require temporary epicardial pacing will be managed and monitored appropriately. Removal of epicardial pacing wires should be on Day 3 post operatively unless otherwise indicated by the Cardiothoracic or ICU teams.

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Background Information:  
Atrial and/or ventricular pacing wires are frequently inserted at the end of a cardiac surgical procedure. Their main use is to improve haemodynamic function in the presence of bradycardia, arrhythmias and atrial and ventricular tachyarrhythmia’s. Temporary epicardial pacing consists of pacing wires sutured to the epicardium of the heart, one on the atrium and one on the ventricle. The ventricular wires commonly exit the skin on the left side of the sternum, while the atrial wires exit the right side of the sternum which are then attached to pacing leads which is then connected to a pacing box or pulse generator.

1. Introduction:
The risk addressed by this policy:
Patient Safety

The Aims / Expected Outcome of this policy:
Staff caring for a patient with epicardial pacing wires will have the skills and knowledge to provide safe and effective management for removal of pacing wires.
2. **Policy Statement:**

- All care provided within Liverpool Hospital will be in accordance with infection prevention/control, manual handling and minimisation and management of aggression guidelines.
- Epicardial Pacing Wires should be removed on the third postoperative day unless otherwise indicated by CT team, that this is provided the patient has not been paced nor had any arrhythmias in the past 48 hours.
- This procedure must be performed by the Surgeon, Registrar or an accredited Registered Nurse who has been deemed competent by CNE.
- Verify written order in health care record prior to removing the epicardial pacing wires. Review clinical pathway if applicable.
- Pacing wires should only be removed when facilities for urgent operation and medical cover are available.
- If the patient has an arrhythmia, the patient must be reviewed by the Cardiothoracic Team prior to epicardial wires being removed.
- Pacing wires must not be removed on the morning of discharge.
- The patient’s coagulation status must be checked prior to epicardial pacing wire removal. If the patient is on intravenous heparin, the infusion must be ceased for 4 hours prior to removal. If the patient is on S/C Heparin the dose should be withheld or the wires removed 4 hours after the dose has been administered. If the patient is on warfarin, ensure the patient’s INR is ≤ 2.
- All patients must have ECG monitoring during epicardial pacing wire removal and monitoring must continue for 4 hours following removal
- Epicardial pacing wires must not be handled without the use of gloves as it may result in the patient receiving micro shocks
- Once epicardial pacing wires are removed, the wires must be inspected by a second Registered Nurse to ensure that the tip is intact. This inspection must be documented in the health care record.
- If resistance is met when attempting to remove epicardial pacing wires, stop immediately and seek assistance from the Cardiothoracic Team or a staff member more experienced in removing epicardial pacing wires.
- Epicardial pacing wires must be removed prior to discharge from hospital

3. **Principles / Guidelines**

a. **Equipment**

   - Personal protective equipment(PPE) gown, gloves, goggles
   - 0.9% sodium chloride or chlorhexidine 0.5%
   - Dressing pack
   - Occlusive dressing
   - Stitch cutter
   - Gauze
   - Cardiac monitoring
b. Procedure

- Explain procedure to patient and advise them they might have a “pulling sensation”
- When both atrial and ventricular epicardial pacing wires are present, the atrial wire(s) are removed first and the ventricular wire(s) last
- Explain procedure to patient
- Ensure patient has cardiac monitoring attached. Assess patient rhythm to ensure patient is in sinus rhythm if not review with cardiothoracic and ICU teams
- IV access available in case of emergency
- Patient to be in bed
- Remove dressing from epicardial wires
- Wash hands, apply gloves
- Clean insertion site with saline or chlorhexidine
- Remove sutures that are securing the wires in place with stitch cutter
- Gently pull epicardial wires one at a time with a slow steady action pulling with the heart beat to aid removal. If wires do not dislodge with gentle pulling notify CNE and or ICU medical officer
- If bleeding occurs from insertion site apply pressure, if bleeding continues inform ICU medical officer
- Apply occlusive dressing
- Inspect wires post removal with second RN.
- Document any blood loss or tissue found on wires
- Document on flowchart removal of wires
- Dispose of sharps appropriately.
- Wash hands
- Patient must stay in bed 1hour post removal
- Record observations every 15minutes for 1 hour post removal
- Monitor for arrhythmias and or cardiac tamponade

\[\text{c. Complications}^{2}\]

- Infection,
- Myocardial damage, perforation
- Acute tamponade
  \[\text{Caused by a large volume of bleeding into the pericardium creating pressure on}\]
  \[\text{the heart impeding function. This can be life threatening and requires prompt}\]
  \[\text{intervention.}\]
  \[\text{Observe for:}\]
  \[\text{o Anxiety}\]
  \[\text{o Jugular vein distension}\]
  \[\text{o Tachycardia}\]
  \[\text{o Hypotension}\]
  \[\text{o Dyspnoea}\]
  \[\text{o Decreased peripheral pulses}\]
  \[\text{o Muffled heart sounds}\]
- Disruption of coronary anastomoses
- Ventricular arrhythmias

\[\text{d. Precautions}^{2}\]

- This procedure must be performed by the Surgeon, Registrar or Registered Nurse
  who has attended the cardiothoracic rotation or who has been deemed competent by
  a CNE CNC
- Pacing wires should only be removed when facilities for urgent operation and
  medical cover are available.
- Patient must have cardiac monitoring attached 4 hours post removal
- If the patient has an arrhythmia, the patient must be reviewed by the Cardiothoracic
  Team prior to epicardial wires being removed.
- Pacing wires must not be removed on the morning of discharge.
The patient's coagulation status must be checked prior to epicardial pacing wire removal. If the patient is on intravenous heparin, the infusion must be ceased for 4 hours prior to removal. If the patient is on S/C Heparin, the dose should be withheld or the wires removed 4 hours after the dose has been administered. If the patient is on Warfarin, ensure the patient’s INR is ≤ 2.

All patients must have ECG monitoring during epicardial pacing wire removal and monitoring must continue for 4 hours following removal.

Epicardial pacemaker wires are a low resistance connection to the heart. This creates the potential for microshock-induced arrhythmia, particularly ventricular fibrillation. Therefore, patients must be cared for in a cardiac-protected electrical environment, and wires should only be handled with non-conductive gloves.

4. Performance Measures
All incidents are documented using the hospital electronic reporting system: IIMS and managed appropriately by the NUM and staff as directed.

5. References / Links
4. Risks associated with removal of ventricular epicardial pacing wires after cardiac surgery
5. Cardiac Monitoring in Adult Cardiac Patients in Public Hospitals in NSW. Document Number PD2008_055. 25-Sep-2008
6. Sensations during removal of epicardial pacing wires after coronary artery bypass graft surgery

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