

Pacemaker (Temporary Epicardial) CSICU: Patient Care in Emergency Situations

Site Applicability

SPH - CSICU

Practice Level

Specialized: RNs working in CSICU who have received education and an opportunity to successfully demonstrate these skills.

Policy Statements

1. Initiating temporary pacing in an emergency situation
2. Adjusting pacemaker settings with MD order
3. Weaning pacemaker generator to off with MD order
4. Removing pacemaker generator with MD order

Nurses in CSICU **are not** responsible for:

1. Checking sensitivity and capture thresholds

Need to Know

For the purpose of this protocol, emergency situations that require immediate temporary pacing are defined as;

1. One of the following cardiac rhythms **IF** hemodynamically unstable
 - Asystole, greater than 3 seconds
 - Sinus Arrest/Sinus Block
 - Sinus bradycardia
 - Second degree AV block, Type II
 - Third Degree AV Block
 - Junctional bradycardia
2. Pacemaker malfunction (e.g., failure to capture)

Hemodynamically unstable is defined as:

1. A heart rate less than 50 bpm **AND** one or more of the following;
 - a) Systolic hypotension (SBP less than 90 mmHg)
 - b) Respiratory distress
 - c) Decreased level of consciousness
 - d) Signs and symptoms of myocardial ischemia

Protocol

Patient Assessment and Interventions

Problem	Signs and Symptoms	Nursing Interventions
Asystole Pulseless Electrical Activity (PEA)	No pulse	<ul style="list-style-type: none"> • Call Code Blue • Initiate temporary epicardial pacing by turning pulse generator on. (Pacemaker will turn on to default settings in DDD mode) • Start CPR
Brady-arrhythmia with hemodynamic instability	Hemodynamic instability is defined as: <ol style="list-style-type: none"> 1. A heart rate less than 50 AND one or more of the following: <ul style="list-style-type: none"> • Systolic hypotension (SBP less than 90 mmHg) • Respiratory distress • Decreased level of consciousness • Signs and symptoms of myocardial ischemia 	<ul style="list-style-type: none"> • Initiate temporary epicardial pacing by turning pulse generator on (Pacemaker will turn on to default settings DDD mode) notify MD to further assess and write new orders to cover new pacemaker settings

Pacemaker Assessment and Interventions:

Problem	Possible Cause and Effects	Nursing Interventions
Failure to capture:	<ul style="list-style-type: none"> • ECG Findings: pacemaker spike evident but no immediate atrial or ventricular depolarization • Pacemaker initiates electrical impulse but there is no mechanical response. • Effect on cardiac output depends on the frequency of failure to capture. • May cause decrease in heart rate, blood pressure, cardiac output, LOC 	<ul style="list-style-type: none"> • Determine hemodynamic status of the patient • Check connections and tighten if loose • Check battery and change if needed (see Appendix A) • Change polarity of epicardial wires that are connected to cable. • Reposition patient • Increase the output (mA) on the pulse generator until each pacing spike is followed by a paced complex (capture) • Notify MD

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Problem	Possible Cause and Effects	Nursing Interventions
Failure to sense	<ul style="list-style-type: none"> • ECG Findings: pacemaker spike evident after an atrial or ventricular contraction • Pacemaker fails to sense patient's intrinsic rhythm and initiates an electrical impulse at programmed pacing interval • Cardiac output may be severely compromised during failure to sense, since pacemaker fires on T wave (vulnerable period) • Lethal arrhythmias may occur as a result. 	<ul style="list-style-type: none"> • Determine hemodynamic status of patient • Check battery and change if needed. • Check connections and tighten if loose • Reposition the patient • Observe pulse generator for sensing light (should flash with each intrinsic (patient's own) QRS. • If there is non-sensing, increase sensitivity on pulse generator (by turning down the mV) • Notify MD
Failure to Pace	<ul style="list-style-type: none"> • ECG Findings: no pacemaker spikes evident even when HR falls below minimum pacing setting • Pacemaker fails to initiate electrical impulse when needed • Could be due to over-sensing (sense indicator flashes for complexes in addition to QRS complexes, e.g. T-wave, artifact), or device failure (e.g., lead fracture, loose connections, dead battery) • Decreased or absent cardiac output during failure to pace. 	<ul style="list-style-type: none"> • Determine hemodynamic status of patient. • Check battery and change if needed • Check connections and tighten if loose • If over-sensing, decrease sensitivity on pulse generator (by turning up the number of mV) • Notify MD

Documentation

1. Critical Care Flow Sheet- vital signs and hemodynamic parameters Q1 to 4H as indicated by clinical condition and CSICU protocol.
2. Nurses' Notes- pacemaker settings (rate, mA, sensitivity with each change). Response to pacing, any changes in rhythm and patient response after rate change, changes in pacemaker settings, any reported pain and any nursing interventions and responses.
3. ECG Rhythm Strip Flow sheet- mount rhythm strip and complete full analysis every shift and with any change in rhythm.

Patient and Family Education

- Briefly describe need for pacemaker

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- Provide reassurance and emotional support to patient and family
- Explain pacemaker function in simple terms, and temporary nature to patient and family
- Describe restrictions such as limitation of activity, the need to call for assistance with turning, not to handle the pacemaker or electrode, and not to use an electric razor.

Related Documents

1. [B-00-13-10083](#) - Epicardial Pacing and Pacing Wire Care on Cardiac Wards
2. [B-00-12-10064](#) – Pacemaker (Epicardial): Temporary, Checking Intrinsic Rhythm
3. [B-00-13-10118](#) – Epicardial or Transvenous Temporary Pacing in Critical Care: Patient Care

References

1. Carlson, K.K, and Lynn-McHale, D.J (2010). AACN Procedure Manual for Critical Care 6th ed. Philadelphia: W.B. Saunders Company.
2. Heart and Stroke Foundation of B.C. & Yukon. (2015). *B.C. ACLS Algorithms (2015)*.
3. Woods, S.L. Froelicher E.S. Underhill Motzer, S. Bridges, E.J. (2009) Cardiac Nursing 6th Ed. Philadelphia: Lippincott Williams & Wilkins
4. Dunning, Joel, et al, Guidelines for resuscitation in cardiac arrest after cardiac surgery. European Journal of Cardio-thoracic Surgery 36 (2009) 3-28
5. Hayes, David L, (2019) Temporary Cardiac Pacing In: Up to Date Post TW Ed, Up to Date Waltham, MA. (retrieved April 23, 2019)

Persons/Groups Consulted:

Cardiac Surgeon
Anesthesiology
Clinical Nurse Leader CSICU
Clinical Nurse Leaders CSICU
Clinical Nurse Educator 5B

Author:

Nurse Educator CSICU

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Appendix A



Medtronic

CRDM Product Education Brief

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Emergency Replacement of Batteries in the Model 5388 Dual Chamber Temporary Pacemaker

Overview and Objectives:

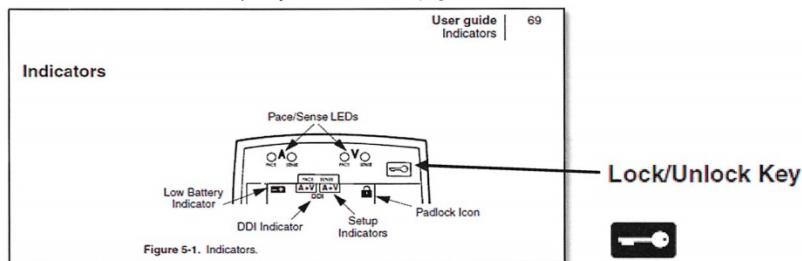
This document reiterates the proper procedure to remove the batteries in the Model 5388 Dual Chamber Temporary Pacemaker in an emergency situation (i.e. while the device is connected to a patient). **Note:** Medtronic does not recommend routine battery replacement while the pacemaker is connected to a patient.

This education brief is consistent with existing labeling and is educational in nature to help improve usability and understanding with customers who manage patients that are being externally paced with the Model 5388 external pacemaker.

Background:

Several sections in the Instructions For Use (IFU) product labeling of the Model 5388 external pacemaker technical manual discuss the proper use and replacement of batteries. Figure 5-1 from the technical manual provides an overview of the indicators that will be referenced later in this education brief.

Model 5388 Dual Chamber Temporary Pacemaker IFU - pages 26 and 69



Product Labeling Instructions Related to Battery Operation / Battery Replacement

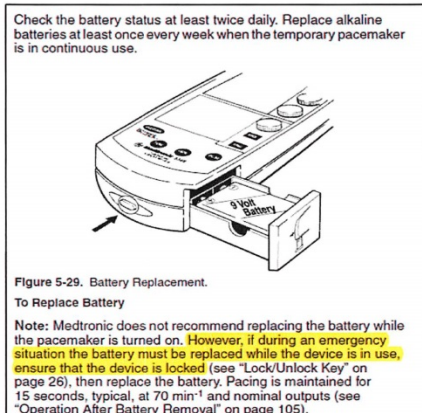
It is recommended that battery replacement be done only when the device is not in use.

However, as indicated in the highlighted section below, some patients may require external pacing for extended periods of time and may require emergency battery changeout to occur while the device is still in operation.

Per product labeling, the device will continue to operate safely for 15 seconds when the battery is removed, under the conditions noted in the image below – when the backlight is OFF. The backlight is turned OFF when the device is locked.

To perform emergency replacement of a battery while the device remains ON and In Use:

- Press the Lock/Unlock Key (Refer to highlighted note below from IFU Chapter 5, pages 92-93)
- Follow Steps 2-5 below. Verify device settings remain unchanged following battery replacement



2. Press button on the bottom of the device to open battery drawer.
3. Remove old battery and discard.
4. Insert fresh battery as shown on the diagram inside the battery drawer.

Note: Inspect battery terminals for contamination. Use of replacement batteries with contaminated terminals can result in device shutdown.

Note: The device works with the battery polarity reversed.

5. Close battery drawer. Make sure it clicks.

Note: Failure to fully close the battery drawer can result in the battery drawer opening and the pacemaker shutting down.