

Pacemaker (Epicardial): Temporary, Checking Intrinsic Rhythm (CSICU)

Site Applicability

SPH Cardiac Surgery Intensive Care Unit (CSICU)

Practice Level

Specialized: Limited to registered nurses in the CSICU who have received education and supervised practice

Requirements

This activity requires a physician order

Need to Know

- For patients who are stable (Cardiac Index (CI) greater than 2.2 L/min), but have been paced since the operating room, the CSICU nurse may turn the rate down to see if the patient has an intrinsic rhythm.
- Nurses should not turn the rate of the pacemaker down if the patient is hemodynamically unstable.
- A discussion between the nurse and the physician needs to occur prior to the nurse turning down the pulse generator and/or grounding and insulating the epicardial wires

Hemodynamic Stability:

Defined as:

- MAP greater than 60
- SBP greater than 90
- CI greater than 2.2
- **AND** absence of signs and symptoms of decompensation.

Temporary Pacemaker modes, functions and indications:

1. Possible modes of pacing are:
 - Asynchronous (fixed) single chamber
 - Asynchronous (fixed) dual chamber
 - Demand (inhibited) single chamber

- Demand (inhibited) dual chamber
2. Intersociety Commission for Heart Disease Resources (ICHD) Pacemaker Classification codes:
 - 1st letter - chamber(s) paced
 - 2nd letter - chamber(s) sensed
 - 3rd letter - mode of response
 3. Indications for temporary pacing:
 - Bradycardic arrhythmias, which result in decreased cardiac output
 - 2° or 3° AV block resulting in decreased cardiac output
 - Asystole
 - Standby Mode especially after cardiac surgery to treat 1 to 3

Recognize potential complications associated with temporary epicardial pacing:

- See [Appendix B](#): Potential Complications

Equipment and Supplies

1. Pacer wires
2. Pacemaker
3. Cardiac Monitor

Procedure

Steps (also see Algorithm, [Appendix A](#))

PROCEDURE	RATIONALE
1. Assess the stability of the patient: the Cardiac Index, MAP and SBP should be within normal parameters.	If the patient is not stable while paced, then they will not be stable after the rate is decreased. The patient is also not a candidate for transfer to the ward.

<p>2. Use the following instructions for each pacemaker mode:</p> <p>♥ A Pacing:</p> <ol style="list-style-type: none"> Maximize A sensing to 0.4 mV (maximum). Turn rate down by increments of 10 bpm. <p>♥ Acceptable rhythm to continue is Normal Sinus Rhythm, Sinus Bradycardia and first-degree Atrio ventricular block,</p> <p>♥ Ventricular Pacing:</p> <ol style="list-style-type: none"> Turn rate down by increments of 10 bpm. Acceptable rhythms are NSR, accelerated junctional, junctional, or conducted Atrial Fibrillation with controlled ventricular response. 	<p>Maximizing the atrial sensitivity allows the pacemaker to detect the minimal amount of intrinsic activity.</p> <p>Turning the rate down by increments of 10, allows the nurse to assess how the patient is coping with a slower rate. This decreases overdrive suppression of the sinus node slowly, to permit sinus node recovery and a more accurate assessment of the intrinsic rhythm.</p>
<p>♥ AV Pacing:</p> <ol style="list-style-type: none"> If <i>AV paced</i>, maximize atrial sensitivity to 0.4 mV. Turn rate down by increments of 10 bpm. If <i>A sensed, V paced & V rate greater than 60</i>, in order to determine if AV Block is present: <ul style="list-style-type: none"> Turn rate down by increments of 10 bpm to a minimum of 30 bpm (this will give an AV interval of 250 msec). If rhythm remains V paced, return pacemaker back to original rate. Acceptable rhythms are NSR and 1st Degree AV Block. 	<p>Turning the rate down by increments of 10, allows the nurse to assess how the patient is coping with a slower rate. This decreases overdrive suppression of the sinus node slowly, to permit sinus node recovery and a more accurate assessment of the intrinsic rhythm.</p> <p>A sensed V paced is the only mode where the pacer rate is turned down to a minimum of 30 bpm. If V pacing is still observed, then AV block is greater than 250 msec and requires physician assessment.</p>
<p>3. If no intrinsic activity by 50 bpm then turn the rate back to the original rate. (<i>exception: see A sensed-V paced instructions above</i>),</p>	<p>If the patient's intrinsic rate is below 50, they will unlikely be able to sustain a normal cardiac output (CO) at this rate.</p>
<p>4. If intrinsic rate is greater than 50 bpm and the patient is presently hemodynamically stable, keep pacer rate 10 bpm below intrinsic rate.</p>	<p>This will allow the patient's normal intrinsic rate to take over.</p>
<p>5. Assess hemodynamics at the new rate. If CI, MAP and SPB are within normal limits (for at least 15 minutes), then keep pacemaker at this rate. If they are not, change back to the original rate.</p>	<p>An intrinsic rate doesn't necessarily mean that the patient will be able to sustain good CO.</p>

Documentation (Cerner)

1. Interactive View and I&O >> Adult Critical Care Systems Assessment **2** >> Pacemaker/Cardiac Rhythm Devices. >> complete all relevant DATA cells>> which includes *Device Safety Checklist*
2. Document any **pacemaker setting changes** in Cerner pacemaker/Cardiac Rhythm Devices>. Activity >>> modify setting and “add Comment” to describe patient condition.
3. Document **Rhythm changes** in Cerner in>> Cardiac Rhythm analysis and “add comment” to describe patient condition.
4. Document all **major pacemaker event** in a separate Nursing narrative note i.e. loss of capture
5. ECG Rhythm Strip Flow sheet (form ID 2892): Print and mount rhythm strip and analysis Q shift and PRN with any significant change in rhythm (no need to mount strip for simple rate, MA or sensitivity change) “add comment” in Cerner should capture this information

Patient and Family Education

1. Basic description of arrhythmias and need for pacemaker.
2. Basic description of pacemaker function, and temporary nature.
3. Description of 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.
4. Explain to patient what you are going to do and how they may feel before you turn down the rate.

Related Documents

1. [B-00-13-10118](#) – Epicardial Pacing in Critical Care
2. [B-00-13-10025](#) – Cardiac Surgery: Post operative Care (CSICU)

References

1. Hackney, Genevieve (Jan 2022). Pacing: Temporary and Epicardial Pacemaker Management Retrieved from Elsevier online clinical skills October 2023
2. Estes, Mark, (2022) Temporary Cardiac Pacing. Retrieved from UpToDate October , 2023
3. Spotts, Valerie, Nikki J Taylor, and Jennifer Pesenecker. Temporary Transvenous and Epicardial Pacing, AACN Procedure Manual for Progressive and Critical Care-E-Book, Page 412-426
4. Medtronic. Model 5392 Temporary External Pacemaker Tip Card retrieved <https://asiapac.medtronic.com>products>files>, Nov 2023

Appendices

[Appendix A](#) - Algorithm for Checking Intrinsic Rhythm in CSICU

[Appendix B](#) – Potential Complications

[Appendix C](#) - Medtronic Emergency Replacement of Batteries

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Persons/Groups Consulted:

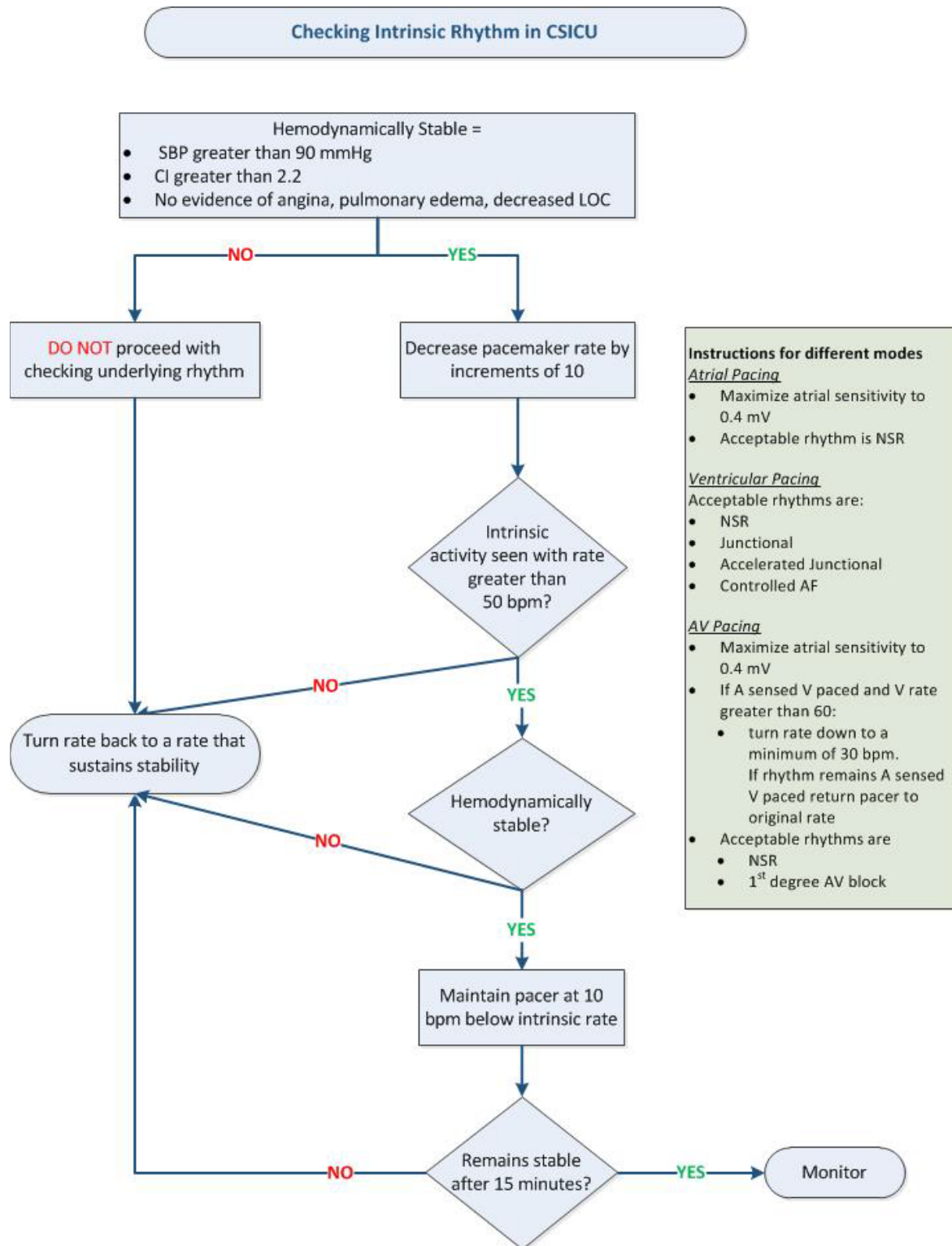
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Appendix A: Algorithm for Checking Intrinsic Rhythm in CSICU



Appendix B: Potential Complications

Complication	Signs and Symptoms	Nursing Actions
Pacemaker failure to capture	<p>There is a pacemaker spike but no immediate atrial or ventricular contraction.</p> <p>The pacemaker initiates the electrical impulse but there is no mechanical response.</p> <p>The frequency of failure to capture determines the effect on cardiac output.</p> <p>May see decrease in heart rate, blood pressure, cardiac output, LOC</p>	<p>Determine hemodynamic status of the patient.</p> <p>Assess for pacing of diaphragm or cardiac tamponade.</p> <p>Identify cause of failure. Check connections and tighten if loose. Check battery and change if needed. Change the polarity of the epicardial wires that are connected to the cable.</p> <p>Reposition the patient.</p> <p>Output setting may need to be increased.</p> <p>Notify MD.</p> <p>Be prepared to institute emergency protocol.</p>
Pacemaker failure to sense	<p>There is a pacemaker spike after an atrial or ventricular contraction.</p> <p>The pacemaker fails to see or sense the patient's contraction and initiates an electrical impulse at the programmed pacing interval.</p> <p>There is severe risk to adequate cardiac output during failure to sense beats where the spike is in the T wave. Lethal arrhythmias may occur as a result.</p>	<p>Determine hemodynamic status of the patient.</p> <p>Identify cause of failure. Change battery if needed, check connections, and sensitivity setting.</p> <p>Remove potential sources of electromagnetic interference from patient's bedside</p> <p>Reposition the patient</p> <p>Notify MD.</p> <p>Be prepared to institute emergency protocol.</p>
Failure to pace	<p>There is no pacemaker spike when there should be.</p> <p>The pacemaker fails to initiate an electrical impulse when needed.</p> <p>There is a decreased or absent cardiac output during failure to pace.</p>	<p>Determine the hemodynamic status of the patient. Assess for cardiac tamponade</p> <p>Identify the cause of failure. Check battery and change if needed and check connections and tighten if loose.</p> <p>Notify MD.</p> <p>Be prepared to institute emergency protocol</p>

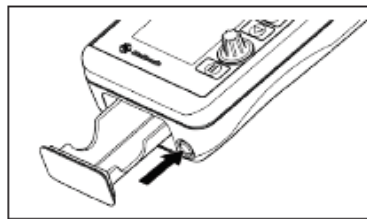
Appendix C: Medtronic Emergency Replacement of Batteries

MEDTRONIC MODEL 5392 BATTERY REPLACEMENT

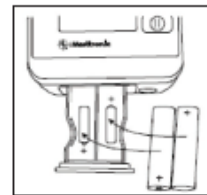
Battery Installation and Replacement

Note: Medtronic recommends disconnecting device from patient before replacing battery.

1. Press the battery drawer latch release button until the battery drawer opens.



2. Remove the old batteries.
3. Install two new LR6-sized (AA-sized) alkaline batteries. Verify that the batteries align with the polarity markings on the inside of the battery drawer.



4. Close the battery drawer firmly until the battery drawer is fully latched.

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

5. Discard the old batteries properly according to local regulations.

Notes

- Replace the temporary pacemaker batteries in the following situations:
 - Replace the batteries for each new patient
 - Replace the batteries when the low battery indicator appears during temporary pacemaker operation
 - Replace the batteries at least once every week when the temporary pacemaker is in continuous use
- Install the batteries with proper polarity. The temporary pacemaker does not turn on or provide pacing therapy with incorrect battery polarity
- If during an emergency situation the batteries must be replaced while the temporary pacemaker is in use, ensure that the temporary pacemaker is locked before replacing the batteries. Pacing is maintained at the current settings for 30 s, minimum, if the settings are at nominal values.