ASSISTING A PHYSICIAN WITH INSERTION AND INITIATION OF TEMPORARY CARDIAC PACING; AND CARE AND MONITORING OF THE PATIENT ARE POST-ENTRY LEVEL COMPETENCIES FOR RNS.

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GENERAL

POLICY

1. Care of a patient with Temporary Cardiac Pacing includes:

   1.1. Transvenous Pacing
       1.1.1. Assisting with Insertion
       1.1.2. Initiation of Temporary Cardiac Pacing under the direction of a physician
       1.1.3. Care and Monitoring

   1.2. Temporary Cardiac Pacing via PA Catheter
       1.2.1. Assisting with Insertion
       1.2.2. Initiation of Temporary Cardiac Pacing under the direction of a physician
       1.2.3. Care and Monitoring

   1.3. Transcutaneous
       1.3.1. Assisting with Initiation of under the direction of a physician
       1.3.2. Care and Monitoring

   1.4. Epicardial
       1.4.1. Assisting with Initiation, of under the direction of a physician
       1.4.2. Care and Monitoring of Temporary Cardiac Pacing

   1.5. Changing Pulse Generator

2. A physician order is required:
   2.1. For all temporary cardiac pacing.
   2.2. To initiate, adjust or discontinue temporary cardiac pacing.
   2.3. To remove transvenous pacing catheters. Refer to procedure for PA catheter for removal.

3. Removal of epicardial pacing wires is performed by a physician or by a RN who has been deemed competent in the Post Entry Level Competency (Shared Competency), Removal of Epicardial Pacing Wires (pending).

4. Note: Without a physician present, initiating temporary cardiac pacing and adjusting settings of the pulse generator of a temporary cardiac pacing device are Delegated Medical Functions for RN’s. Refer to Temporary cardiac pacing - Initiating Pacing and/or adjusting settings of the pulse generator CC 10-076.
5. Stimulation threshold (mA) is to be determined each time temporary pacing is initiated, and reassessed minimum of once every 24 hours.

6. mA for pacing should be set 2-3 times above the stimulation threshold and must be reassessed at least once every 24 hours.

7. Patients with temporary pacemakers require continuous cardiac monitoring or telemetry.

8. All patients with temporary cardiac pacing require IV access.

9. Temporary pacemakers inserted at the bedside require that placement be confirmed by x-ray.

10. Prior to performing, the RN is to be proficient in the following skills:

   9.1. Cardiac Monitoring: Cardiac Rhythm Assessment and Telemetry Monitoring CC 10-013 (All)
   9.2. Cordis, SLIC, PICL - Care, Maintenance and Removal of CC 80-030 (Transvenous)
   9.3. Hemodynamic Monitoring (Transvenous) NC-50-10-100
   9.4. Non-tunnelled Central Venous Access Catheter (multilumen) CC 80-015(SC) (Transvenous)

   In addition, the RN must possess knowledge of pacing ECG morphology.

11. The physician is to be notified as soon as the need for temporary cardiac pacing is identified.

GUIDING PRINCIPLES

1. Patient mobility may be restricted to prevent dislodgement of temporary pacing wires.

2. Pacemaker settings should reflect patient response:
   2.1. mA should be sufficient to capture the myocardium and provide adequate heart rate and blood pressure
   2.2. Sensitivity should be set to demand to limit incidents of competition (exception, atrial pacing)
   2.3. Rate should be set to maintain adequate cardiac output.

3. Refer to manufacturers instructions for operation of unit or site specific temporary pacing equipment.

4. Temporary cardiac pacing is initiated in demand ventricular mode (exception atrial pacing) unless specifically ordered asynchronous by the physician.

5. Parameters for atrial and AV sequential pacing are determined and ordered by the physician.

6. Dressing and cleansing of site are performed as for transvenous pacing catheters. (See Non-tunnelled Central Venous Access Catheter (multilumen) CC 80-015(SC) )

7. All connections should be checked each shift to ensure they are secure. (I.e. connections between pacing wires, pacing cables and pulse generator).
8. Pacing parameters are documented each shift and when there are any changes to the parameters.

I - TRANSVENOUS PACING: ASSISTING WITH INSERTION, PATIENT CARE AND MONITORING

POLICY

1. The RN must be proficient in the appropriate Post-Entry Level (Shared) Competencies as stated in Policy Statement # 9 General.

EQUIPMENT

Refer to AACN 5th edition page 342

GUIDING PRINCIPLES

Refer to: General - Guiding Principles

PROCEDURE

1. Ensure venous introducer (ie.: Cordis) used for temporary cardiac pacing has an infusing IV line attached.

2. Ensure compatibility, of pacing wires for PA catheter (ie. only PA catheter pacing wires are used with PA catheters.)

3. Assess and document transvenous pacing catheter length each shift and prn.

4. Restrict patient mobility depending on insertion site:
   4.1. Femoral insertion site: bedrest, avoid flexion or abduction of leg
   4.2. Jugular or subclavian site: limited mobility.


Determining stimulation threshold

8. Set the pacing rate 10 beats above the patients intrinsic rate

9. Gradually decrease the mA from 20 until capture is lost

10. Gradually increase mA until 1:1 capture is established. This is the Stimulation or pacing threshold
11. Set the mA 2-3 times above the stimulation threshold. For example if 1:1 capture is achieved at 3mA, then mA on pulse generator should be set at 6-10mA.

**II - EPICARDIAL PACING & PATIENT CARE AND MONITORING: (CCU; 6.1 - Cardiology IMCU; CVICU; 7.1 - Cardiovascular Surgery IMCU)**

**POLICY**

1. The RN must be proficient in the appropriate Post-Entry Level (Shared) Competencies as stated in Policy Statement #9 General.

**EQUIPMENT**

- Alcohol swabs
- #21 gauge needle if needed for ground
- pulse generator, either single or dual chamber with 9V battery
- connecting cables
- wide paper tape
- cardiac monitor

**PROCEDURE**

*Assisting a physician with initiating Single Chamber (Atrial or Ventricular) Epicardial Pacing*

1. Identify cardiac rhythm and confirm need to pace.
2. Identify the method of pacing desired as per physician order.
3. Test battery function in pulse generator & replace battery if necessary.
4. Expose and identify location of wires: atrial wires to right of sternum, ventricular wires to left of sternum.
5. Connect pacing wire to negative (-) terminal of pacing cable and ground lead to positive (+) terminal of pacing cable.
6. Establish ground using un-used ventricular or atrial wire, noting that:
   6.1. ventricular wire should not be used as a ground for atrial pacing
   6.2. if there is only one wire from the patient, that wire is always negative; ie not the ground wire.

   Insert the wire into the negative terminal of the connector cable and tighten screw clamp

7. If there is no ground or second RV wire, establish a pacing circuit by using a #21 or smaller gauge needle inserted through a small fold of skin on the upper abdomen. Insert the metal tip of the needle into the positive side of the connector cable opening and tighten the screw clamp.

8. Attach the connection cable to the pulse generator
9. The mA should be sufficient to capture the myocardium and provide adequate heart rate and blood pressure.

9.1. Sensitivity should be set to demand to limit incidents of competition (exception, atrial pacing)
9.2. Rate should be set to maintain adequate cardiac output.

Determining stimulation threshold

10. Refer to Transvenous Pacing – Procedure # 8-11

Initiating A-V Sequential Pacing

11. As with single chamber pacing, connect the pacing wire from the chamber to be paced to the negative terminal of the pacing cable.

Note: A pacing wire and a ground wire are required for both circuits.

12. Connect the atrial pacing wire to the atrial output terminals, connecting positive and negative electrode terminals to the respective positive and negative output terminals. If a second wire is not in situ, a needle may be used for ground to complete the pacing circuit.

12.1. Connect the ventricular pacing wire to the ventricular output terminals, connecting the positive and negative electrode terminals to the respective positive and negative output terminals. If a second wire is not in situ, a needle may be used for ground to complete the pacing circuit.

III - TRANSCUTANEOUS PACING - ASSISTING WITH INITIATING, CARE AND MONITORING OF (EXTERNAL, NON-INVASIVE)

GUIDING PRINCIPLES
Refer to: General - Guiding Principles

PROCEDURE

1. Identify cardiac rhythm and confirm need to pace with physician.

2. Plug monitor IN.

3. Select monitor ON.

4. Correct placement of pacing pads is essential for successful pacing. Refer to manufacturer’s instructions and diagrams on pacing pad packaging. Consider:
   4.1. Back-Front placement with back (posterior, +) pacing electrode between the spine and left scapula at the level of the heart, and front (anterior, -) pacing electrode at 4th intercostal space mid axillary line.
   4.2. When posterior placement is not possible, the back electrode may be placed 2nd intercostal space to the right of the sternum and the anterior pad will be placed at the 4th or 5th intercostal space, mid axillary line.
5. Ensure adequate skin contact of pacing pads. Consider:
   5.1. Shaving hair from appropriate areas
   5.2. Rubbing skin surfaces with alcohol swab, dry gauze, or soap and water to remove oily
       residue and dead skin cells.

6. Consider patient sedation / analgesia prior to initiating non-invasive pacing.

7. Select Lead II.

8. Adjust ECG size to obtain a visible waveform.

9. Ensure there is a secondary cardiac monitor (ie. separate from pacing device) to facilitate
   assessment of cardiac rhythm.

10. Connect pacing electrodes to pacing cable from defibrillator.

11. Select Pacer ON.

12. Set pacing rate by turning rate ppm dial to 10 - 20 ppm higher than patient’s intrinsic (own) rate.
    If no intrinsic rate, set at 70 -90 ppm.


14. A stimulation threshold of 40-70 mA is required to pace the average-sized adult

15. Gradually increase mA output until capture is achieved, as evidenced by pacer spike occurring
    before widened QRS.

16. Check to ensure output (pulse) with each paced beat. Monitor vital signs.

17. Monitor skin integrity under electrodes every shift and prn.

18. Advocate for alternative method of pacing. (e.g. Transvenous or permanent pacing)

19. Consider patient sedation / analgesia prior to initiating non-invasive pacing.

20. For more information on this procedure refer to Policy Initiating Temporary Cardiac Pacing:
    the AACN Procedure Manual for Critical Care, 5th ed, pages 323-339, and the attached
    learning Module for Temporary Cardiac Pacing.

IV - NURSING CARE POST TEMPORARY PACEMAKER

PROCEDURE

1. For Care of and Monitoring the patient with Transcutaneous (External) Pacing: Refer to

2. In addition, for all post temporary pacemaker patients, refer to the following table:
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<td>Ensure continuous cardiac monitoring with documentation of heart rate at least every hour, other vital signs and hemodynamic response to pacing every 4 hours or more often if the patient’s condition warrants it.</td>
<td>Changes in vital signs with accompanying signs &amp; symptoms of clinical deterioration.</td>
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<td>Evaluate ECG for paced rhythm or resolution of the initiating dysrhythmia.</td>
<td>Oversensing, undersensing, failure to capture or fire.</td>
</tr>
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<td>Assess patient comfort, need for analgesia or sedative and the patients response to interventions.</td>
<td>Persistent hiccups.</td>
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<tr>
<td>Check and document stimulation threshold level at least every 24 hours.</td>
<td>Unrelieved discomfort.</td>
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<tr>
<td>If using a PA catheter for pacing and it is necessary to do a pulmonary artery wedge, assess capture after wedging.</td>
<td>Loss of capture after wedging the PA catheter.</td>
</tr>
<tr>
<td>Change the dressing every week or more often if dressing is wet, soiled etc.</td>
<td>Increased temperature.</td>
</tr>
<tr>
<td>Monitor patient for other complications.</td>
<td>Increased white blood cell count.</td>
</tr>
<tr>
<td>Monitor electrolytes.</td>
<td>Redness, drainage warmth or pain at insertion site.</td>
</tr>
<tr>
<td>Check all connections at least daily and after ambulation (pacing wires, cables, pulse generator).</td>
<td>Any signs of embolus, thrombosis, myocardial perforation, pneumothorax, hemothorax, or phlebitis.</td>
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<td>Inability to maintain tight connections.</td>
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**V - CHANGING A PULSE GENERATOR OF A TEMPORARY PACEMAKER**

**GUIDING PRINCIPLES**

Refer to: General - Guiding Principles

In addition:
1. Two nurses should be present to facilitate rapid change-over to a new pulse generator.
2. The new pulse generator should be ready prior to starting the exchange.
3. Minimize risk of static shock by wearing examination gloves during procedure.

**EQUIPMENT**
- pulse generator
- pacing extension cables
- cardiac monitor

**PROCEDURE**

1. Assemble equipment.
2. Explain procedure to patient.
3. Test battery of new pulse generator.
4. Turn on the new pulse generator and select the settings (output and rate) of the new pulse generator as per settings on the current pulse generator.
5. Attach the pacemaker electrodes into the positive and negative outlets of the extension cable of the new pulse generator and ensure screws are securely in place.
6. Connect the positive and negative electrodes of the extension cable into the corresponding positive and negative outlets of the new pulse generator.
7. Unscrew the pacing extension cable from the old pulse generator from the pacing wires.
8. Quickly attach the pacing wires to the new pacing extension cable and pulse generator.
9. Confirm pacing and capture on cardiac monitor.
10. Assess patient for hemodynamic response and vital signs.

11. Document:
   11.1. Date and time of pulse generator change.
   11.2. setting on the new pulse generator (output and rate)
   11.3. assessment that the new pulse generator is functioning, including:
      11.3.1. assessment of pacing, capture and vital signs post change-over
      11.3.2. vital signs and monitor strip pre and post change-over.
      11.3.3. patient response

(Refer to Diagram on page 291 AACN)

**RELATED CAPITAL HEALTH DOCUMENTS**

Cardiac Monitoring: Cardiac Rhythm Assessment and Telemetry Monitoring CC 10-013
Care of a patient with Temporary Cardiac Pacing (Transvenous, Epicardial and Transcutaneous) CC-
Non-tunelled Central Venous Access Catheter (multilumen) CC 80-015(SC)
Cordis, SLIC, PICL - Care, Maintenance and Removal of CC 80-030 (for Transvenous and PA Catheter)
**Hemodynamic Monitoring for PA Catheter NC-50-10-100**

Initiating temporary cardiac pacing and/or adjusting settings of pulse generator without a physician present CC 10-076

**REFERENCES**


Retrieved May 05, 2006 from:
http://gateway.ut.ovid.com/gw2/ovidweb.cgi


**HISTORICAL DATES**

Integrated June, 2006; Replaces:
- QEII NC – 10-30-60, Temporary Cardiac Pacing, Epicardial, Transvenous, AV Sequential, PA Catheter,
- QEII NC 10-30-30, Non-Invasive External Pacing
- QEII NC10-30-10, Changing Pulse Generator of a Temporary Pacemaker
- DGH, 1994, Assisting with Insertion of Temporary Pacemakers
- DGH, 1991, Care of Patient with Temporary Pacemaker
- Twin / Oaks/ Birches, 2000, Nursing Responsibilities During External Pacing