

PROTOCOL FOR: Pacemakers: Care of Patients with Temporary Pacemakers

- POLICY:
1. Cardiology is consulted on all patients requiring a temporary transvenous pacemaker.
  2. Physician obtains an informed consent form, unless the situation is an emergency.
  3. Patient must be placed on ECG monitoring.
  4. Anyone handling exposed wires should wear rubber gloves. Avoid touching the patient/pacer equipment and another piece of electrical equipment simultaneously.
  5. If wires are to be discontinued from pulse generator they must be grounded. Covering with plastic caps is the preferred method for grounding.
  6. Specific orders for pacemaker settings must be written by the physician/ APRN managing the pacemaker. Orders should include: mode, rate, MA (milliamps) for output, MV (millivolts) for sensitivity, and A-V interval (for dual chamber pacemaker).

DESIRED PATIENT

- OUTCOMES:
1. Patient will receive appropriate stimulus/capture from pacemakers.
  2. Patient will not experience complications secondary to the placement of the pacemaker.

CLINICAL  
ASSESSMENT

- AND CARE:
1. Nursing assessment of all pacer patients will take place every 2-4 hours and prn, and should include:
    - a. Level of consciousness
    - b. Vital signs (including apical pulse and blood pressure) Temperature should be taken every four hours and prn.
    - c. Pain at the insertion site.
    - d. Peripheral pulses (especially distal to insertion site for loss or decrease).
    - e. Pace and sense indicators for proper pacing/sensing in relation to patient need. (Factors that may decrease threshold and reduce capture include MI/ischemia and

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fibrosis at the catheter tip. Patients with these conditions may require an increased MA during the initial 48-72 hours following insertion, and should be observed closely for sensing and non-capture problems during this time.)

2. For immediate post-operative open heart patients, attach epicardial wires to the pacer pulse generator and set per MD/APRN orders. Capture is generally assessed within 15-30 minutes of arrival in ICU. However, if patient's heart rate is > 100 BPM, do not test pacer wires until HR falls less than 100 BPM. To assess capture, turn "rate" dial 10 higher than patient's rate, set MA on 10 (or higher if needed for capture), and leave sensitivity on "DEMAND" or near 0. MA is then dialed down to assess threshold for capture. The pacemaker can similarly be tested for a sensitivity threshold: Sensitivity is slowly decreased (dialed to a larger number) until failure to sense is noted, then increased again until proper sensing occurs. MA (output) and MV (sensitivity) are set at levels above the identified thresholds - generally 2-3 times the threshold. Refer to specific MD/ APRN orders.
3. The nurse should assess heart sounds/breath sounds every 4 hours and prn. (A right ventricular pacemaker may produce a paradoxically split second heart sound due to the delay in left ventricular depolarization.) A change in intensity of the heart sounds, or a pericardial friction rub, may be indicative of myocardial perforation with subsequent cardiac tamponade. Any heart sound abnormalities or adventitious breath sounds should be documented on the ICU flowsheet and in the progress notes.
4. The following aspects of pacer care will be assessed each shift:
  - a. Site dressing for intactness, dryness, drainage.
  - b. Generator settings, including: rate, MA (output), MV (sensitivity), on/off.
5. The patient's electrolyte status (especially serum potassium) should be monitored at regular intervals as ordered by MD throughout the pacing period.
6. The face cover will be in place or lockout mechanism activated on the pulse generator except when making setting changes.

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7. All connections will be checked for tightness each shift and prn.
8. The external generator will be secured either to the bed linens with safety pins or suspended on an IV pole.
9. The patient cable will be coiled and never left dangling around the bedside rail or chair when the patient is out of bed per MD order.
10. All equipment in the patient's room (especially the bed) should be properly grounded.
11. Use caution to keep liquids away from the generator. (Instruct patient/visitors regarding the same.)
12. No electrical equipment, such as electric shavers, should be used. Properly grounded television sets and radios may be in the patient's room, but should not be touched by the patient or come in contact with the bed.
13. Do not disconnect the pacemaker before defibrillation. Keep paddles away from pacing wires and generator. (Most manufacturers state that pulse generators are made to withstand a current of up to 400 watt-seconds during defibrillation.)
14. Always have extra pacer box available, and a 9-volt battery.
15. Any problems with equipment should be reported to Biomedical Engineering (Ext. 2954 or page after hours).
16. Antecubital/Subclavian/Jugular Insertions: Keep the patient on bedrest for 24° except for standing to void and using a bedside commode, in an attempt to prevent early catheter dislodgment. An antecubital approach will necessitate the use of an armboard.
17. Femoral Insertions: Keep the patient on bedrest at all times. Leg should be kept fairly straight.
18. Assess the patient's anxiety level about pacemaker dependency. Attempt to identify and allay unreasonable fears. Discuss the patient's prognosis with the physician and clarify with the patient the continued need for the pacer and the possibility of a permanent pacemaker. Include the patient's family/significant other in discussions.
19. Do not disturb dressing for initial 24 hours, then change every 48 hours.

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20. Observe the insertion site for signs of infection or cellulitis during dressing changes. Document any redness, swelling, drainage, unusual tenderness, warmth, and pain in the progress notes and notify physician/APRN.

REPORTABLE  
CONDITIONS:

Observe the patient and rhythm for the following complications. Follow the suggested nursing interventions if these problems are identified.

1. Dislodgment of catheter: indicated by a significant loss of capture/sensing. Obtain a rhythm strip for documentation. Notify the physician/APRN and discuss the need for a chest x-ray and possible preparation for catheter manipulation.
2. Malfunction or Failure: indicated by a failure to pace (no pacer spikes where pacing should occur), failure to sense (pacemaker spikes occur where they should not be occurring) or failure to capture (pacemaker spike occurs, but no EKG complex follows). Immediately check connections, battery, and settings. Notify physician or APRN and initiate troubleshooting steps outlined below:
  - a. failure to pace: check that pacemaker is on. Replace battery or pulse generator, check that connections are secure. Check sensitivity and adjust, as it may oversensing (ie. sensing muscle artifact and therefore not firing). If the patient is pacer dependent, an external pacer may be used as a back-up.
  - b. failure to sense (undersensing): replace battery, adjust the sensitivity setting (dialing to a smaller number will make the pacemaker more sensitive to the patient's own beats). Check that the mode is appropriate for the sensing capability that is desired. If these measures fail, and patient is not pacemaker dependant, turn the pacemaker off (to prevent the pacemaker from firing on a T wave, potentially causing R on T phenomenon and VT/Vfib) and notify the physician/ APRN.
  - c. failure to capture: replace battery, increase output (MA). Lead may be out of position and require repositioning by physician/APRN. Positioning the patient on his/her side may cause the pacemaker wire to fall back in contact with the endocardium and produce capture - turn first to the left, and if not successful, turn right.

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4. Perforation of the Right Ventricle (rare): indicated by the loss of capture with continued pacemaker spikes. Diaphragmatic stimulation may cause visible contractions and/or hiccoughs. Should this occur, turn the pacemaker off and notify the physician/APRN. Observe for possible cardiac tamponade. Provide for back-up pacing via a transcutaneous pacemaker if indicated.

APPROVAL: Intensive Care Unit Standards Committee  
Nursing Standards Committee  
Cardiac Step-Down Standards Committee

EFFECTIVE DATE: 2/88

REVISION DATES: 2/90, 1/92, 1/93, 11/94, 8/99, 8/02, 10/03, 12/05, 9/08

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