

PARKLAND HEALTH & HOSPITAL SYSTEM
Nursing Services

Section: Cardiovascular
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Distribution: Nursing Procedure Manual

TEMPORARY PACEMAKERS — TRANSVENOUS
Insertion and Care of the Patient

PRACTICE

STATEMENT: Qualified nursing personnel shall assist the Provider with the insertion of a transvenous pacemaker. The provider must obtain an informed consent.

PURPOSE: To provide an artificial electrical stimulus when the heart's intrinsic electrical system has failed.

INDICATIONS MAY INCLUDE:

Acute myocardial infarction, heart block, or symptomatic bradyarrhythmias. patients particularly susceptible to cardiac arrest while undergoing anesthesia or surgery and to improve the patient's clinical state

EQUIPMENT: Percutaneous sheath introducer kit – *Size 6 French*
Transvenous pacing catheter – type specified by the LIP
Antiseptic solution
Lidocaine – 1%
4 x 4's (10/pkg) - 1
Sterile drapes
Sterile towels
Sterile gloves, sterile gown, mask, cap, goggles or face shield
EKG machine Defibrillator
Cardiac arrest cart
Pacemaker pulse generator from CPICU/MICU/SICU/10 West) with patient extension cables
New 9-volt battery for pulse generator
Central line dressing kit
If introducer sheath is to be left in for IV access – injection cap and flush
Lead aprons (if fluoroscopy is used)

PROCEDURE:

1. Refer to the Time-Out nursing procedure.
<http://intranet.pmh.org/home/PP-Index/Nursing/23-07.pdf>
2. Wash hands and gather the equipment.
3. Prepare the pulse generator.
 - a. Place a new battery in the pulse generator.
 - b. Secure patient extension cable into the appropriate sockets on the pulse generator. (e.g. positive/negative and if dual chamber atrial/ventricular)
 - c. Turn the pulse generator on briefly to verify that it is functioning, then turn off.
4. Emergency equipment should be present and functioning.
5. Verify presence of patent IV catheter. Hang TKO IV fluid.
6. Verify that the patient is connected to cardiac monitor, pulse oximeter, and blood pressure monitoring device.
7. Personnel assisting with procedure will don cap, mask, goggles. Assist provider with sterile gown, gloves.
8. The provider will:
 - a. Cleanse the insertion site with antiseptic solution and position sterile drapes.
 - b. Infiltrate insertion site with lidocaine.
 - c. Obtain venous access and insert the introducer.
 - d. Advance the pacemaker wire through the introducer to the right ventricular apex under fluoroscopy guidance.
9. Once the catheter is inserted, hold the patient extension cable so that the provider can insert the pacing lead wires into the appropriate socket (i.e. positive to positive, negative to negative). The blue end of wire is inserted and advanced as far as possible. To secure the wire, screw down the plastic knobs, making sure wire does not slip. Verify the connections between pacing wire and extension cable and pulse generator are correctly placed and secure.
10. Set rate, output/mA and sensitivity on the pulse generator as ordered by the Provider. Settings will be manipulated to assess pacing threshold (the minimum output in mA needed to achieve consistent depolarization) and sensing threshold (the smallest electrical impulse in millivolts that the

pacemaker can sense). The thresholds help determine the appropriate output and sensitivity settings for the individual patient.

11. After the Provider has sutured the pacing catheter in place, apply a sterile dressing. Secure with tape as needed to prevent dislodgement.
12. The pulse generator is usually suspended from an IV pole next to the patient. The pulse generator must be located in a secure place that prevents any tension on the pacing catheter, which may cause dislodgment.
13. Obtain post procedure 12-lead EKG and chest x-ray.
14. Documentation includes the following:
 - a. Patient's underlying heart rate/rhythm; vital signs
 - b. Date and time of pacemaker insertion
 - c. Type of pacing wire inserted and insertion site
 - d. Name of the provider performing procedure
 - e. Type of pulse generator and pacemaker settings
 - f. Patient tolerance of procedure
 - g. Assessment of pacemaker function
 - h. CXR verification of placement
 - i. Patient teaching

Note: If inserted under fluoroscopy, the provider may observe for pneumothorax and placement by fluoro but PA chest X-ray must be obtained as soon as possible.

Care of the Patient with a Temporary Transvenous Pacemaker

1. Check the pacemaker settings on the pulse generator that are relevant for the pacing mode (e.g. for ventricular demand pacing – rate, ventricular output, ventricular sensitivity). If the settings are not consistent with the provider's orders, consult with the provider. If the pacemaker is currently turned off, be familiar with how to turn it on in case it is needed.
2. Check the pulse generator for a low battery indication. Newer models have a low battery signal that appears if the battery is weak. Extra batteries and an extra pulse generator should be accessible.

Note: A new 9-volt battery should last a week to 10 days with normal use (i.e. rate 60-70, output 10, 100% pacing).

3. Assess the insertion site. Make sure the dressing is dry and intact, the pacing catheter is Taped securely. Change dressing every 72 hours or prn damp, loose, or soiled if biopatch applied dressing is changed every 7 days.

4. Check to be sure that all connections are secure, and that there is no tension on the pacing catheter lead wires that could cause dislodgement of the catheter.
5. Monitor the ECG for appropriate pacing, sensing and capture, and for the presence of arrhythmias. Troubleshoot improper function as indicated.
 - a. Failure to capture – pacing spikes not followed immediately by QRS (or P wave if atrial pacing). Pacemaker is firing, but fails to depolarize the myocardium. This could result in an inadequate cardiac output.

Interventions may include:

- 1) Check all connections, change battery if low, consider changing pulse generator.
 - 2) Reposition patient on the side (try left side first).
 - 3) Check output setting. Notify the provider. The output/mA may need to be increased. The pacing wire may need to be repositioned.
 - 4) If patient is symptomatic, emergency drugs or a transcutaneous pacemaker may be indicated.
- b. Failure to sense – pacing spikes occurring when not needed and are too close to patient's beats. Pacemaker is failing to sense patient's intrinsic beats and is firing inappropriately, competing with the patient's intrinsic rhythm. This could cause arrhythmias.
 - 1) Check all connections, change battery if low, consider changing pulse generator
 - 2) Reposition patient on the side (try left side first)
 - 3) Check sensitivity setting. Notify the LIP. Sensitivity may need to be increased (by *decreasing* the mV setting). The pacemaker may need to be turned off to eliminate competition.
6. Follow electrical safety precautions. Pacing wires provide a direct path by which current can travel to the myocardium. Current directly delivered to the myocardium (i.e. microshock) can cause ventricular fibrillation.
 - a. Wear gloves if handling the exposed tips of the pacemaker lead wires.
 - b. Be sure all connections between pacing wires and cable and pulse generator are secure and inserted completely so that no uncovered metal is exposed.
 - c. Keep dressing over the pacemaker dry at all times.
 - d. Cover exposed pacing wire tips if they are not connected to the pulse generator or cable.
 - e. Be sure all electrical equipment in the room is grounded.
 - f. Do not touch electrical equipment and lead wires simultaneously.

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