

PARAMEDIC TIP SHEET #2: *Transcutaneous Pacing*

Indications for Transcutaneous Pacing

Transcutaneous pacing is indicated in asystolic or bradycardic dysrhythmias with or without cardiac arrest. The idea of transcutaneous pacing is based on the consideration that the patient's present asystolic or symptomatic bradycardic rhythm may be a direct result of a conduction abnormality resulting in the decreased heart rate. Conditions in which transcutaneous pacing is most often indicated include:

- ◆ **Absolute bradycardia (HR < 60 bpm) with evidence of hypoperfusion (often associated with acute MI or cardiac ischemia involving the Sa or AV nodes).**
- ◆ **Asystole with a short time (< 10 mins) since collapse, particularly if the asystole occurred shortly after defibrillation or medication administration.**
- ◆ **PEA with a short time since collapse, particularly with evidence of drug overdose or electrolyte abnormalities (e.g. hyperkalemia).**

Many references discuss the consideration of pacing in symptomatic supraventricular and ventricular (specifically Torsades VT) tachydysrhythmias when all other therapies have been unsuccessful. This particular type of pacing is referred to as "overdrive" pacing. It requires a pacing rate much greater than the tachydysrhythmia being treated. Unfortunately, most transcutaneous pacing devices used in the prehospital setting are not designed for pacing rates above approximately 170 bpm. It is unlikely that overdrive pacing can be successfully accomplished in the prehospital setting considering this limitation.

There are a number of limitations and contraindications to transcutaneous pacing. Transcutaneous pacing is not indicated and is used rarely, if at all, in these situations:

- ◆ Hypothermia
- ◆ Patients less than 14 years of age [In children, pacing is seldom required since bradycardia in children is usually a result of hypoxia.] Pacing is indicated in children when the bradycardia results from a known congenital cardiac abnormality.
- ◆ Bradycardia resulting from hypovolemia or hypoxia
- ◆ Patients with prolonged time of cardiac arrest
- ◆ Bradycardic patients without evidence of hypoperfusion
- ◆ Shock or Hypovolemic patients

Methods

The following transcutaneous pacing method assumes that initial care of the patient has already begun.

1. Ensure 3-wire (or 4) ECG monitoring is continued. The patient is placed in the supine position.
2. Attach the pacing wires to the pacing electrodes/pads and connect to the device. On some devices, the pacing wires are specific to the location of the pacing pad placement (e.g. red wire to the anterior chest pad).
3. Pacing pad placement may be accomplished using one of two methods:
 - Anterior-Posterior Method: One pad with the connected electrode wire is placed on the patient's back just below the scapula and to the left of the spine. Obviously, in cardiac arrest, CPR must be stopped while this pad is placed. The second pad is placed on the anterior surface of the chest to the left of the sternum and essentially over the heart. Placement of pads directly over the sternum or spine may decrease pacing effectiveness.

(continued on next page)

PARAMEDIC TIP SHEET #2:
Transcutaneous Pacing (continued)

- Anterior-Anterior Method: This method has gained popularity due to the development of multi-function pads. These pads may be used for both defibrillation and pacing. The placement is the same as the placement of defibrillation pads. The sternum pad is placed to the right of the sternum just below the right clavicle (not on the clavicle or sternum). The apex pad is placed at the level of the apex of the heart in the area of the anterior axillary and mid-axillary lines.
- 4. In awake patients, consideration is given to providing sedation (e.g. a benzodiazepine with or without a narcotic analgesic). If pacing is truly indicated, it should not be delayed for IV access and sedation.
- 5. Advise the patient of the procedure and the pain that will be experienced.
- 6. Begin by adjusting the rate and current. At a minimum, the rate and current should each be set at 60 bpm and 60 mA, respectively.
- 7. Assess for evidence of electrical capture. If electrical capture is obtained, assess for evidence of mechanical improvement of perfusion (e.g. peripheral pulses now present, increased BP, etc.).
- 8. If electrical capture is not obtained, gradually increase the current until electrical capture is obtained. Most devices allow increases of current in increments of 5, 10 or 20 mA.
- 9. If electrical capture is obtained but there is no perfusion improvement, gradually increase the rate until perfusion improvement is noted. Many devices allow for rate increases of 5, 10, or 20 bpm.
- 10. Consider the increases in current and rate as similar to titrating an IV flow rate. In this case, you are trying to utilize the lowest current and pacing rate possible in order to obtain adequate perfusion.
- 11. If the patient does not respond quickly to transcutaneous pacing, prepare for pharmacologic therapies aimed at increasing perfusion (e.g. alpha-1 and beta-1 agonist) such as dopamine or epinephrine infusions.
- 12. Continue with all other appropriate care.

Tips

- ◆ Transcutaneous pacing is most useful in those patients in whom the slow heart rate is the most likely cause of the inadequate perfusion. Bradycardia resulting from inadequate circulating volume or hypoxia IS NOT managed by transcutaneous pacing (e.g. hypovolemia, hypoxia, shock).
- ◆ In some patients, transcutaneous pacing devices are placed in a “standby mode” (“Just in case I need to pace” mode). This is typically done with bradycardic AV blocks with suspected cardiac ischemia or acute MI.
- ◆ Transcutaneous pacing in asystole is seldom successful. If it is to be successful, pacing must be performed EARLY in the cardiac arrest. Pacing late in the arrest is almost always unsuccessful and will most likely waste time.
- ◆ It is often difficult to assess the pulse or blood pressure during pacing due to muscle contractions. Using the right side of the body for pulse and BP assessments may be helpful.
- ◆ In the pulseless patient, pacing may make recognition of underlying VF difficult. The paramedic must consider the possibility of underlying VF in the pulseless patient during pacing. Stopping pacing to assess for VF may be necessary.