



County of Santa Cruz

HEALTH SERVICES AGENCY

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EMERGENCY MEDICAL
SERVICES PROGRAM

Procedure No. 6000
Reviewed 04/01/2010

Emergency Medical Services Program

Approved

Medical Director

Subject: TRANSCUTANEOUS CARDIAC PACING

I. Definition:

Transcutaneous pacing is a technique of electronic cardiac pacing accomplished by using skin electrodes to pass repetitive electrical impulses through the thorax.

II. Indications

Transcutaneous pacing should be considered in those pediatric and adult patients experiencing substantially symptomatic bradycardia, no matter the etiology. In general, symptomatic bradycardia is defined as a patient with a heart rate of less than 60 bpm with significant hypotension/signs of shock.

Non-cardiac origins of symptomatic bradycardia in adults include hypoxia, trauma, drug overdose, electrolyte imbalances and hypothermia. Symptomatic bradycardia in children is usually secondary to hypoxia, and less commonly, due to a toxic ingestion. *In both adults and children, effort should be made by care providers to correct these causes of bradycardia prior to pacing, when possible.*

Transcutaneous pacing of pediatric patients should be reserved for children with profound symptomatic bradycardia refractory to BLS and ALS interventions and by Base Physician order unless the child is *in extremis*. Use pediatric pacing electrodes for children less than 15 kg.

III. Contraindications

- Asystole or brady-asystolic arrest
- Non-intact skin at the electrode site
- Patients with signs of serious blunt or penetrating trauma

IV. Procedure

- a. Explain procedure to patient and consider sedation.¹ Sedation is not mandatory.
- b. Establish IV/IO access if possible. Do not delay pacing in grossly unstable patients to do so.
- c. Place monitoring and pacing electrodes. Anterior/posterior pacing electrode placement is preferred, though anterior/lateral placement is also acceptable. Verify that the pacing and monitoring electrodes are adequately spaced from one another to prevent ECG interference.
- d. Set initial pacing rate at 80 bpm. ECG monitor should be set to the **demand** pacing mode.
- e. Begin output current at 0 milliamps (mA). Increase output in 10 mA increments until electrical capture is noted. Following this, confirm that mechanical capture (pulses) has also been achieved. Assessment of capture should show pacer spikes that are followed by QRS complexes, with corresponding pulses.
- f. If capture is maintained but the patient still remains symptomatic (BP of less than 90 systolic, poor skin signs, delayed capillary refill, weak pulses, ALOC), consider increasing the rate in 10 bpm increments until 100 bpm is achieved.
- g. If patient comfort is maintained, continue pacing. If the patient is uncomfortable, consider sedation. Another option is to reduce current output in 5 mA increments to a point just above electrical and mechanical capture.
- h. If perfusion remains problematic, make base station contact to discuss an order for dopamine with the base station physician.
- i. If the patient remains unconscious during pacing, monitor vital signs carefully. In cases where electrical capture is achieved with no palpable pulses, consider following Protocols C2 or C2-P, Pulseless Electrical Activity (PEA).
- j. A paper copy of the ECG obtained during this procedure should be delivered to the receiving hospital, and should be attached to the patient's PCR.

¹ Sedation for Patients Being Paced

Sedation may include the use of Versed and Morphine Sulfate to reduce the discomfort.

Adults:

- Versed 1 – 2.5 mg IV/IO, or 2.5 – 5 mg IM. May be repeated to a total of 5 mg IV/IO, 10 mg IM.
- Morphine Sulfate: 2 – 5 mg IV/IO, or 10 mg IM. Morphine Sulfate should only be used if treatment with Versed is not adequate to control the discomfort caused by this procedure. Monitor the patient carefully for worsened hypotension and hypoxia.

Pediatrics:

- Versed : 0.1 mg/kg IV/IO to a maximum of 2 mg total, or 0.2 mg/kg IM to a maximum of 3 mg total.
- Morphine Sulfate: 0.1 mg IV/IO/IM to a maximum of 5 mg. Morphine Sulfate should only be used if treatment with Versed is not adequate to control the discomfort caused by this procedure. Monitor the patient carefully for worsened hypotension and hypoxia.