Transvenous pacing

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indications

- Bradyarrhythmias resulting from acute reversible causes
- Cardiac conduction abnormalities
- Overdrive pacing of tachyarrhythmias
- Failure of other pacing devices
indications

- Bradydysrhythmias
- Symptomatic sinus node dysfunction
- Sinus arrest/ Sinus bradycardia
- Symptomatic atrioventricular block
- Mobitz type II
- Third degree AV block
- Acute myocardial infarction (especially anterior distribution)
- New left, right, or alternating bundle branch block
- New bifascicular block
- Symptomatic patient secondary to failure of permanent pacemaker
- Symptomatic drug overdose
- Tachydysrhythmias
- Overdrive pacing of rhythms refractory to medical management
contraindications

- prosthetic tricuspid valve
- severe hypothermia
equipment

- **Sterile** mask, gown, gloves, drapes
- Venous **introducer** central line kit
- Transvenous bipolar pacing **catheter**
- Pacemaker **generator** with battery and cable
- **Telemetry** or ECG machine
- **Crash cart** with resuscitation equipment and defibrillator
pacing catheter
setup

Connection adapter to pacer box

Electrode connector

Pacing catheter

Balloon

Extensible sleeve

Introducer sheath
pacemaker generator

Rate control

Output (mA)

Sensitivity (mV)

On / Off switch
Intravenous access obtained with an introducer in the right internal jugular vein provides direct access to the right ventricle via the superior vena cava and right atrium.
Attach the *still-compressed* sterile sheath to the introducer hub, making sure that the connector of the sheath is firmly attached to the hub of the introducer. Open the hub of the introducer by *turning it counterclockwise to allow passage of the pacing wire*. Inflate then *deflate* the balloon on the pacing wire *before it is introduced* to test it for integrity. There is a valve that keeps the balloon inflated; it must be turned to inflate/deflate the balloon. Use ~1.5 mL of air for the balloon.
An assistant attaches the proximal pacing wire to the nonsterile energy source. Use the *demand mode* and turn on the pacer output to the highest level, rate about 80/min. With the balloon *deflated*, insert the pacing wire into the *still collapsed sheath* and into the hub of the introducer.
Step 4

Slowly advance the wire through the introducer. *Inflate* the balloon when the tip of the pacing wire is in the superior vena cava and continue to advance. Close the valve to keep the balloon inflated.
Watch the EKG and look for capture, demonstrated by a wide QRS pattern after each pacer spike. The RV should be encountered at 15–20 cm as noted by markings on the pacing wire. If no capture is seen by 25 cm, withdraw the wire and try again—this is a blind procedure and luck plays a role. When consistent capture is seen, deflate the balloon and advance the wire 1–2 cm more to seat the wire in the endocardium.
ekg method
expected ekg tracings
Tighten the valve on the sheath introducer to stop subsequent movement of the wire, and *extend the sheath its full length*. Suture the wire in place.

Determine pacing threshold (first sign of capture). Set the output.

Leave the pacer in the demand mode until stability is assured.
post procedure care

- Obtain a CXR
  - Assess for proper placement of the pacing wire and any complications.
- Obtain a 12-lead EKG
  - The electrocardiogram should show captured pacer spikes before every QRS.
  - The QRS should be in a left BBB pattern.
  - Right BBB morphologies suggest coronary sinus pacing or septal perforation.
- Cardiology consultation
- Reassess the pacemaker
post procedure ekg
post procedure cxr
post procedure cxr
complications

- Pacemaker malfunction
  - Absence of stimulus
  - Failure to capture
  - Oversensing (inappropriate inhibition of the pacemaker)
  - Undersensing (inappropriate pacing when there should be inhibition)
- Cardiac perforation
- Arrhythmias
- Thromboembolic complications
- Intrathoracic trauma
- Infectious complications