ER BASICS · ONE-PAGER

Temporary Pacing

Transcutaneous, transvenous and epicardial pacing: settings, thresholds and troubleshooting

15 sources + more detail
erbasics.com/sheets/temporary-pacing.html
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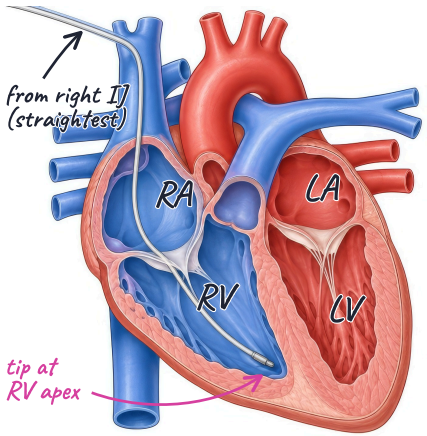
TRANSVENOUS Lead path, position and daily care



1 Modes and settings

Letters: chamber paced, chamber sensed, response to sensing (I inhibit, T trigger, D both, O none).

MODE	WHAT IT DOES	TYPICAL USE
AAI	Paces and senses the atrium	Sinus brady, intact AV conduction; ineffective in AF/flutter
VVI	Paces and senses the ventricle	AV block, slow AF/flutter, no atrial wire
DDD	Paces and senses both chambers	AV block; keeps the atrial kick
VOO / DOO	Fixed rate, no sensing	Emergency or cautery only

EXAM TIP Units: rate in ppm, output in mA, sensitivity in mV. Sensitivity runs backward: a LOWER mV number is MORE sensitive. Undersensing: lower it. Oversensing: raise it.

2 Transvenous and epicardial basics

1. Sensing first, only with an adequate native rhythm (never if pacer-dependent): rate at least 10/min below native, minimal output; raise the mV until sensing stops, lower until it returns.
2. Set sensitivity at half that or less (5 mV threshold: 2.5 mV).
3. Then capture: rate at least 10/min above native; lower the mA until capture is lost, raise until consistent.
4. Set output 2 to 3 times threshold or more (2 mA threshold: 4 to 6 mA).
5. Recheck daily. Thresholds drift, most in the first 48 hours.

- Transvenous: RV lead through a central vein. Risks: perforation and tamponade, pneumothorax, infection, thrombosis, VT, dislodgement.
- RV pacing looks like LBBB; a new RBBB pattern suggests migration or perforation. Hiccups or twitching: check lead position and output.

3 Reading the strip and troubleshooting



Paced rhythm: a wide QRS follows every spike (electrical capture).

PROBLEM	ON THE MONITOR	FIRST FIXES
Failure to capture	Spike, no QRS after it	Raise mA; check connections, wire position, electrolytes
Undersensing	Spikes despite native beats, some on T waves	Lower the mV number
Oversensing	Pauses, no spikes	Raise the mV number; reduce noise; dependent during cautery: asynchronous
Failure to pace	No spikes, rate below set rate	Check power, battery, cables; TCP backup



Failure to capture: some spikes have no QRS.



Undersensing: spikes at the set rate ignore the patient's own beats.

SAFETY Spikes on T waves (undersensing, or VOO/DOO over a native rhythm) can trigger VT or VF: pause the pacer, defibrillate, recheck sensing. Use asynchronous modes only for emergencies or cautery.

4 After cardiac surgery

- Atrial wires usually exit right of the sternum, ventricular wires left. Confirm the labels.
- Asystole or severe bradycardia arrest: DDD 80 to 100/min at maximum output, or the emergency DOO button. Compressions if pacing fails or takes over 1 minute.
- PEA with the pacer running: pause it briefly to unmask VF.
- Keep defibrillator pads away from wires and generator; recheck pacing after shocks.
- Wire removal (often after day 2, at least 24 hours before discharge): hold heparin; check platelets and INR per protocol.
- Afterward: bed rest about 1 hour; watch 24 hours for tamponade (new hypotension, JVD, muffled heart sounds).

SAFETY Wires are a low-resistance path to the heart: tiny leakage currents can cause VF (microshock). Wear gloves, cap exposed ends, keep them dry, use only grounded equipment. The generator is MR unsafe.

5 Transcutaneous pacing (TCP)

For unstable bradycardia (2025 AHA: usually under 50/min; older ACLS and many exams use 60) with hypotension, altered mentation, shock, ischemic chest pain or acute heart failure, after atropine fails; immediately for high-degree AV block without IV/IO access. Not for VF. Paramedics use TCP; transvenous and epicardial care is ICU and critical care transport.

Exam-study doses (2025 AHA). Follow your institution's or agency's protocols.

DRUG	TYPICAL ADULT DOSE
Atropine	1 mg IV every 3 to 5 min, max 3 mg
Dopamine	5 to 20 mcg/kg/min
Epinephrine	2 to 10 mcg/min

1. ECG leads for demand sensing; pads anterior-posterior or anterior-lateral (reversed pads can raise the threshold).
2. Demand mode, rate about 60 to 80/min.
3. Raise the mA until every spike gives a wide QRS and T wave; set just above that (about 10%). Adult thresholds: often 40 to 80 mA.
4. Confirm mechanical capture: a pulse at the paced rate (femoral or right radial/brachial, not carotid). A wide QRS alone is not enough.
5. Analgesia and/or anxiolysis if conscious; do not delay pacing in a crashing patient.
6. No capture: reposition the pads. Check skin; plan transvenous pacing.

EXAM TIP Atropine is unlikely to help wide-QRS (infranodal) block and should not be used after heart transplant (Class III: Harm). Go to pacing.

SAFETY Routine pacing is not recommended in established cardiac arrest (no survival benefit; it may delay CPR). Exception: immediate epicardial pacing in arrest after cardiac surgery.

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