Temporary Pacing

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

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.

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.

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.

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.

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.

Sources (15) are listed with links at icubasics.com/sheets/temporary-pacing.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.