Temporary Pacing: It’s All About Time

Temporary pacing is a short-term treatment for arrhythmia that produces hemodynamic instability and provides delivery of rate support. In this article, Dr. Chihrin, Dr. Gould and Dr. Krahn discuss the indications, delivery, complications and duration of temporary pacing.

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Temporary pacing generally involves short-term delivery of rate support in the context of symptomatic bradycardia utilizing transcutaneous pacing pads or a transvenous pacing lead attached to an external pacing generator. This typically provides a bridge until a permanent solution to the bradycardia can take place, most commonly permanent pacemaker implantation, or alternatively, resolution of a reversible cause (bradycardia causing drugs, inferior MI). Choice of temporary pacing method can vary considerably; important factors in this decision are:
• the time available to initiate pacing,
• the expertise of the operator and
• the expected temporary pacing duration.

What are the indications for temporary pacing?
Temporary pacing should be considered as temporary treatment of an arrhythmia that produces acute hemodynamic instability which would benefit from increased heart rate. In principle, the indications are similar to those for permanent pacing, which include:
• acute management of bradyarrhythmia producing significant hemodynamic instability, including (but not limited to asystole),
• Mobitz Type II atrioventricular (AV) block,
• third degree AV block,
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Temporary pacing should also be considered to increase heart rate in bradycardia-dependent tachycardia that is unresponsive to other therapies and rarely, for overdrive suppression of tachyarrhythmias. The latter are uncommon clinically, but represent an indication where pacing may play a dramatic role. In each case, it is important to weigh the possibility of life-threatening arrhythmias and the risk of complications encountered during temporary wire placement. For example, a patient with stable hemodynamics and a regular narrow complex ventricular escape rhythm > 40 bpm, in the context of complete AV block, may be monitored closely with transcutaneous pacing pads in place, while a patient with significant asystolic periods and unstable, broad complex escape, leading to syncope not responsive to medical intervention, will derive benefit from relatively urgent temporary pacing.

**How can temporary pacing be delivered?**

Temporary pacing is provided via transvenous, transcutaneous, or epicardial means. Transcutaneous pacing can be performed as immediate treatment for asystole but typically requires substantial energy to capture the heart, causing considerable discomfort to most patients. Epicardial wires can be placed during cardiac surgery to provide backup pacing in the event of perioperative sinus or AV node injury. However, most commonly temporary pacing is provided with a single lead transvenous pacemaker. Placement of a balloon-tipped lead can be performed on a stretcher without fluoroscopy similar to a Swan-Ganz catheter and is aided considerably by vascular flow directing placement. Placement of a temporary pacing wire with fluoroscopy is easier and safer secondary to direct visualization of the lead, making it

**FAQ**

**How should temporary pacing be initiated in a patient with a permanent pacemaker or lead failure?**

A temporary wire can still be placed. The case for a right internal jugular approach is at its strongest in this scenario, as to ensure that a subclavian approach is protected for permanent device placement at the time of repair should the initial device, most commonly placed via the left subclavian vein, be compromised.

**FAQ**

**Does temporary pacing lead to pacemaker dependence?**

It is possible, as pacing has been shown to promote pacemaker dependence in some patients, making proper lead placement and appropriate monitoring critical.

**About the authors...**

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Temporary Pacing

Recognizing symptomatic third degree atrioventricular block in the context of a recent MI, you arrange for transfer to the hospital where Carl will receive temporary pacing until the AV block resolves or a permanent pacemaker is implanted.

What level of monitoring is required during temporary pacing?

Traditional temporary pacing, using standard temporary wires, has been shown to lose capture more frequently when compared to the exceedingly low risk with permanent pacemakers. Telemetry should be maintained for the duration of temporary pacing. Daily portable chest x-rays can be helpful to assess lead position and anticipate incipient dislodgement.

The right internal jugular is favourable as it is associated with decreased complications and spares subclavian access for future permanent pacemaker placement. The femoral vein is preferable if time permits. Without imaging, a hard-tipped lead can be advanced “blindly”—that is, advanced with the pacing generator activated; observation of ventricular capture and left bundle branch pattern following each pacing spike will confirm placement in the right ventricle (RV). A more careful, but time consuming, approach utilizes the pacing wire as an ECG lead for observation of changes in ECG pattern during advancement. While any site within the RV will provide adequate temporary pacing, RV apical placement affords the greatest stability.

Newer temporary pacing wires contain actively-fixating helices, which can be affixed to the endocardium to help maintain positioning, but require more operator expertise.

Access sites for transvenous pacing include:
- the internal jugular,
- subclavian,
- femoral and rarely,
- the brachial veins.

FAQ
generally undesirable secondary to increased incidence of deep vein thrombosis and infection.

**What complications are common?**

Complications of temporary pacing have been reported to be as high as 35% in a study of British community hospitals,¹ but typically occur in 2% to 10% of patients. Complications include:

- local injury at the venous access site,
- pneumothorax during subclavian approach,
- hemorrhage,
- cardiac perforation and pericardial tamponade,
- arrhythmia induction including ventricular tachycardia and ventricular fibrillation,
- post-procedural lead displacement resulting in loss of pacing and
- infection.

Complication frequency has been inversely associated with physician expertise. As such, a minimum of 10 temporary wires should be performed under guidance for physicians acquiring this skill.²

**How long can a patient be paced with a temporary wire?**

Most studies have shown a relatively low rate of infection within one week of traditional transvenous temporary pacing. Infection can be reduced by avoiding femoral access and maintaining high standards of IV access care.

Recently, temporary permanent pacing has been offered at some centers, utilizing active-fixation leads and externally placed, reusable permanent pacemakers, affixed to the skin with a sterile occlusive dressing (Figure 1). If permanent pacing is required, the system is removed, the device sterilized for future external use, the lead is discarded and a new permanent pacing system is implanted at a separate site. Utilized in scenarios where extended temporary pacing is expected but permanent pacing is not, this approach improves the reliability of temporary pacing, decreases monitoring cost and provides for increased patient comfort and mobility.³ 💚

**Take-home message**

- Temporary pacing should be provided when bradycardia is hemodynamically significant and refractory to other interventions
- The right internal jugular approach is associated with lower complications and protects subclavian access for future permanent device placement
- Balloon-guided pacing wires are useful in situations where fluoroscopy is unavailable or introduces too much delay. However, their efficacy is compromised in states of low blood flow
- Temporary pacing requires close monitoring including telemetry to avoid dislodgement. The duration of temporary pacing using a transvenous approach should be minimized, since complications increase with time

**References**