



POINT OF VIEW

Temporary internal pacing^{☆,☆☆}



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Implementation

Abstract Technology and insertion techniques for cardiac temporary internal pacing have experienced a remarkable development over the last few years. Despite this fact, the procedure continues to have potentially fatal associated complications. Temporary internal pacing is indicated for the treatment of bradyarrhythmias or tachyarrhythmias refractory to conventional treatment, or arrhythmias causing cardiovascular or clinical instability of the patient. On the other hand, the indications of temporary cardiac pacing are far less well defined than those of permanent pacing. Since the decision of implementing temporary pacing is complex and delicate, it should always be carefully considered, and over-indication should be avoided. We must base these decisions on robust knowledge of the arrhythmias that may benefit from temporary internal pacing, and should also acquire the habit of considering external temporary pacing among other less aggressive treatments, and to make the best use of new technologies such as echocardiography that add accuracy to the procedure.

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PALABRAS CLAVE

Marcapasos transvenoso;
Bloqueo auriculoventricular;
Bradiarritmias;
Taquiarritmias;
Sobreestimulación cardiaca;
Implantación

Marcapasos transitorios intravenosos

Resumen La estimulación transitoria intravenosa ha experimentado en los últimos años grandes avances tanto a nivel de la técnica de implantación como a nivel tecnológico, a pesar de lo cual es una técnica que puede llegar a presentar graves complicaciones. Habitualmente, se implantan marcapasos provisionales por bradiarritmias o taquiarritmias refractarias a tratamientos conservadores, o cuando se produce inestabilidad hemodinámica o clínica del paciente. Si sumamos que las indicaciones son mucho menos claras que las de la estimulación cardiaca definitiva, comprobamos que la decisión de implantar un marcapasos provisional intravenoso es siempre complicada y arriesgada, por lo que debemos evitar una sobreutilización de este tipo de estimulación. Para enfrentarnos con mayor garantía a esta situación, debemos valernos de un mejor conocimiento de las arritmias que nos hacen plantearnos el implante,

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valorar alternativas menos agresivas, como el marcapasos transcutáneo, y valernos de las nuevas tecnologías, como la ecografía, que facilitarán el desarrollo de esta técnica.

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Introduction

Since Zoll¹ first applied two electrodes connected to a generator to the thorax via the hypodermic route in 1952, temporary cardiac pacing has experienced great advances in terms of both technology and the techniques employed. This has resulted in a notorious increase in the use of temporary internal (transvenous) pacemakers (TVPs) in recent years. Indeed, excessive use is sometimes made of these devices, and the indications may be rather questionable.

Although the learning curve is not too demanding, the technique is not without complications—many of which can be serious.²

Internal pacing seeks to achieve clinical and hemodynamic stabilization in patients who present acute electrical instability due to bradyarrhythmias or tachyarrhythmias. However, the indications of TVP are far less clear than those of permanent cardiac pacing, since they are based on clinical experience rather than on scientific evidence.³⁻⁵

In general, TVP is indicated in bradyarrhythmias with hemodynamic alterations that do not respond to conservative management (positive chronotropic drugs, treatment of the underlying cause, etc.) or in situations where permanent pacemaker (PPM) implantation is not indicated at the time or is not possible, or where the risk of PPM implantation outweighs its benefits. In any case, the cause triggering the arrhythmia always should be treated if possible.

The decision to implant a TVP is sometimes difficult. Caution should accompany the decision, since implantation in situations of paroxysmal atrioventricular block (AVB) can cause the latter to become dependent upon the pacemaker – with the consequent risk of cardiac arrest in the event of accidental electrode displacement.

Likewise, in the case of tachyarrhythmias, and once the etiological and drug treatment options have been exhausted, we can resort to cardiac overdrive or overstimulation in an attempt to revert the situation, as in patients with *torsades de pointes* or polymorphic ventricular tachycardias associated to prolongation of the QT interval.^{6,7}

As a general rule, patients will require TVP if they suffer syncope, cardiac arrest or hemodynamic instability secondary to bradycardia/tachycardia, once the conservative measures have failed or are difficult to apply in a rapid and effective manner.

The big problem is defining hemodynamic instability. What do we mean by “instability”? Hypotension? The need for vasoactive drugs? And if so, at what doses? Do we take the shock index to be a subjective piece of information? Oliguria? Hypoperfusion? Diminished consciousness? Can we really improve the hemodynamic condition of a patient suffering from bradycardia with the implantation of a single-chamber PPM in VVI pacing mode, knowing that this may lead to a loss of atrioventricular synchronization with a consequent drop in cardiac output?⁸ It is not always easy to make a decision.

The present study aims to analyze the indications and complications of TVP implantation, following a review of the series found in the literature—an arduous task considering the diversity of published results.

In addition to TVP, there are other temporary pacing options, e.g., transcutaneous, epicardial or transesophageal pacing modes, each with different advantages and inconveniences—though such systems will not be addressed here.⁹⁻¹¹

Indications

The indications of TVP are classified according to the urgency of the situation. However, they lack clear supporting evidence, except in the case of syncope, cardiac arrest or hemodynamic instability secondary to bradycardia or tachycardia.

It is common for this kind of situation to manifest in acute myocardial infarction (AMI). In the event of AVB in the context of inferior AMI, we usually observe a suprahisian escape rhythm, associated to a good prognosis and favorable response to positive chronotropic drugs. Both the sinus node (SN) and the atrioventricular node (AVN) are irrigated by the circumflex artery or the right coronary artery; as a result, conduction alterations in the context of inferior AMI are transient and rarely progress. Other mechanisms are the activation of chemoreceptors in the posterior wall of the left ventricle, the release of adenosine, and an increased effect of the parasympathetic tone. In contrast, in anterior AMI, the appearance of blocking phenomena is indicative of a poor prognosis due to the degree of block, which in this case is associated to ventricular escape rhythms with bundle block morphology, since the His-Purkinje system is usually irrigated by the anterior descending artery or some of its branches. Such situations progress towards complete block in an unpredictable and abrupt manner. Furthermore, the great extent of myocardium affected by ischemia in these cases (interventricular septum and anterior wall) results in important ventricular dysfunction and a poor short-term prognosis.¹² Such conditions were relatively common in the pre-percutaneous angioplasty era. At present, however, and thanks to early coronary revascularization, any such phenomena that may arise are quickly resolved once coronary flow has been restored.¹³

Outside the context of AMI, in the case of symptomatic bradycardia, TVP is indicated conditioned to the clinical and hemodynamic tolerance of the patient, and depending on the stability of the ventricular escape rhythm, when the heart rate drops to under 40 bpm and the rest of conservative measures (such as transcutaneous pacing) have failed.

Therefore, management without TVP should be attempted in patients with high degree block, sick sinus syndrome, etc., in the absence of excessive symptoms, reducing possible complications and leaving the venous accesses free for posterior PPM implantation.¹⁴ The indication of TVP

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