

Cardiac Pacemakers



Eleanor Paglia, MD, Jill Carter, MPA, PA-C

KEYWORDS

- Cardiac Pacemaker • Pacemaker indications • Pacemaker Complications
- Pacing Modes • Pacemaker Interrogation

HOSPITAL MEDICINE CLINICS CHECKLIST

1. Pacemaker insertion in the setting of sinus node dysfunction requires both symptoms and irreversibility.
2. First-degree atrioventricular block and type I second-degree atrioventricular block do not typically progress to advanced block, and therefore do not require a pacemaker.
3. Type II second-degree and third-degree atrioventricular block pose a significant risk of complications and therefore permanent pacemaker is indicated irrespective of symptoms.
4. Chest radiography is helpful in confirming type of pacemaker, placement of leads and presence of ICD shock coils, as well as device and manufacturer identification.
5. The North American Society of Pacing and Electrophysiology (NASPE) and the British Pacing and Electrophysiology Group (BPEG) published the NBG pacemaker code, last revised in 2002. It describes the 5-letter code for operation of implantable pacemakers and is the common language used to communicate device pacing modes. There are 5 positions, although position V is rarely used.
6. Atrial pacing, when possible, is preferred given that it avoids the complications associated with long term right ventricular pacing (heart failure death and atrial fibrillation).
7. Managed Ventricular Pacing and Mode Switching are pacing programs that minimize dependency on right ventricular pacing.
8. Cardiac resynchronization therapy (CRT), also referred to as biventricular pacing, is used in systolic heart failure to improve ventricular synchrony, resulting in improved outcomes.

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Internal Medicine, Newton-Wellesley Hospital, 2014 Washington Street, Newton, MA 02462, USA

E-mail address: epaglia@partners.org

Hosp Med Clin 6 (2017) 374–396

<http://dx.doi.org/10.1016/j.ehmc.2017.04.007>

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9. Implantable cardioverter defibrillators (ICDs) are devices used for treatment of tachyarrhythmias. ICDs are equipped with both demand pacing functionality as well as the ability to deliver high-voltage shock. They might also be programmed to provide specialized therapeutic intervention such as anti-tachycardia pacing (ATP).
10. A pacemaker magnet moves a programmable switch in the pacemaker which will change the pacemaker mode, commonly DOO at a predetermined high rate. Magnets will also turn off ICD therapy so that it will not be able to deliver a shock.

When should pacemaker implantation be considered?

In a community hospital, it is important to have a basic understanding of the indications for implantation of a permanent pacemaker. The most recent guidelines were published in 2012 as an update to the 2008 American College of Cardiology

		SIZE OF TREATMENT EFFECT			
		CLASS I Benefit >>> Risk Procedure/Treatment SHOULD be performed/ administered	CLASS IIa Benefit >> Risk Additional studies with focused objectives needed IT IS REASONABLE to per- form procedure/administer treatment	CLASS IIb Benefit ≥ Risk Additional studies with broad objectives needed; additional registry data would be helpful Procedure/Treatment MAY BE CONSIDERED	CLASS III No Benefit or CLASS III Harm Procedure/ Test Treatment COR III: No Benefit Not Helpful No Proven COR III: Harm Excess Cost w/o Benefit Harmful to Patients or Harmful
ESTIMATE OF CERTAINTY (PRECISION) OF TREATMENT EFFECT	LEVEL A Multiple populations evaluated* Data derived from multiple randomized clinical trials or meta-analyses	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Sufficient evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Some conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Greater conflicting evidence from multiple randomized trials or meta-analyses 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Sufficient evidence from multiple randomized trials or meta-analyses
	LEVEL B Limited populations evaluated* Data derived from a single randomized trial or nonrandomized studies	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Evidence from single randomized trial or nonrandomized studies 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Some conflicting evidence from single randomized trial or nonrandomized studies 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Greater conflicting evidence from single randomized trial or nonrandomized studies 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Evidence from single randomized trial or nonrandomized studies
	LEVEL C Very limited populations evaluated* Only consensus opinion of experts, case studies, or standard of care	<ul style="list-style-type: none"> Recommendation that procedure or treatment is useful/effective Only expert opinion, case studies, or standard of care 	<ul style="list-style-type: none"> Recommendation in favor of treatment or procedure being useful/effective Only diverging expert opinion, case studies, or standard of care 	<ul style="list-style-type: none"> Recommendation's usefulness/efficacy less well established Only diverging expert opinion, case studies, or standard of care 	<ul style="list-style-type: none"> Recommendation that procedure or treatment is not useful/effective and may be harmful Only expert opinion, case studies, or standard of care
	Suggested phrases for writing recommendations	should be recommended is indicated is useful/effective/beneficial	is reasonable can be useful/effective/beneficial is probably recommended or indicated	may/might be considered may/might be reasonable usefulness/efficacy is unknown/unclear/uncertain or not well established	COR III: No Benefit is not recommended is not indicated should not be performed/ administered/ other is not useful/ beneficial/ effective COR III: Harm potentially harmful causes harm associated with excess morbidity/mortality should not be performed/ administered/ other
Comparative effectiveness phrases ¹		treatment/strategy A is recommended/indicated in preference to treatment B treatment A should be chosen over treatment B	treatment/strategy A is probably recommended/indicated in preference to treatment B it is reasonable to choose treatment A over treatment B		

Fig. 1. Applying classification of recommendations and level of evidence. (From Epstein AE, DiMarco JP, Ellenbogen KA, et al. 2012 ACCF/AHA/HRS focused update incorporated into the ACCF/AHA/HRS 2008 guidelines for device-based therapy of cardiac rhythm abnormalities: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol 2013;61(3):e6–75; with permission.)

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