

27. Permanent Pacers

Basically Three Types of Clinically Pacemakers

1. **"VVI" SINGLE LEAD**
 - a. Ventricular pacing and sensing; inhibited when ventricle fires on its own
 - b. Useful for patients with chronic atrial fibrillation
2. **"DDD" TWO LEADS**
 - a. Excellent for providing atrial kick; can adjust PR interval to allow filling
 - b. Generally should be used in most patients without atrial fibrillation
3. **"Bi-V" THREE LEADS**

Beside pacing right, the left ventricle is paced in left lateral wall by coronary sinus (vein)
CRT-Cardiac resynchronization therapy

Pacemaker types are designated by 3 or 4 letters

- a. First letter - Pacing (which or both ventricles), eg. A, V, or D (dual)
 - b. Second letter - Sensing (A, V, D)
 - c. Third letter - Mode (whether pacer is inhibited (I) or activated (T) or both (D) after sensing)
 - d. Fourth letter -Rate responsive (R) or other option
- Mode switching: DDD pacer switches to VVI when atrial fibrillation is noted
- Hysteresis - waiting period: pacer begins at heart rate < Z, but paces at rate > Z

Holding magnet over pacemaker, pacer becomes VOO or DOO-pacing only

Pacemaker Implantation Guidelines: (Gregoratos, et al, JACC 2002; 40:1703-19)

1. Sinus Node Dysfunction
 - Class I Symptomatic bradycardia, sinus pauses even if due to essential drug therapy
 - Class IIb Minimally symptomatic patients, rates <30 bpm while awake
Tachy-Brady Syndrome
 - Class III Asymptomatic, or symptomatic bradycardia due to nonessential drug
2. Acquired Atrioventricular Block
 - Class I --Asystole 3.0 sec or any escape rate <40 bpm in awake symptom-free, or
After catheter ablation, Postoperative AV block not expected to resolve
 - Class IIa Asymptomatic 3^o AV block average awake ventricular rates > 40 bpm
 - Class III AV block expected to resolve (drug toxicity, Lyme disease)
3. Chronic Bifascicular and Trifascicular Block
 - Class I - Intermittent third-degree AV block & Type II 2^o AV block.
 - 2^o AV block regardless of type with associated symptomatic
 - Alternating Bundle Branch Blocks (may progress to 3^o AVB)
 - Class IIa Syncope probably due to AV block
 - Class III Fascicular block without AV block or symptoms
4. After the Acute Myocardial Infarction
 - Class I-- Mostly as above
Persistent 1^o AV Block with associated BBB (not present before MI)
 - Class III- Transient AV block in the absence of intraventricular conduction defects.
5. Bi-V Indications
 - Biventricular Pacing both ventricles via RV apex and LV from the coronary sinus venous system
 - Indication NYHA Class III. Asynchrony index (Ts-SD) >31.4 ms predict a favorable response after CRT