Dual-Chamber Pacing or Ventricular Backup Pacing in Patients With an Implantable Defibrillator. The Dual Chamber and VVI Implantable Defibrillator (DAVID) Trial

The DAVID Trial Investigators JAMA 2002;288:3115–23.

Study Question: Does dual-chamber, rate-responsive (DDDR) pacing have any benefits in patients without a bradycardia indication for pacing who receive an implantable defibrillator (ICD)?
Methods: A dual-chamber pacemaker/ICD was implanted in 506 patients who had a standard indication for ICD implantation, an ejection fraction (EF) ≤0.40 and no indication for antibradycardia pacing. Post-implantation, patients were randomly assigned to ventricular pacing at a rate of 40/min (VVI-40, 256 patients) or DDDR pacing with a lower rate of 70/min (DDDR-70, 250 patients). Pharmacologic therapy for left ventricular dysfunction was prescribed for all patients. The end point of the study was a composite of death and first hospitalization for heart failure (HF). The median follow-up was 8.4 months.
Results: The mean age of the patients was 65 years, and their mean EF was 0.27. Coronary artery disease was present in 84%, and 57% had a history of HF. The relative hazard for the study end point was 1.6 in the DDDR-70 group. The 1-year survival free of death or hospitalization for HF was 84% in the VVI-40 group, compared to 73% in the DDDR-70 group.
Conclusions: In patients with a low EF who require an ICD, compared to ventricular backup pacing, dual-chamber pacing increases the risk of death and hospitalization for HF.
Perspective: MADIT-II also reported that dual-chamber pacemaker/ICDs were associated with an increase in hospitalizations for HF. The likely mechanism for aggravation of HF by right ventricular pacing is ventricular desynchronization. Therefore, ICDs should be programmed such that ventricular pacing is minimized. If pacing is necessary in a patient with HF, biventricular pacing should be considered. FM

Safety and Efficacy of Advanced Atrial Pacing Therapies for Atrial Tachyarrhythmias in Patients With a New Implantable Dual Chamber Cardioverter-Defibrillator

Gillis AM, Unterberg-Buchwald C, Schmidinger H. J Am Coll Cardiol 2002;40:1653–9.

Study Question: How efficacious are device-based pacing therapies in terminating atrial tachycardia (AT) and atrial fibrillation (AF)?
Methods: A dual-chamber implantable cardioverter-defibrillator (ICD) designed to deliver therapies for AT/AF in addition to ventricular tachycardia/ventricular fibrillation was implanted in 151 patients. Their mean age was 62 years, and 52% had a prior history of AT/AF. Atrial therapies consisted of ramp, burst, plus two extrastimuli (burst+) and 50-Hz pacing. The ICD stored information on 25 treated episodes of AT/AF. The ICDs were interrogated 1 and 3 months post-implant.
Results: AT/AF was detected in 28% of patients. Atrial therapies terminated 32% of AT episodes, compared to 15% of AF episodes. Most successful AT/AF terminations were a result of ramp or burst+ pacing, and the overall efficacy of 50-Hz pacing was only 12%. Pacing efficacy for AT was related to atrial cycle length (CL), with efficacy improving by 59% for every 50 ms increase in CL. There were no complications related to device therapies.
Conclusion: Device-based pacing therapies for terminating atrial arrhythmias are safe but have only modest efficacy for AT and low efficacy for AF.
Perspective: Because the efficacy of anti-tachycardia pacing (ATP) is related to the AT CL, antiarrhythmic drug therapy may improve the response to ATP by slowing the CL. In addition, drug therapy may organize AF into a rhythm that is more amenable to ATP. Therefore, it is possible that antiarrhythmic drugs, which often are used in conjunction with ICDs to prevent frequent discharges, may improve the efficacy of atrial pacing therapies. FM

Reproducibility of Sequential Head-Up Tilt Testing in Patients With Recent Syncope, Normal ECG and No Structural Heart Disease

Sagrista-Sauleda J, Romero B, Permanyer-Miralda A, et al. Eur Heart J 2002;23:1706–13.

Study Question: How reproducible are the results of 2–3 head-up tilt (HUT) tests performed at defined intervals?
Methods: HUT was performed in 127 patients (mean age 43 years) with syncope and no structural heart disease. Patients with a positive HUT test were randomly assigned to undergo second and third tests at 1-week intervals (n=37) or a second test 2 weeks after the first test (n=45). Patients with a negative HUT test were randomly assigned to undergo a second test 1 week (n=21) or 2 weeks (n=24) after the first test.
Results: The reproducibility of a positive response was 81% when tested at 1 week, and dropped to 53% when tested at 2 weeks. When there were two positive tests, a third test also was positive in only 53% of patients. The reproducibility of a cardioinhibitory response (rate <40/minute, or asystole >3 seconds) was 50% during a second HUT test and 10% during a third test. The reproducibility of a negative response was 80% and was not affected by the interval between tests.
Conclusions: The reproducibility of a positive response to HUT decreases as the interval between tests increases. When HUT is performed on three occasions, the reproducibility of a positive response is only approximately 50%,