TRINITY COLLEGE FOR WOMEN
NAMAKKAL
Department of Physics

- Solid state physics
- 19UPHE01-ODD Semester
- Presented by
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PACEMAKERS

OUTLINE

- Basic Functions and Types
- Associated Morbidity
- Specific Indications for use
- Follow up

PULSE GENERATOR

PURPOSE

- Bradycardia
- Block

PACEMAKER CODES

1 Chambers Paced	2 Chambers Sensed	3 Response to Sensed Stimulus	4 Rate Modulation?	5 Multisite Pacing (ICD)
O (none)	O	O	O (non-rate responsive)	O
A (atrium)	A	T (triggered)	R (rate responsive)	A
V (ventricle)	V	I (inhibited)		V
D (both atrium& ventricle)				D

Paced Rhythm

- Stimulated P wave nearly normal in appearance

PACED RHYTHM

- Wide complex QRS
  1. Does not use the normal conduction system
  2. Depolarizes ventricles from right to left and from apex to base.
  3. Resembles complete LBBB

PACED RHYTHM

- Broad T wave and may include sharp inversions that mimic ischemia

TYPICAL ECG PRODUCED BY PACEMAKER

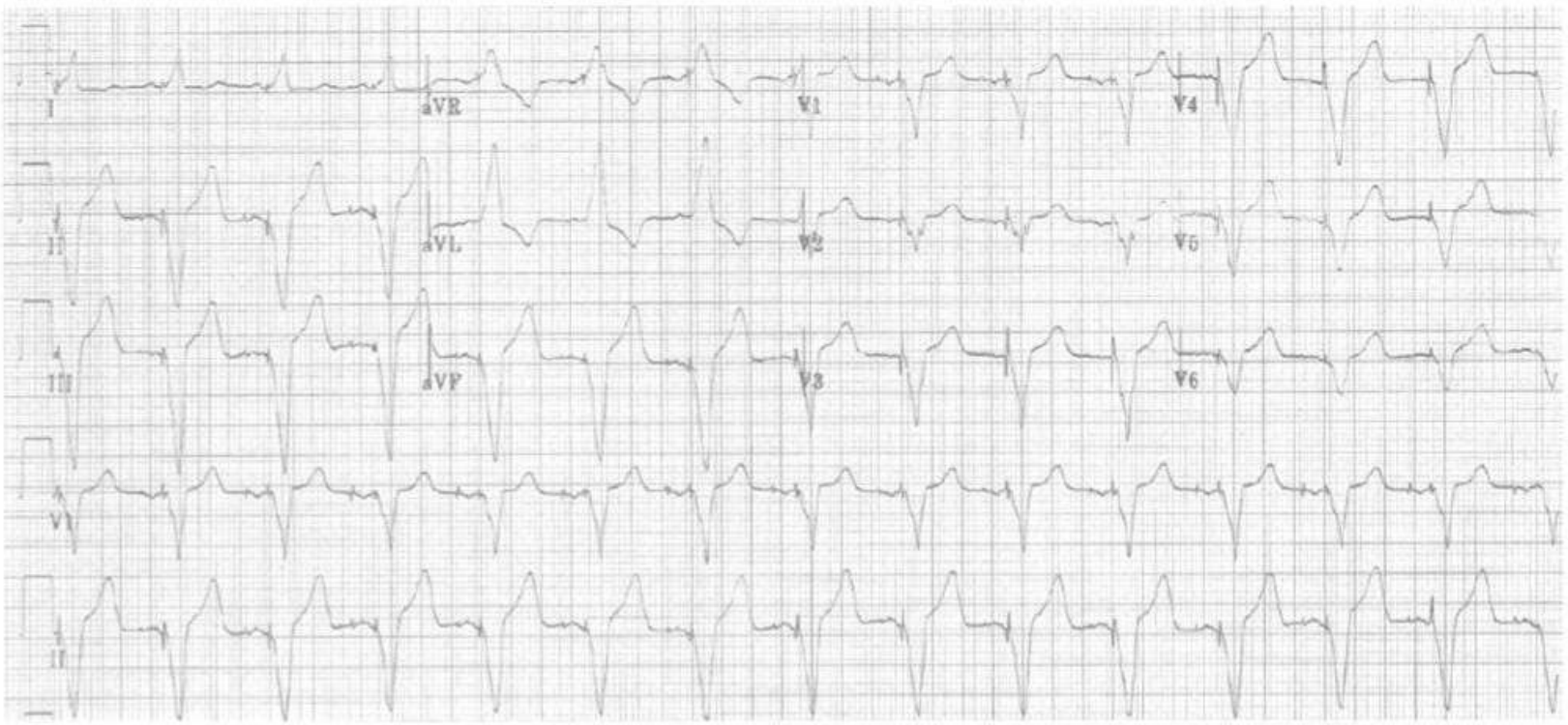

FIGURE 3. Typical ECG produced by complete DDD pacing.

TYPICAL ECG PRODUCED BY PACEMAKER

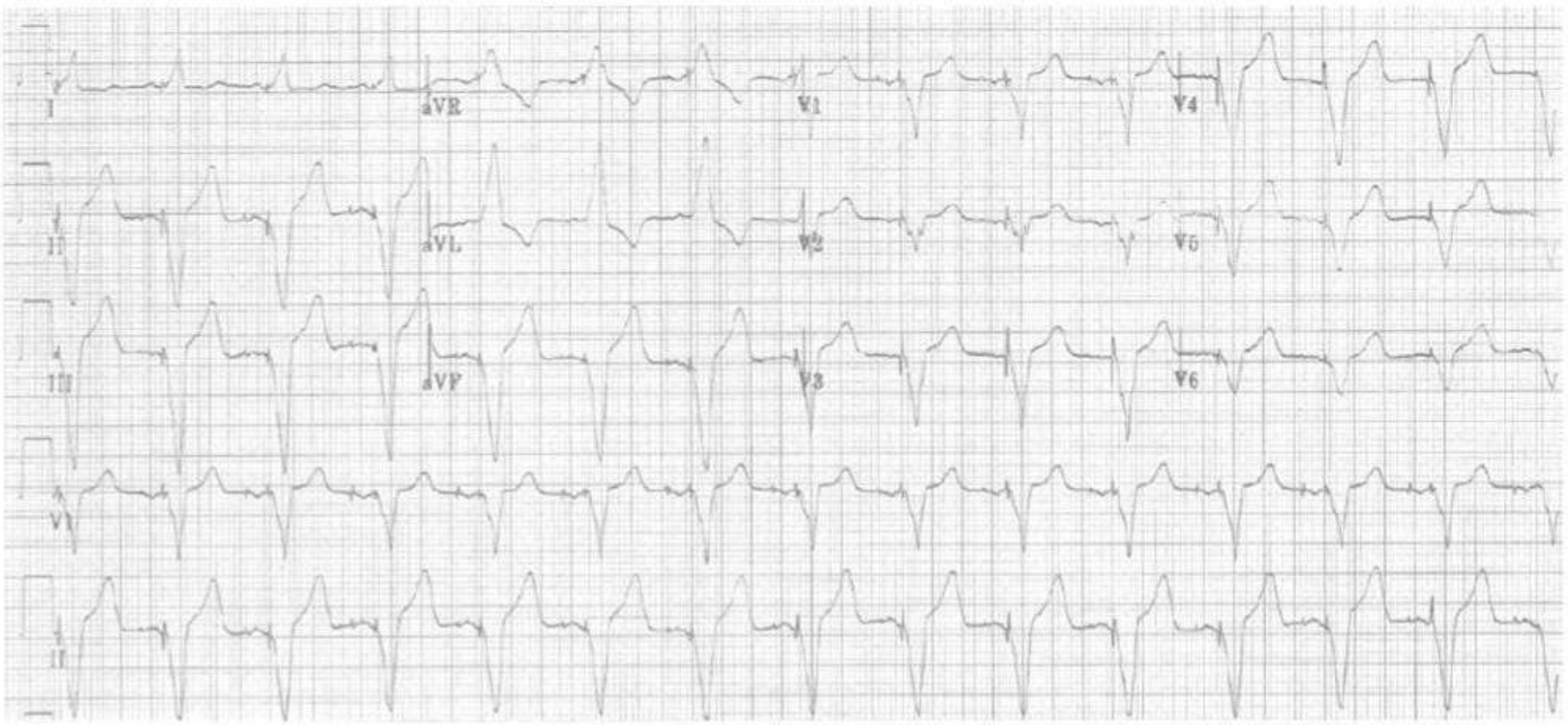

FIGURE 3. Typical ECG produced by complete DDD pacing.

LANDMARK TRIALS IN CARDIAC PACING FOR SINUS NODE DISEASE

Reference	No. of patients	Age (y), mean ± SD or median (IQR)	Indication (%)		Pacing mode	Follow-up (mo)	Primary end point	Mortality	Importance and main findings
			SND	AVB					
MOST[11]	2010	74 (67-80)	100	21	VVIR, DDDR	33	Death or stroke	HR, 0.97; 95% CI, 0.80-1.18	DDD pacing results in improvement in QOL, CHF, and AF in SSS compared with VP
PASE[12]	407	76±7 (65-96)	43	49	DDDR, VVIR	18	QOL	16% vs 17%; P=.95	Dual-chamber pacing improved QOL (P=.045). No mortality difference between pacing modes. Decreased AF with AP in SSS
SAVE-PACe[33]	1065	72±12	100	21[b]	DDD; forced VP vs minimized VP	20	Time to persistent AF	5.4% vs 4.9%; P=.54	Avoidance of unnecessary VP reduces AF in SSS
Danish trial[41]	225	76±8	100	0	AAI, VVI	40	Mortality, AF, CHF, embolism	19% vs 22%; P=.74	First prospective, randomized trial to suggest advantage of AP over VP. Decreased AF and CHF with AP
CTOPP[42]	2568	73±10	41	51	VVIR, DDDR, AAIR	36	Death or stroke	HR, 0.91; 95% CI, 0.82-1.17	No difference in mortality, CHF, or stroke. Less AF with physiologic pacing
UKPACE[44]	2021	80±6	NR	100	VVI, VVIR, DDDR	56	Death	HR, 1.04; 95% CI, 0.89-1.17	No difference between AP and VP pacing in the incidence of CHF, AF, stroke, or death in AVB

[a] AAI = atrial inhibitory; AAIR = atrial inhibitory with rate modulation; AF = atrial fibrillation; AP = atrial pacing; AVB = atrioventricular block; CHF = chronic heart failure; CI = confidence interval; CTOPP = Canadian Trial of Physiologic Pacing; DDD = dual-chamber pacing and sensing with inhibition and atrial tracking; DDDR = DDD with rate modulation; HR = hazard ratio; IQR = interquartile range; MOST = Mode Selection Trial in Sinus-Node Dysfunction; PASE = Pacemaker Selection in the Elderly; QOL = quality of life; SAVE-PACe = Search AV Extension and Managed Ventricular Pacing for Promoting Atrioventricular Conduction; SND = sinus node disease; SSS = sick sinus syndrome; UKPACE = United Kingdom Pacing and Cardiovascular Events; VP = ventricular pacing; VVI = ventricular inhibitory; VVIR = VVI pacing and rate modulation.

[b] First-degree AVB only.

LANDMARK TRIALS IN PACING FOR NEUROCARDIOGENIC SYNCOPE

Reference	No. of patients	Trial design	Entry criteria	Results
VASIS[50]	42	Unblinded RCT	Recurrent syncope and cardioinhibitory response during tilt-table testing	80% risk reduction with pacemaker therapy (DDI with rate hysteresis)
SYDIT[51]	93	Unblinded RCT	Recurrent syncope and cardioinhibitory response during tilt-table testing	87% risk reduction with pacing (vs atenolol)
VPS[52]	54	Unblinded RCT	Recurrent syncope and cardioinhibitory response during tilt-table testing	85% risk reduction with pacemaker therapy (rate decrease)
VPS II[53]	100	Double-blind RCT	Recurrent syncope and cardioinhibitory response during tilt-table testing	No significant difference between DDD mode and ODO mode

[a] DDD = dual-chamber pacing and sensing with inhibition and atrial tracking; DDI = dual-chamber pacing without atrial synchronous ventricular pacing; ODO = sensing only; RCT = randomized controlled trial; SYDIT = Syncope Diagnosis and Treatment Study; VASIS = Vasovagal Syncope International Study; VPS = North American Vasovagal Pacemaker Study.

THANK YOU