Basics of Pacemaker Timing
Cycles and Diagnostics: Uses and Interpretations

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VVI Pacing

Lower rate interval

(Postventricular Ventricular) Blanking Period

(Postventricular Ventricular) Refractory Period
VVI Pacing with Hysteresis

Hysteresis extension
Lower rate interval
AAI Pacing

(Postatrial Atrial) Blanking Period
(Postatrial Atrial) Refractory Period

Lower rate interval
Oversensing of the QRS complex in the atrium
(ventricular farfield oversensing)
AAI-Stimulation

Lower rate interval

→ Undersensing of atrial fibrillation (true undersensing)
Timing Cycles and Diagnostics

AAI-Stimulation

"Blanked" Signal (Functional Undersensing)  Refractory Sensed Signal
DDD Pacing

AV sequential pacing (inhibited)

AV synchronous pacing (triggered)

AV interval paced
- can be completely blanked
- can be only partially blanked

AV interval sensed
DDD Pacing

AV interval only partially blanked

AV interval sensed
DDD Pacing

Postventricular atrial blanking (PVAB, black)

Postsystolic atrial refractory period (PVARP, white)
DDD Wenckebach
Upper Rate Behaviour
Wenckebach Upper Rate Behaviour
Timing Cycles and Diagnostics

Automatic Mode Switching

→ fast and irregular tracking of AT
Endless-Loop-Tachycardia (ELT)
No Endless-Loop-Tachycardia (ELT)
DDI Pacing

DDIR, LRL 60/min

25 mm/s
VDD Pacing
VDD Pacing with ELT
Endless-Loop-Tachycardia: Termination

After x cycles of VP-AS: automatic PVARP extension
→ P wave no longer tracked, ELT stops
Noise Reaction
Noise Reaction
Atrial flutter with 2:1 undersensing (every 2nd flutter wave in PVAB) and 2:1 conduction by pacemaker
Safety Window Pacing
Safety Window Pacing

50 mm/s
Safety Window Pacing (SP)

False positive intervention due to a PVC

Appropriate intervention of SP due to cross-talk