Pro Arrhythmic Atrial Pacing. How Poor Search AV Delay Programming Can Trigger Atrial Flutter

Terry Dillon Bart’s Heart Centre
Case Study

- 73 M
- OOHVF 2011
- Boston Scientific Teligen DDDR implanted
- Feb 2017 – Routine ICD Clinic F/U
- Normal measurements
On Interrogation

• AMS x 6 – previous 3 months
• AT x 3 – spontaneous initiation
  longest 10 secs
• AT x 3 – atrial paced initiation
  longest approx 3 days
• Similar previous long episodes
• Anticoagulated - warfarin
Programmed Settings

- Rate 60 – 130 ppm
- AV delays:
  - Sensed 95- 170 ms
  - Paced 110 – 200 ms
- AV Search delay switched on
Further Info

- ULR – sinus bradycardia PR interval 360 ms
- A Pacing - 59 %
- V pacing – 56 % (increased from 33 %)
- Long PR – Increased prior bisoprolol dosage?
Short VP1 to AP2

A Paced 1

A Paced 2 -? Fusion

V Paced 1

AV 400 ms

V Paced 2

Shock
A Tachycardia Onset

- Why short A pace 1 - A Pace 2 interval?
- Long AV delay AP 2 – VP 2
- AP2 – AT trigger or Incidental Fusion
- EGMs show identical recurrences
Search AV Delay

- AV search - extends AVD 400ms
- 32 ventricular cycles – followed by 8 AV search cycles
- Intrinsic AV conduction occurs – AV search maintained
- No intrinsic conduction – AVD normalises
Rate Response

- Rate response – V to V timing
- Atrial pacing – fits to V-V interval
- Shortened VP to AP interval – accommodates AV delay duration
Algorithmic Interaction

- Rate increase from accelerometer
- Short V-V interval
- Long extended AV delay
- Short paced A-A – short V-A
Action

Search AV delay switched off!
Remote F/U July 2017

- AHR events significantly reduced
- Longest episode < 4 mins – no EGM
- All others max 10 secs
- Histos – AHR 30% reduced to 0%
- Susceptible - AT (A Flutter)?.
- Extensive AVD duration – likely accentuates condition.
Analysis and Conclusion

• AV search - use with care
• Consider PR duration
• Identify Wenckebach cycle length
• Premature A pacing – functional ectopic
• Long AVD / PR interval – diastolic disruption.
Thank you!