Is post-mortem evaluation of cardiac rhythm management devices useful?

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Introduction

The number of pacemakers and implantable cardioverter defibrillators (ICD’s) continues to rise worldwide. Recently there are increasing concerns about long term reliability in the setting of recalls such as Sprint Fidelis and Riata. The Heart Rhythm Society recommend explant of devices during post mortem to facilitate returned product analysis and improve monitoring of device performance. Overall little data exists on the rate, feasibility and information garnered from device interrogation post mortem.

Aims

1. to investigate whether device interrogation provided additional information for the pathologist
2. whether device function was normal.

Methods

Devices were explanted from 32 consecutive post mortems, performed according to hospital protocol, between 2008 and 2011. Explanted devices were sent for interrogation to the Cardiology department. Interrogation and interpretation of the device data was performed blinded to the post-mortem findings. Battery voltage, charge time, lead impedances, thresholds and intrinsic amplitude measurements were recorded. Data related to potential arrhythmias was also recorded, as was pacemaker dependency, defined as pacing >80%. After data collation the investigators jointly decided as to the value of the interrogation on a case by case basis.

Results

- 32 devices retrieved at autopsy
  - 24 pacemakers
  - 8 ICD’s
- 84% male, 16% female. Mean age at time of death 75yrs (32-95yrs)
- Mean heart weight 583g
- Device implanted for mean of 3.2yrs (<1-10yrs)
- Mean pacemaker battery voltage 2.75V
- Mean ICD battery voltage 2.92V
- No interrogation gave concern over lead or overall device function
- Devices under advisories/recalls
  - 3 ICDs – demonstrated normal function
  - 1 lead – demonstrated normal function

Conclusion

All devices showed normal function, including those subject to advisories. In 11/32 case interrogation of devices after autopsy correlated with a cardiac cause of death and provided additional information in another 3 cases. Overall, device interrogation post-mortem is both feasible and useful.