Paced 12 Lead Surface ECG Criteria during Pacemaker Implantation are not Predictive of Right Ventricular Septal Pacing Lead Position Compared to Post Implant Cardiac CT.

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Presenter Disclosure Information

Gerald Kaye

- Study Chair of Protect-Pace study: sponsored by Medtronic
- Principal Investigator for Respond study: sponsored by Sorin/LivaNova
- Paid lectures Biotronik, Medtronic and Pfizer
- Consultancy agreement: Biotronik

Paul Gould/ John Coucher/Jit Pratap/Peter Moore

- No disclosures
Background

- Experimental and clinical data suggest that chronic right ventricular apical pacing (RVA) may have a deleterious effect on left ventricular function.

- Right ventricular non-apical (RVNA) pacing, particularly septal pacing, has been proposed to prevent left ventricular dysfunction\(^1\).

- Placing a lead at the RV septum involves fluoroscopy in the anteroposterior (AP) and 30\(^0\) left anterior oblique (LAO) position sometimes in combination with a surface ECG\(^2\).

- There is currently no accepted standard methodology for either placing or defining lead position.

Study Aim:

To compare the position of the post-implant pacing lead as determined by high resolution contrast cardiac CT imaging with a paced 12-lead surface ECG

Study approved by hospital Human Research Ethics Committee
Methods

• Entry criteria
  • ventricular pacing lead (single or dual chamber)
  • septal pacing lead placement (RVS) or apical lead position (RVA)

• Lead placement at implant
  • fluoroscopic placement for both positions utilised antero-posterior (AP) and left anterior oblique (LAO) 30° views
  • RVS placement facilitated by use a manually shaped septal stylet
Methods – CT imaging

- Modified Coronary CT angiography imaging protocol
- Intravenous Omnipaque 350 contrast (60ml) (GE Healthcare, Oslo, Norway) was administered at 6ml/s followed immediately by a 70ml 20% contrast/saline bolus at 6ml/s
- Dual source 256 channel Siemens Definition Flash CT scanner (Siemens, Erlangen, Germany)
- True septal lead position was defined if the pacing lead tip pointed towards the left anterior descending artery (LAD)\(^1\) aided by late contrast filling outlining the RV cavity enhancing identification of the interventricular septum

## Results ECG – leads designated “septum”

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<th>LEAD ANGULATION</th>
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## Results ECG – leads designated “apex”

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Conclusion

- CT provides a clear image of the pacing lead tip position
- Rapid image acquisition minimizes movement artifact
- Use of late contrast flush enhances right ventricular septum and provides accurate localization of the lead tip in relation to other cardiac structures
- Is a useful research tool at determining pacing lead position within the heart
- Although the ECG differentiates RVA from RVS lead position it does not allow accurate lead tip position compared to CT