Successful development of cardiac resynchronization therapy (CRT) device implantation service in a small centre in APHRS region: decade long contemporary single-centre experience

Becky (Yi-Wen) Liao
Dean Boddington
Charles Yao-Cheng Ho

Introduction: Tauranga Hospital, serving a population around 250,000, commenced CRT pacing services in 2009 with two operators who had experience with pacemaker and ICD implantation but no prior experience with CRT devices. An overall strategy of procedural safety was put in place with specific strategy of cephalic vein access for all leads where possible. We reviewed results of CRT-P/CRT-D implantation at our centre from inception of service through the following 10 years.

Methods: Data for consecutive patients undergoing CRT-P/D implantation or device replacement at Tauranga Hospital from April 2009 to July 2019 were retrospectively collected for characteristics and outcomes from electronic records and pacing database. Two authors collected data to ensure accuracy.

Result: Total of 131 procedures studied. Patient mean age was 68 +/- 9 years and 80% were male. There were 70(53%) new CRT-Ds implanted and 42(32%) new CRT-Ps. 19(17%) of procedures were upgrades. All patients had cardiomyopathy of which 60% were non-ischaemic. 76% of devices were implanted for cardiomyopathy with LBBB. The rest were for pacing induced cardiomyopathy or patients with cardiomyopathy and heart block. Majority (80%) of patients were in sinus rhythm. First procedure successful implantation was achieved in 100/108(92%) new CRT procedures but 4 developed phrenic nerve stimulation causing abandonment of LV pacing. 7(6%) patients had a second procedure performed. Two repeat procedures were performed to reposition LV lead because of phrenic nerve stimulation. Of the 8 patients in whom LV lead could not be positioned during first procedure, 2 had successful LV lead positioning with a second procedure at the same centre; 3 had successful positioning of an LV lead at another centre; and 1 had a His bundle pacing lead implanted at the same centre. Procedural complications included two haematomas (1.5%), one right atrial lead dislodgement (0.9%), one left ventricular lead dislodgement (0.9%) and one small pneumothorax (0.9%) not requiring an intercostal drain. There were no infections, cardiac perforations/tamponade or deaths. Improvements in LV Ejection Fraction (>10%) occurred in 48% of patients at follow-up.

Conclusion: In this audit of CRT-P/D procedures performed at Tauranga Hospital, 6% of patients required a second procedure to achieve an acceptable overall 93% successful rate of delivery of long term CRT pacing. A further 3% were referred to another centre and have achieved successful CRT therapy. Apart from the requirement for repeat procedure, the complication rate was very low. We believe the strategy of gaining cephalic vein access for all leads where possible has contributed to success and the low complication rate. The study demonstrates that CRT can be safely and successfully performed in a relatively low volume centre if strategically implemented.