ABSTRACT

Right ventricular apical versus septal pacing impact on left ventricular synchrony and function

Ibraheem Attia, MSc;Abdo Azab, MD;Khaled Husein, MD; Nashwa Abed, MD; Hassan Khaled, MD.

Critical Care Department, Cairo University

Background: Right ventricular (RV) pacing alters left ventricular (LV) mechanical activation, resulting in adverse impacts on LV function. Alternative RV septal pacing results in narrower QRS duration and may be more physiologic than RV apical pacing.This study was aimed to investigate the effect of RV apical (RVA) and septal pacing (RVS) on LV dyssynchrony and function.

Patients and methods: 40 patients clinically indicated for dual chamber pacing were included, subjected to conventional M-mode and 2-D echocardiography with following parameters looked for: left ventricular end diastolic diameter (LVEDD), left ventricular end systolic diameter (LVESD), ejection fraction (EF%), fractional shortening (FS%), cardiac output (CO L/m) and tissue Doppler imaging to assess LV dyssynchrony baseline study on temporary RV apical pacing. Then patients were divided randomly into two groups:Group1: 20 patients underwent permanent RV apical pacing.Group11: 20 patients underwent permanent RV septal pacing. QRS duration, Electrical parameters including RV stimulation threshold, R wave, and ventricular lead impedance together with fluoroscopic time were measured in every patient. Both groups were followed up within one week and at least 6 months after implantation by echocardiography, and tissue Doppler imaging.

Results: QRS duration was significantly narrower in pts with septal pacing compared to RV apical pacing (148.85$\pm$6.89 vs 162.1$\pm$5.98, $P < 0.001$). Electrical parameters at implant were satisfactory for all patients and no patients required lead repositioning. There were no significant differences in the RV mean stimulation threshold, R-wave sensing, lead impedance and fluoroscopic time between the RV apical and RV septal lead positioning. Within one week following implantation there was no significant difference in LVEDD, LVESD, LVEF, CO and LV mechanical delay. On follow up, in RV septal paced patients compared to RV apical paced patients LVEDD(cm) was lower (4.73±0.59 Vs 4.94±0.61, P value= 0.27), LVESD(cm) was significantly lower (3.02±0.37 Vs 3.42±0.45, P value= 0.004), LVEF(%) was significantly higher (69±8Vs 62±7, P value= 0.006), CO (L/min) was significantly higher (4.88±0.29 Vs 4.5±0.62, P value= 0.019),LV lateral to septal delay was significantly lower (72±5 Vs 83±6, P value< 0.001).

Conclusion: Long term RV septal pacing is feasible, reliable and efficient associated with less adverse effects on LV dyssynchrony and function compared to long term RV apical pacing.

Key words: RV septal pacing, LV dyssynchrony.