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Routine parahisian pacing for bradyarrhythmia using conventional leads

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Background. Pacemaker lead implantation to the right ventricle apex (RVA) may lead to some adverse effects (dyssynchrony, heart failure progression, etc.) and selective His bundle pacing requires special equipment, therefore, it is necessary to search for a compromise, such as parahisian region (PHR) pacing.

Purpose. To study the possibility of routine PHR (non-selective His bundle) pacing using conventional leads comparing to RVA pacing.

Methods. The study included 424 patients with who underwent antibradycardia pacing in 2015-2018 in "Republican cardiological dispensary", and "First clinical medical centre". Most of the patients (59,0 %) were women. The indication for implantation in 167 cases was 2-3 degree of AV-Block, in 178 – sick sinus node syndrome, in 79 – bradyform of atrial fibrillation. Patients were dived into 3 groups: 113 with PHR pacing by means of passive fixation leads (group 1), 214 with pacing of same region by means of active fixation leads (group 2), and 97 with pacing of the RVA (group 3). Lead implantation was performed under the X-ray control using the conventional introducers and included stylets. Main anatomical landmark was septomarginal trabecula in the upper-middle third of intraventricular septum. Measurement of threshold, impedance, lead stability determination, continuous ECG recording and QRS measurement were carried out during procedure. Portable ultrasound machine with ECG synchronization was used to evaluate aortic preejection delay (APD) and intraventricular delay (IVD).

Results. The acute threshold of ventricular pacing in different groups was 0.48±0.01 V, 0.52±0.01 V and 0.57±0.01 V respectively (p = 1.0). There were no lethal outcomes, purulent complications, no perforations with leads. Among other complications, in group 1 failure of implantation of "passive" lead in the PHR region was in 4 cases (3.5%), lead dislocation occurred in 2 (1.8%) patients, an threshold increase more than 3 V – 2 (1.8%). In group 2 – 3 dislocations (1.4%), implantation failure – 2 (0.9 %), in group 3 – an threshold increase was observed in 2 patients (2.1%), dislocation – 2 (2.1%) (p = 0.15). QRS value of PHR pacing in the group 1 was 147 ± 2 ms, in group 2 – 143 ± 2 ms (p=0.1), RVA pacing QRS was 169 ± 3 ms (p = 0.0001). There were no differences between groups 1 and 2 by ECHO-criteria of cardiac dyssynchrony – APD was 131 ± 2 ms and 139 ± 4 ms (p = 0.12), IVD was 14 ± 3 ms and 20 ± 4 ms (p = 0.48) respectively. APD and IVD of group 3 were significantly higher – 169 ± 5 ms (p = 0.007) and 54 ± 5 ms (p = 0.01), respectively.

Conclusions. Routine PHR pacing is suitable in most patients with bradycardia, does not require special equipment using, does not lead to an increase in the number of complications, and exceeds the RVA pacing by the ECG end echocardiographic criteria for cardiac interventricular dyssynchrony. Further investigation required to compare it to selective His bundle pacing.