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STUDIUM PRZYPADKU / *CLINICAL VIGNETTE*

Multipoint pacing of the left ventricle to achieve better resynchronisation and clinical response

Wielopunktowa stymulacja lewej komory w celu osiągnięcia pełniejszej resynchronizacji i odpowiedzi na leczenie

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A 65-year-old female with non-ischaemic cardiomyopathy, New York Heart Association III heart failure, and left bundle branch block was treated with cardiac resynchronisation therapy (CRT) of a defibrillator (CRT-D) Quadra Assura MP with a Quartet™ quadripolar left ventricular lead (St. Jude Medical, USA) (Fig. 1). The lead was placed into the lateral cardiac vein with its distal point located in the apical and proximal point in the mid-ventricular area. The defibrillator lead was implanted to the apex of the right ventricle. The device allows pacing of not only four different points, but also provides almost synchronous pacing of two points of the left ventricle (LV). We present how different settings of the CRT-D device affected the QRS morphology in 12-lead electrocardiogram (Fig. 2C–H). Synchronous biventricular pacing (BiVp) with LV paced from the distal electrode (Fig. 2C) caused narrowed QRS (188 ms) with RS morphology in lead V_1. Synchronous BiVp with LV paced from the Mid 2 and Mid 3 electrodes (Fig. 2D, E) gave further R wave amplitude increase in lead V_1 and QRS shortening (160 ms and 140 ms, respectively). Synchronous BiVp with LV paced from the proximal electrode (Fig. 2F) was associated with the most dominant R wave in lead V_1, but the QRS width (140 ms) was quite similar to the one observed during pacing with the Mid 3 electrode. As shown in Figure 2H, multipoint pacing caused no further QRS width reduction compared to pacing from the proximal electrode but gave the most dominant R wave in lead V_1. It also led to maximal change in QRS amplitude in lead V_6 from +1.7 mV in native QRS to –1.7 mV, i.e. delta change of 3.4 mV. According to the unpublished subanalysis of the MADIT-CRT trial, higher delta change in QRS amplitude in lead V_6 from baseline to post-implantation day was the best electrocardiographic predictor of reduction in heart failure or death during CRT pacing.

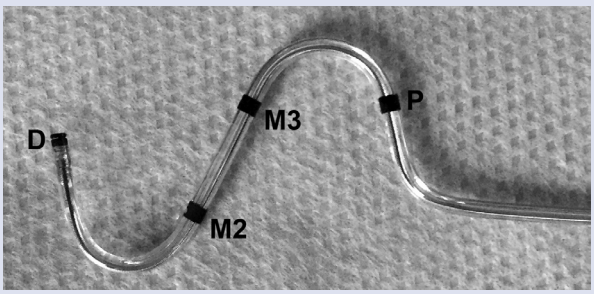

Figure 1. Distal end of the left ventricular quadripolar pacing lead; D — distal electrode; M2 — Mid 2 electrode; M3 — Mid 3 electrode; P — proximal electrode

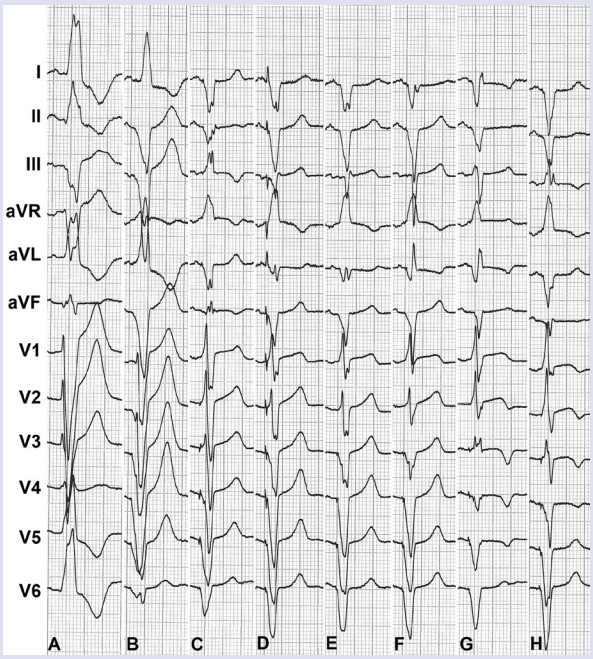

Figure 2. QRS morphology as a response to different configurations of biventricular pacing; **A**. Baseline electrocardiogram; **B**. Right ventricle apical pacing; **C**. Synchronous biventricular pacing (BiVp) with left ventricle (LV) paced from distal electrode; **D**. Synchronous BiVp with LV paced from Mid 2 electrode; **E**. Synchronous BiVp with LV paced from Mid 3 electrode; **F**. Synchronous BiVp with LV paced from proximal electrode; **G**. BiVp with LV paced from proximal electrode with 50 ms pre-excitation; **H**. BiVp with multipoint LV pacing in configuration: proximal electrode — 10-ms delay — distal electrode — 40-ms delay — right ventricular lead

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