

The turbulence of heart rate and blood pressure after induced single ventricular premature contractions in patients with ICD

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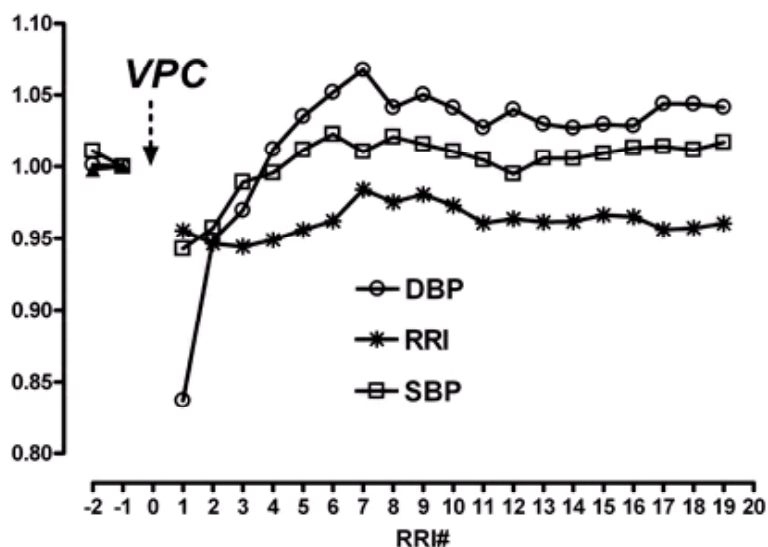
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Introduction and objective: Heart rate turbulence (HRT) is a short term fluctuation in sinus cycle length that follows a ventricular premature complex (VPC). Turbulence of systolic blood pressure (SBP), accompanying HRT, has been also reported. The aim of this study was to describe and compare HRT and turbulence of both systolic and diastolic blood pressure (DBP) induced by VPC stimulated by implanted cardioverter-defibrillators (ICD). The study was performed in 5 patients with ICD (59.5 ± 10.2 years old, all male) who gave their informed consent for stimulation of single VPCs during routine pre-discharge evaluation of ICD after its implantation.

Patients and methods: Twenty five single VPCs, 1 every 30 seconds, were induced via ICD and telemetry in all patients with concomitant recordings of finger pulse pressure wave (Portapres 2, FMS, The Netherlands). Except single VPCs and occasionally some VPC pairs, no other ventricular arrhythmia was observed. Most of 125 impulses given to all patients produced VPCs. However, basing on RR intervals (RRI) analysis, only 64 VPCs fulfilled the strict criteria used for HRT calculation. Finally, 25 of them, after visual inspection of their local RRI tachograms revealing a normal HRT pattern, were accepted and taken for further analysis. In statistical analysis the values of RRI, SBP and DBP for the last sinus beat before the triggered VPC were taken as reference. The ranges of relative changes of RRI, SBP and DBP within the first 20 sinus beats after VPCs were mutually compared with Wilcoxon test.

Results: The highest range of relative changes was observed for DBP ($28.1 \pm 11.1\%$), then SBP ($17.0 \pm 10.2\%$) and the smallest for RRI ($15.5 \pm 9.5\%$). The range of changes in DBP was significantly higher than for SBP ($p = 0.0001$) and RRI ($p = 0.0004$). There was no significant difference in the ranges of relative changes of SBP and RRI turbulence. The figure below presents profiles of relative values of RRI, SBP and DBP for consecutive sinus beats before and after VPCs (gap corresponds to VPC coupling interval and compensatory pause) for pooled data (DBP — open circles; SBP — open squares; RRI — asterisks).

Conclusions: It has been proven that HRT is induced by hemodynamic changes following VPC and that baroreflex is involved in its mediation. However it is plausible that DBP has stronger contribution in HRT induction than SBP does.



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