

PW3-4

Unravelling The Mechanisms Behind The Hemodynamic And Autonomic Remodeling Induced By Orthostatic Training

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Introduction: Neurocardiogenic reflex syncope (NRS) is a common clinical entity resulting from excessive reflex autonomic responses, particularly during orthostatism. Therapeutic options are controversial and of limited effectiveness. Tilt-training (TT) has been advocated as a promising tool to treat these patients (P). However, its mechanisms of action and clinical impact remain elusive. Aim: to characterize hemodynamic, autonomic and baroreflex responses during a TT-program in NRS-P refractory to conventional measures.

Methods: 28P (50% male, 41 ± 14 yrs) without structural heart-disease, with recurrent NRS documented by tilt-testing (cardioinhibitory 50%, mixed 35%, and vasodepressor 15%). The TT-program included 9 tilt-sessions (3 times/week, 30 min, 60° in 6 sessions and 70° in 3 sessions) under continuous ECG and blood pressure monitoring, combined with daily home orthostatic self-training (20 min with back support) and 10° head-up during sleep. Systolic-volume, cardiac-output, total-peripheral-resistance ($\text{dyne} \cdot \text{s}/\text{cm}^5$), baroreflex-sensitivity and heart-rate variability were computed. P were followed during 24 ± 12 months (1st month and every 6 months).

Results: After the TT-program there was a significant increase of total-peripheral-resistance (1485 ± 225 vs. 1591 ± 187 , $p < 0.05$), with a reduction of its standard deviation (206 ± 60 vs. 150 ± 42 , $p < 0.05$). Variability studies using auto-regression analysis showed an increased overall autonomic activity, reflected by a progressive increase in the variability indices (LF 544.08 ± 146 vs. 914.64 ± 225 , $p < 0.05$; HF 5.32 ± 0.7 vs. 7.42 ± 0.8 , $p < 0.05$). This increase can also be seen through changes in the baroreflex effectiveness index (61.06 ± 20 vs. 69.70 ± 17 , $p = 0.08$). Recurrence of syncope occurred in 5P (19%), with a significant reduction in the number of episodes ($4.0 \pm 3.2/P$ in the 12 months before TT vs. $1.4 \pm 0.8/P$ post-TT, $p < 0.05$).

Conclusions: In refractory NRS, TT may be an effective option, with long-term benefits due to a better orthostatic tolerance through three mechanisms: increased vasoconstrictor reserve and its lower variability combined with increased overall autonomic tone and baroreflex activity.