

Time-courses of the Central Frequencies of Low-Frequency Components of RR intervals, Systolic and Diastolic Pressure Variabilities in response to Active Orthostatic Test

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Previously, while studying the effects of static and dynamic exercises on HRV, we provided evidence supporting the adequate performance of the central frequencies of low-frequency components ($_{CF}LF$) of: RR intervals ($_{CF}LF_{RR}$), systolic ($_{CF}LF_{SP}$) and diastolic ($_{CF}LF_{DP}$) pressure variabilities as cardiac and vasomotor sympathetic activity measures. Currently, in 23 healthy subjects we assessed the effects provoked by 1-min stages of supine position, active orthostatic test (AOT) and recovery to supine on the instantaneous time-courses of $_{CF}LF_{RR}$, $_{CF}LF_{SP}$ and $_{CF}LF_{DP}$ and of low-frequency powers ($_pLF$) of the same variables ($_pLF_{RR}$, $_pLF_{SP}$, $_pLF_{DP}$), estimated by a time-frequency distribution. The response patterns of $_pLF_{RR}$, $_pLF_{SP}$ and $_pLF_{DP}$ dynamics to AOT were similar and depicted an initial prominent change (IPC) upwards, followed by their return to baseline (RB) and a final moderate change (FMC) upwards. Mean maximal points in IPC and FMC were greater ($p < 0.003$) than their mean baseline (BL). The response patterns of $_{CF}LF_{RR}$, $_{CF}LF_{SP}$ and $_{CF}LF_{DP}$ were similar but in opposite direction to those of $_pLF$: a prominent decrement in IPC, return to BL in RB and a final moderate reduction in FMC. Mean minimal points in IPC and FMC were less ($p < 0.001$) than their mean BL. Mean correlations of $_pLF_{RR-CF}LF_{RR}$, $_pLF_{SP-CF}LF_{SP}$ and $_pLF_{DP-CF}LF_{DP}$ relations ranged from -0.88 ± 0.35 to -0.96 ± 0.07 in IPC, -0.82 ± 0.22 to -0.88 ± 0.10 in RB and -0.21 ± 0.65 to -0.41 ± 0.57 in FMC. The table shows means of $_{CF}LF_{RR}$ and $_{CF}LF_{DP}$. Our findings, initial prominent and final moderate leftward shift of $_{CF}LF_{RR}$, $_{CF}LF_{SP}$ and $_{CF}LF_{DP}$ dynamics that were strongly and inversely correlated with $_pLF_{RR}$, $_pLF_{SP}$ and $_pLF_{DP}$ and that $_{CF}LF_{RR}$ is greater than $_{CF}LF_{DP}$, support that AOT provokes similar cardiac and vasomotor sympathetic activations, large at the onset and moderate at the ending. Thus, $_{CF}LF$ are trustable measures of sympathetic activity, possibly branch-specific: $_{CF}LF_{RR}$ for the cardiac and $_{CF}LF_{DP}$ for the vasomotor one.

Table. Means \pm S.D. of $_{CF}LF_{RR}$ and $_{CF}LF_{DP}$ in BL, IPC, RB and FMC. N=23.

	BL	IPC	RB	FMC
$_{CF}LF_{RR}$ (mHz)	101 \pm 4	85 \pm 4*	100 \pm 5	92 \pm 4*
$_{CF}LF_{DP}$ (mHz)	94 \pm 3 \dagger	83 \pm 3* \dagger	98 \pm 6 \dagger	88 \pm 4* \dagger

* $p < 0.001$ vs. BL. $\dagger p < 0.01$ $_{CF}LF_{RR}$ vs. $_{CF}LF_{DP}$.