

**Relationship between Hemodynamic and Cardiopulmonary Indices as Measured in Cardiac Patients by two Separate and Specific Tests**

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Background: Direct non-invasive hemodynamic evaluation becomes more and more familiar by the relative new impedance cardiography (ICG) test. On the other hand, the cardiopulmonary exercise test (CPET) is well known as a reliable physiological test for indirect hemodynamic evaluation through CPET indices and the Fick formula.

Aim of Study: To correlate and cross-match between direct and indirect hemodynamic indices as measured by the two tests, the ICG and the CPET, separately.

Material and Methods: 30 cardiac patients (pts) who underwent both, ICG and CPET separately and up to two weeks apart, were included in the study. Linear correlations were done between all the indices of both tests. Values of  $R > 0.6$  and  $P < 0.05$  were considered statistically significant.

Results: Significant correlations were found between peak-HR of the CPET and the following ICG indices: to peak-CI(Cardiac Index) –  $R=0.74$ ,  $P < 0.0001$ ; to peak-CO(Cardiac Output) –  $R=0.72$ ,  $P < 0.001$ ; to delta-SI(Stroke Index) –  $R=0.75$ ,  $P < 0.005$ . Other crossover correlations between peak-HR of the ICG test and the CPET indices were: to peak-O<sub>2</sub>-Pulse(O<sub>2</sub>P) –  $R=0.62$ ,  $P < 0.005$ ; peak-O<sub>2</sub>-Consumption(VO<sub>2</sub>) –  $R=0.74$ ,  $P < 0.001$ . Other specific correlations were shown between peak-CI and peak-VO<sub>2</sub>:  $R=0.82$ ,  $P < 0.001$ ; peak-CO and peak-VO<sub>2</sub>:  $R=0.72$ ,  $P < 0.001$ ; peak-SI and peak-O<sub>2</sub>P:  $R=0.76$ ,  $P > 0.001$ ; peak-SV and peak-O<sub>2</sub>P:  $R=0.76$ ,  $P < 0.001$ .

Conclusions: Such crossover significant correlations between the indices of both above tests may validate the ICG indices as reliable non-invasive hemodynamic evaluation and may further establish the CPET indices for similar, though indirect, physiological assessment.