

The use of heart rate variability in detecting sleep disordered breathing in patients with heart failure

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Background

Sleep disordered breathing (SDB) is common in patients with congestive heart failure (CHF). In patients with OSA, the very low frequency (VLF) power spectral density of the interbeat interval increment, when corrected for the total power spectral density (%VLFI), is strongly associated with presence of obstructive apneas.

Aim

To determine if the %VLFI could be used to detect the presence of SDB in CHF patients.

Methods

20 male patients with CHF [age 62.1(11.7) yrs, NYHA 1.5(0.6), EF 39.5(12.7) %, MVO₂ 17.6(3.6) ml/Kg/min] were recruited. Patients with atrial fibrillation, ventricular pacing, excessive ventricular ectopy were excluded. All underwent polysomnography. SDB was defined as an AHI₂₀ events/hr. Heart rate (HR) data was collected overnight using a Holter monitor and processed using an analysis program automated to calculate %VLFI (Novacor).

Results

9/20 had SDB. A receiver operator characteristic curve was constructed assuming a cut-off an AHI of 20 events/hr. The area under the curve was 0.869, and the asymptotic significance was 0.011. Setting the %VLFI at 2.33% yielded a sensitivity of 100% and a specificity of 64.3%. The positive predictive value was 54.5% and the negative predictive value 100%. There were no false negatives.

Summary

Spectral analysis of HR may be used as a rule out test for SDB in mild to moderate CHF. For health services assessment of HR variability may reduce demand on overburden sleep laboratories, by eliminating those unlikely to have SDB.