

**AUTONOMIC CONTROL OF CARDIAC FUNCTION IN PATIENTS IN
STABLE SINUS RHYTHM AND HISTORY OF ATRIAL
FIBRILLATION WITH AND WITHOUT HEART FAILURE**

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Heart failure (HF) and atrial fibrillation (AF), emerging as two epidemics of the 21st century, have been mechanistically linked to changes in cardiac vagal control. The pathophysiological relationship between AF and HF has been only partially elucidated. We therefore investigated whether tonic activation of excitatory chemoreceptor afferents contributes to the altered vagal control in HF patients with a history of AF. In 18 patients (72±9y, 7male) with sinus rhythm and a history of AF (n=9, without any evidence of structural heart disease, AF group; n=9 with structural heart disease and clinical presentation of HF, HF group) and 10 healthy controls we investigated the impact of chemosensory deactivation (by breathing 100% oxygen) on hemodynamics, oxygen saturation and breathing rate. In addition, we performed a deep breathing test demonstrating an impaired heart rate variation in patients without and with HF as compared to controls (Expiration/Inspiration difference: 23.9±6.9 vs 6.9±6.1bpm, and 23.9±6.9 vs 7.8±4.8bpm, each p<0.05). In the control as well as the AF group heart rate decreased during chemoreceptor deactivation (control: -4.8±3.4%; AF: -5.1±3.0%; p<0.05), whereas heart rate did not change in HF patients. This resulted in an impaired cardiac chemoreflex sensitivity in HF patients (1.9±1.6 vs 0.5±1.2 ms/mmHg; p<0.05). Our data suggest that tonic activation of excitatory chemoreceptor afferents may contribute to a low vagal tone in heart failure patients with a history of AF. Evaluation of peripheral chemoreceptor function might be useful to characterize vagal activity in patients with a history of AF during the development and progression of HF.