Relationship of Atrial Tachyarrhythmias and OptiVol Fluid Index in patients with pacemaker and preserved ejection fraction

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Introduction: Atrial fibrillation (AF) is the most common arrhythmia and is responsible for significant morbidity and mortality in patients with heart failure (HF) with reduced ejection fraction (HFrEF) or preserved ejection fraction (HFpEF). There is a reciprocal relationship between HF and AF in which HF predisposes to AF and AF worsens HF. Much is known about the role of AF in HFrEF but studies of AF in HFpEF are more limited. Modern pacemakers provide an index of intrathoracic fluid status OptiVol fluid index (OVFI) by measuring transpulmonary electric impedance. This study was to determine whether elevated intrathoracic fluid congestion correlated with increased atrial tachyarrhythmia (AT) events.

Methods: This study was a retrospective analysis of data from patients with Medtronic Advisa pacemaker (OptiVol built-in) and LVEF ≥ 50% between 2012 and 2014 in our single-center hospital. Daily fluid index measurements and values of time in device-detected AT/AF episodes were used to identify patients with OVFI threshold crossing with or without AT/AF. Different threshold of OVFI was also be evaluated.

Result: Findings in 151 patients with 212 follow-up visits (mean, 1.4 visits per patient) were evaluated. Device-detected AT/AF prevalence was 47%. AT/AF frequency (percent of patients visits with at least 1 episode of AT/AF more than 4 hours since previous device interrogation) was greater in OVFI ≥ 20 versus OVFI < 20 (P =0.035). Finally, in terms of temporal sequence, the threshold crossing of OVFI ≥ 20 preceded AT/AF episodes more than 4 hours in 53% of incidences, followed AT/AF episodes more than 4 hours in 23%, and was simultaneous or indeterminate in the remainder.

Conclusion: These findings not only support the view that worsening pulmonary congestion is associated with increased AT frequency in patients with preserved ejection fraction but also suggest that pulmonary congestion may be responsible for triggering AT events.