004. Obstructive sleep Apnea and Atrial Fibrillation: A Meta-Analysis
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Purpose

Atrial fibrillation (AF) is the most common sustained arrhythmia leading to cardiovascular morbidity and mortality. As the incidence of AF continues to rise, it is imperative to identify and treat potentially modifiable risk factors for the disease. While the traditional risk factors for AF include hypertension, diabetes and coronary atherosclerosis among others, obstructive sleep apnea (OSA) and sleep disordered breathing (SDB), are emerging disorders that appear to be important and rather treatable risks factor for AF. Proposed mechanisms for AF in OSA/SDB populations include increased intrathoracic pressures which in turn lead to impaired left ventricular relaxation and atrial stretching. These mechanisms together with hypoxia and hypercapnia result in atrial fibrosis and tachyarrythmia. Nevertheless, conflicting evidence exists in the literature regarding OSA/SDB as an underlying cause of AF. Therefore, we conducted a meta-analysis of all available studies to characterize the relationship between OSA-SDB and AF.

Methods

Databases including PUBMED, Medline, and Cochrane Library were searched for relevant studies using the keywords “atrial fibrillation”, “obstructive sleep apnea” and “sleep disordered breathing”. OSA was categorized by an Apnea-Hypopnea Index (AHI) >5, a Respiratory Distress Index (RDI) >30 or a 3% Oxygen desaturation Index (ODI) >15. AF was diagnosed by electrocardiogram (ECG) studies. All subjects included had an established diagnosis of OSA using the above mentioned criteria. Within these subjects, the occurrence of AF versus no AF was then compared. The pooled data was analyzed using Comprehensive Meta-Analysis package V3 (Biostat, USA). The Mantel-Haenszel method (Mantel & Haenszel, 1959) was used for calculating the weighted pooled odds ratio under the fixed effects model.

Results

A total of 579 results were generated. Duplicates were removed and 372 records were excluded based on irrelevant abstracts, titles, study design not consistent with the stated outcome, or full-text unavailable. Twelve studies meeting the inclusion criteria were reviewed in full-text; 2 of these articles were eventually removed due to unconfirmed OSA diagnostic modality, and one was also removed based on a control group inconsistent with the other studies. Therefore, a total of 9 studies were included in this meta-analysis for the random pooled effects model (n=19,837). Sample sizes ranged from n=160 patients to n=6841 patients. The risk of AF was found to be higher among OSA versus control group (OR; 2.120, C.I: 1.845- 2.436, Z; 10.598 p; < 0.001). The heterogeneity observed for the pooled analysis was Q-value; 22.487 df (Q); 8 P-value; 0.004, I-squared; 64.424 Tau2; 0.098, suggesting appropriate study selection and moderate heterogeneity.

Conclusions

In conclusion OSA/SDB is strongly associated with atrial fibrillation as demonstrated by our meta-analysis. Our study confirms and further strengthens the notion that OSA/SDB populations are at high risk for development of AF and subsequent cardiovascular morbidity and mortality. Prospective studies are needed to ascertain the effect of the treatment of OSA/SDB for the prevention of AF, a growing health burden with serious consequences.