Silent Atrial Fibrillation and Cardiovascular Risk Factors in Patients with Obstructive Sleep Apnea and Diabetes

Background

With an estimated prevalence of 1-2% worldwide, atrial fibrillation (AF) is the most common sustained cardiac arrhythmia. Almost one third of all transient ischemic attacks (TIA) and ischemic strokes are thought to arise from a cardiac embolism of which as a minimum half is correlated to AF. Both obstructive sleep apnea (OSA) and diabetes mellitus are widespread diseases and are increasingly common. Knowledge of the association to silent AF are limited for both diseases and little is known about risk factor management in patients with OSA.

Objective:

The objective was to investigate the prevalence of undiagnosed AF in two cohorts of patients with diabetes and OSA. Further objectives were to examine and graduate prevalence of AF with the degree of OSA and related cardiovascular risk factors. Moreover, we aimed to assess the calculated 10 year risk of fatal CVD in patients with OSA. Finally, we intended to investigate the indication of preventative lipid lowering treatment in patients with OSA.

Methods:

We performed two prospective clinical trials. In The first prospective clinical trial (study I) included 200 patients with high-risk diabetes and no previous history of AF from an outpatient hospital department at Zealand University Hospital. In study II we included 303 patients investigated for OSA or with known OSA from two sites: one ear, nose and throat (ENT) private practice and from the outpatient sleep clinic at Zealand University Hospital. In both studies, home monitoring for AF was performed with event -triggered ELR (R.test Evolution 4$^{®}$). In study II we additionally performed sleep examinations for obstructive sleep apnea with a portable sleep monitor (NOX T3) for 1 night. Patients were stratified in groups of mild, moderate and severe OSA based on Apnea-Hypopnea-Index (AHI). In study III we investigated the patients with OSA from study II for estimated 10-year risk of cardiovascular death and indication for lipid lowering treatment.

Results:

In study I, we found a prevalence of silent AF of 10.5% detected with ELR versus 0.0% with standard 12 lead ECG in patients with high risk diabetes. More than 85% of all first events of AF were found within the first 5 days of monitoring. Higher age, male gender and albuminuria were associated with silent AF in risk analysis. The number needed to treat (NNT) was 11.8 in the whole population to find one extra patient with unknown AF, while in patients with more complicated diabetes (age of 65 or above, albuminuria and a systolic blood pressure of 150 or above) the NNT was 3.

In study II, we found that patients with moderate (AHI 15- <30) or severe (≥30) OSA had a prevalence of undiagnosed AF of 8.8% versus 1.5% in patients with mild or no OSA (AHI <15). Silent AF was associated with a higher AHI, CHA_2DS_2VASc score and package years. In our cohort, comorbidities were frequently found. In patients with OSA, hypertension was found in 66%, dyslipidemia in 77.6% while type 2 diabetes mellitus was found in 15.8% and prediabetes in 11.8%. Type 2 diabetes mellitus was previously undiagnosed in 18.8% of all cases with both OSA and diabetes. More than 25% of patients in the whole cohort had undiagnosed hypertension and another 27.7% were dysregulated.

In study III, we found a higher 10 year risk of fatal CVD in patients with moderate and severe OSA opposite patients with mild or no OSA. Undertreated hypertension was found in in 53% of patients who were either poorly regulated or had unknown hypertension. Eligibility for treatment with cholesterol lowering agents was

indicated in 17.8% of patients and both statin eligibility and undertreated hypertension were positively associated with the severity degree of OSA.

Conclusions

Undiagnosed AF and undertreated cardiovascular modifiable risk factors are common in both patients with diabetes and patients with OSA. With this study we propose that long-period home-monitoring in these patients is useful for identifying candidates for preventive anticoagulation, cardiovascular treatment and possibly prevent future ischemic stroke.