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Effect Of Continuous Positive Airway Pressure On Metabolic Syndrome And Cardiovascular Markers In Patients With Obstructive Sleep Apnea In A North Indian Population

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Background: Obstructive sleep apnea (OSA) is associated with an increased prevalence of cardiovascular events, metabolic syndrome (MS) and its constituent components. However, whether treatment of OSA reverses these abnormalities is not known. We investigated the effect of treatment with continuous positive airway pressure (CPAP) on MS in patients with symptomatic OSA.

Methods: We conducted a randomized, double-blind, placebo-controlled, cross over trial in 74 patients with moderate to severe obstructive sleep apnea syndrome (OSAS) and MS who were treatment naïve for OSA and MS. Each patient received three months of therapeutic- CPAP and sham-CPAP with a washout period of one month in between. Following measurements were carried out before and after each intervention: anthropometry and body composition analysis, blood pressure (BP), fasting blood sugar (FBS), insulin resistance (IR) by homeostasis model assessment (HOMA-IR), fasting blood lipid profile, HbA_{1c}, serum IL-6, TNF α , hs-CRP, and leptin by ELISA, carotid intima-medial thickness (CIMT) and flow mediated dilatation (FMD) by 2D ultrasound and visceral fat accumulation by CT. MS was defined using the National Cholesterol Education Program, Adult Treatment Panel III criteria, with Asian cut-off values for abdominal obesity.

Results: 71 patients completed the study. Compared to sham-CPAP there was a significant reduction with auto-CPAP in systolic BP (mean difference 3.9 mm Hg [95% confidence interval 0.9-6.8], $p=0.012$), diastolic BP (2.7 mm Hg [0.8-4.6], $p=0.006$), total cholesterol (15 mg/dl [5-25], $p=0.003$), non-HDL cholesterol (15 mg/dl [5-25], $p=0.005$), triglycerides (28 mg/dl [6-49], $p=0.014$), LDL mg/dl (10 [2-19], $p=0.018$), HbA_{1c} (0.3% [0.1-0.5], $p=0.001$), body mass index (0.27 kg/m^2 [0.01-0.53], $p=0.043$), percent body fat (2.0% [0.8-3.2], $p=0.002$) and fat mass (2.2 kg [0.9-3.5], $p=0.001$). There was a trend towards reduction in visceral and subcutaneous fat accumulation ($p=0.085$ and 0.053 respectively). No change was observed in HDL-cholesterol, HOMA-IR, CIMT, FMD or serum inflammatory markers.

Conclusions: In patients from a north Indian population with at least moderately severe OSAS patients with MS, 3 months of therapy with CPAP partially reversed metabolic abnormalities associated with MS including blood pressure, dyslipidemia and long-term glycemic control. However, this treatment duration was insufficient to affect serum inflammatory markers and laboratory measures of atherosclerosis.

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