CPAP Improves Metabolic Syndrome in Apnea Patients

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- A crossover study found that CPAP compared with sham treatment improved parameters of the metabolic syndrome in patients with obstructive sleep apnea and no previous use of CPAP.

- Note that 13% of patients no longer met criteria for the metabolic syndrome after CPAP therapy whereas only 1% of those undergoing sham CPAP did.

Review

Blood pressure and metabolic abnormalities improved significantly in patients with obstructive sleep apnea treated with continuous positive airway pressure (CPAP), results of a randomized, crossover trial showed.

Systolic and diastolic blood pressure, lipids, and glycated hemoglobin all responded favorably to three months of CPAP as compared with sham CPAP ($P=0.02$ to $P<0.001$).

By the end of the study, 13% of patients treated with CPAP no longer met diagnostic criteria for metabolic syndrome, compared with 1% of patients in the sham-CPAP control group, as reported in the Dec. 15 issue of the New England Journal of Medicine.

"CPAP is the first-line treatment for moderately severe obstructive sleep apnea and may be useful for treating the metabolic syndrome or metabolic abnormalities associated with obstructive sleep apnea," Surendra K. Sharma, MD, PhD, of the All India Institute of Medical Sciences in New Delhi, and co-authors wrote in the discussion of their findings.

"As compared with patients in other studies, our patients had more severe metabolic derangements at baseline, which could be one reason for the better response to CPAP therapy," they added.

CPAP was also associated with significant weight loss, which might have contributed to improvement in metabolic parameters.

Estimates of obstructive sleep apnea prevalence have ranged as high as 24% for men and 9% for women. The sleep disorder frequently is associated with metabolic syndrome, with estimates as high as 85% of patients with obstructive apnea and 41% of patients with nonobstructive apnea, according to the article's background information.
CPAP is first-line therapy for symptomatic obstructive sleep apnea and has demonstrated high rates of efficacy in adherent patients. Studies of the treatment's effects on metabolic syndrome have yielded mixed results. Most have shown favorable effects on blood pressure, but data on insulin resistance and lipids have been inconsistent and even conflicting, the authors continued.

In an effort to clarify the effects of CPAP on metabolic abnormalities, Sharma and colleagues conducted a randomized clinical trial involving patients with obstructive sleep apnea and one or more metabolic abnormalities. The patients had apnea documented by overnight evaluation in a sleep laboratory (Apnea/Hypopnea Index score ≥5) and associated with daytime somnolence but no history of treatment with CPAP.

About 80% of the patients met diagnostic criteria for metabolic syndrome, as defined by the National Cholesterol Education Program (JAMA. 2001; 285: 2486-2497).

Patients were randomized to three months of at-home use of CPAP or sham CPAP, followed by a one-month washout period, then crossed over to the opposite treatment for an additional three months.

The final analysis included 86 patients. The patients had a mean age of 45 and all but nine were men. The population had a mean body mass index (BMI) of 32, and mean waist circumference exceeded 110 cm. Almost half of the patients had hypertension, a similar proportion had diabetes, and mean fasting glucose was about 106 mg/dL. More than 80% had some form of dyslipidemia.

Adherence to CPAP was better than was seen with sham, although adherence to sham differed according to whether patients were randomized to that group first (4.8 hours per night) or last (4.1, P=0.02). Better adherence to CPAP was associated with more improvement in blood pressure and metabolic parameters, as confirmed by an analysis of patients who used CPAP for at least five hours per night versus the overall population.

The investigators found that patients had significantly greater improvement with CPAP compared with sham for:

- Systolic blood pressure, -3.07 versus +0.79 mmHg, P=0.001
- Diastolic blood pressure, -2.81 versus -0.33 mmHg, P<0.001
- Glycated hemoglobin, -0.03% versus +0.19%, P=0.003
- Triglycerides, -18.86 versus =0.21 mg/dL, P=.02
- Total cholesterol, -9.36 versus +3.90 mg/dL, P=0.005
- LDL, -5.72 versus +3.83 mg/dL, P=0.008
- Non-HDL, -9.32 versus +3.98 mg/dL, P=0.009
- HDL:total cholesterol, 0.01 versus -0.01, P=0.01
- Reversal of metabolic syndrome, 13% versus 1%, P=0.003

One patient had exacerbation of hypertension requiring treatment during CPAP, two patients were intolerant of CPAP, and one patient discontinued sham therapy.

Limitations of the study included the fairly short washout period of three months – which could not exclude carryover from the treatment -- the lack of ambulatory blood pressure
measurements, and the absence of polysomnographic studies following treatment.

"In 20% of the patients with the metabolic syndrome who underwent CPAP therapy, the metabolic syndrome resolved within three months, which is a clinically significant improvement," the authors wrote. "However, the reversal of the metabolic syndrome was usually due to a significant reduction in only one of the components, with no particular component driving this effect."

"Clinical implications of our study can be extrapolated from drug trials showing a 15% and 42% reduction in the risk of coronary heart disease and stroke, respectively, with each reduction of 5 mmHg in blood pressure and a 20% reduction in the risks of both coronary heart disease and stroke with each reduction of 40 mg per deciliter in LDL cholesterol levels," they added.

The study was supported by Pfizer.
Sharma disclosed a relationship with Pfizer India.

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