In patients with sleep apnea, does CPAP improve long-term cardiovascular outcomes?

Evidence-Based Answer

Yes. In patients with obstructive sleep apnea (OSA), continuous positive airway pressure therapy (CPAP) is associated with a reduction in cardiovascular mortality to levels similar to patients without OSA (SOR: B, meta-analysis of cohort studies). Furthermore, CPAP treatment is associated with fewer new cardiovascular events in patients with OSA and coronary artery disease (CAD) (SOR: B, cohort study). CPAP also results in small improvements in left ventricular ejection fraction (LVEF) in patients with both OSA and heart failure (HF) (SOR: C, meta-analysis of RCTs with disease-oriented evidence).

A 2013 meta-analysis of 6 observational studies (N=11,932) evaluated the association among OSA, CPAP treatment, and cardiovascular mortality.¹ Four studies (N=5,228) found an increased risk of cardiovascular mortality in patients with untreated moderate to severe OSA compared with patients without OSA (HR 2.2; 95% CI, 1.6–3.0). However, 3 studies (N=1,451) found no significant difference in cardiovascular mortality in patients with OSA of any severity who were treated with CPAP compared with patients without OSA (HR 0.82; 95% CI, 0.50–1.3).

In 2003, a cohort study with 7-year follow-up analyzed the effect of OSA treatment on new cardiovascular events in 54 patients with CAD (>70% coronary artery stenosis) and OSA with an apnea-hypopnea index (AHI) >15.² Twenty-one patients were treated with CPAP an average of 5.7 hours/night and 4 patients had upper airway surgery for OSA. The rest declined treatment. The average age of the patients was 57 and all had similar comorbidities and treatments for CAD.

Of the 25 patients receiving treatment, 6 had new cardiovascular events (HF hospitalization, cardiovascular death, or coronary syndrome/ revascularization), compared with 17 of the 29 who declined treatment (HR 0.24; 95% CI, 0.09–0.62).²

In 2013, a meta-analysis of 10 RCTs (N=259) studied the effect of CPAP on LVEF in patients with OSA.³ The average age of the patients in the studies ranged from 49–63 and average AHI was in the severe range (>30) in all but 1 study. Baseline LVEF, measured by echocardiography, ranged from 26% to 68%.

Treatment with CPAP for 4 to 12 weeks resulted in a small improvement in LVEF compared with control groups receiving placebo CPAP, no treatment, or oral appliances (weighted mean difference [WMD] 3.6%; 95% CI, 1.7–5.4). Subgroup analysis of the 6 studies (N=168) of patients with OSA and moderate to severe HF revealed a significant improvement in LVEF after CPAP compared with control (WMD 5.2%; 95% CI, 3.3–7.1), but no difference in LVEF in the 4 studies (N=91) of patients without HF treated with CPAP compared with control (WMD 1.1%; 95% CI, −1.1 to 3.4).³

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19 trials (1,282 women) compared 1 antihypertensive drug with another.

Antihypertensive drugs halved the risk of progression to severe hypertension, but treatment resulted in little difference in the risk of preeclampsia (see TABLE). There was no clear effect on the risk of neonatal deaths, preterm births, or small-for-gestational-age babies, nor clear differences in any other outcomes. Data were insufficient regarding whether the risk reduction in developing severe hypertension would result in fewer hospital admissions, strokes, preterm births, or cesarean deliveries. The quality of the studies included in this review was moderate to poor, due to unclear or inadequate controls for selection bias in 78% of the trials.

In the 2011 WHO recommendations for the prevention and treatment of preeclampsia, the authors considered the available evidence for the treatment of mild to moderate hypertension (ranges referenced as above). The WHO declined to make a recommendation about the treatment of mild to moderate hypertension until further evidence becomes available. The same guideline development group, however, considered that there is an “absence of clinical uncertainty” over whether treatment of severe hypertension (referenced as >160/105 mmHg) during pregnancy is beneficial, as most maternal deaths related to hypertensive disorders are due to the complications of severe uncontrolled blood pressure.

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