Review: continuous positive airway pressure therapy improves subjective and objective sleepiness in obstructive sleep apnoea


QUESTION: In patients with obstructive sleep apnoea (OSA), does continuous positive airway pressure (CPAP) therapy improve subjective and objective measures of sleepiness more than placebo?

Data sources
Studies were identified by searching Medline (1966–2001); previous meta-analyses, including the Cochrane database; and bibliographies of retrieved articles; and by contacting experts in the field.

Study selection
Studies were selected if they were randomised controlled trials of CPAP therapy in adult patients with OSA for ≥1 week and they evaluated subjective sleepiness using the Epworth Sleepiness Scale (ESS) and objective sleepiness using either the multiple sleep latency (MSLT) or the maintenance of wakefulness test (MWT) score, and had a control arm. Studies that compared CPAP devices with oral appliances and autotitrating devices, and observational studies without a control group were excluded.

Data extraction
Data were extracted on the study design; number of patients in each group; year of publication; type of placebo; patient sex distribution, mean age, mean body mass index, baseline apnoea-hypopnoea index (AHI), mean level of CPAP, and compliance with CPAP therapy; and length of follow up. The primary outcomes were change in subjective sleepiness (difference in the mean change in ESS score between the placebo and CPAP groups) and change in objective sleepiness (difference between placebo and CPAP groups for MSLT or MWT score).

Main results
12 studies (sample size range 16–125 patients; mean follow-up 2.2–24 wks) met the selection criteria. Studies varied in the type of control used (5 studies used oral pills and 4 studies used sham CPAP) and quality of design (6 studies had moderate to high quality [ Jadad score ≥3]). The meta-analysis (random effects model) showed that among the 11 studies evaluating subjective sleepiness (706 patients), CPAP therapy led to a greater ESS score improvement than the placebo group (mean ESS score difference 2.94, 95% CI 1.61 to 4.26, p < 0.001). The effect was greater in studies with AHI ≥30 and ESS ≥11 (mean ESS score difference 4.75, CI 2.97 to 6.53, p < 0.001). In 6 of the 8 studies that reported objective measures of sleepiness (482 patients), CPAP increased sleep onset latency more than placebo (0.95 min, CI 0.10 to 1.76, p = 0.04).

Conclusion
In patients with obstructive sleep apnoea, continuous airway pressure therapy improves subjective and objective measures of sleepiness more than placebo.

COMMENTARY
The meta-analysis by Patel et al shows that CPAP is effective for improving sleepiness in a wide range of patients with OSA. Although it may be anathema to say so in an evidence-based journal, there has never been doubt among physicians that CPAP is a strikingly effective therapy for certain people. Such patients will not willingly give up their cumbersome, inconvenient machine. However, a previous systematic review found insufficient evidence for this conclusion.1

The interesting feature of the study by Patel et al is that it shows an effect even though the meta-analysis included 4 studies designed to test the benefit in mild OSA and 1 study that selected patients with no daytime sleepiness. These studies (which contributed nearly half of the patients to the review, and two thirds of those having MSLT or MWT) were designed to see if the effects established in severe OSA could be extended to other situations.

There can be no doubt now that CPAP has an effect on daytime sleepiness in OSA. In patients with more severe problems, it provides more benefit and is more likely to be used. Whether CPAP has an effect on the long term vascular consequences of OSA remains to be seen. Its short term effect on blood pressure and cardiac function suggest that it has a role.2 Although CPAP is the most effective and best established treatment for OSA, it remains an inconvenient form of management for this common problem.

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