Obstructive sleep apnoea I

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The physiological and psychological dose-response effects of CPAP compliance on sleepiness and daily functioning: individual patient level meta-analysis of two randomized placebo-controlled trials
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Objectives: Some of the observed dose-dependent effect of Continuous Positive Airway Pressure (CPAP) on sleepiness in sleep apnea patients (Weaver et al SLEEP 2008) might be due to a placebo-like expectation of benefit, where conscious knowledge of CPAP use drives reported symptom relief in addition to physiological effects on Obstructive Sleep Apnoea (OSA). Analysis of placebo/sham-CPAP controlled trials may help quantify the relative strength of these two effects: physiological and psychological.

Methods: Two placebo-controlled cross-over trials were combined in an individual patient meta-analysis. In study 1 (n=29) mild-moderate OSA patients were randomised to treatment for 3 weeks with a 2 week washout period (Marshall et al Thorax 2005). In study 2 (n=28; Phillips et al. in preparation) moderate-to-severe patients were randomised to treatment for 8 weeks, with a 4-week washout period. Mixed model analysis of variance was used to quantify the effects of raw compliance (High vs. Low cut at 4 hours/night) and the interaction between treatment and compliance on both Epworth Sleepiness Scale (ESS) and the Functional Outcomes of Sleepiness Questionnaire (FOSQ). A significant interaction effect indicates that physiological benefits of compliance exceed psychological benefits. The analysis controlled for the regression to the mean and treatment effects (i.e. sham vs. CPAP).

Results: High compliance regardless of treatment resulted in superior improvement in the ESS (mean=2.1 points; 95% CI=1.0-3.3, p<0.001). In addition, the interaction between treatment and compliance (p=0.058), although of borderline statistical significance, may be of notable clinical significance. The interaction was evidence of the effect of high use of CPAP (3.4; 2.3-4.7) being greater than the effect of high compliance with sham (1.7; 0.4-3.0 p for diff=0.001). High sham use almost had a greater effect on ESS than low sham use (1.3; -0.1-2.7, p for diff=0.06). High compliance improved the total FOSQ score more than low compliance, regardless of treatment (difference=1.1, 0.4-1.7, p<0.01) but a non-significant interaction term indicated that increased CPAP use was not superior to increased sham use (p=0.4). Similar results were obtained for each FOSQ subscale.

Conclusions: Dose-response effects observed clinically in CPAP using patients are probably due to both direct physiological benefits to sleep but also psychological effects that may arise from expectation of benefit.