

# European Respiratory Society Annual Congress 2013

**Abstract Number:** 5406

**Publication Number:** P3580

**Abstract Group:** 4.2. Sleep and Control of Breathing

**Keyword 1:** Sleep disorders **Keyword 2:** Sleep studies **Keyword 3:** Ventilation/NIV

**Title:** Optimal pressure determination for CPAP in the treatment of obstructive sleep apnea syndrome (OSAS). Comparison of prediction equations and autoCPAP titration

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**Body:** To analyze whether there is a good correlation between the pressure setting by autoCPAP and the one calculated by mathematical prediction formulas proposed by Hoffstein et al.  $[(0.16 \times \text{BMI}) + (0.13 \times \text{NC}) + (0.04 \times \text{AHI}) - 5.12]$ , (AmJRespirCritCareMed1994) and Séries et al  $[(0.193 \times \text{BMI}) + (0.077 \times \text{NC}) + (0.02 \times \text{AHI}) - 0.611]$  (Chest2008). Consecutive patients with OSAS diagnosis after a sleep study between December-2003 to December-2012. Patients underwent an attended sleep study for CPAP titration with an autoCPAP device (REMstar®). The pressure was set from 4 to 15 cmH<sub>2</sub>O. We analyze the correlations (Pearson r coefficient and Bland-Altman plots) between the pressure calculated by the formulas and the one obtained by autoCPAP. We included 2514 male patients. Mean values were: age 54 years ± 12.5, neck circumference (NC) 43.8 ± 3.6 cm, BMI 33 ± 6 kg/m<sup>2</sup>; AHI 49 ± 22. Although there was a good correlation between the pressures calculated by both formulas ( $r=0.97$ ,  $p<0.0001$ ), was lower among the pressures obtained by autoCPAP and Hoffstein ( $r=0.62$ ,  $P<0.001$ ) or Series ( $r=0.54$ ,  $p<0.001$ ). Comparing with the optimum pressure by autoCPAP, we found a difference  $\geq 2$  cmH<sub>2</sub>O in 220 (19.8%) patients respect to Hoffstein formula (in 24 was higher and lower in the other 196 patients). By contrast, with the Séries formula there was a difference  $\geq 2$  cmH<sub>2</sub>O in 393 patients (in 356 was higher). When comparing with autoCPAP titration, Hoffstein formula underestimates CPAP pressure values  $>7$  cmH<sub>2</sub>O. The opposite happens with the Séries formula, which overestimates the pressure throughout the usual range of values except for pressures  $>12$  cmH<sub>2</sub>O.