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Extended Abstract

Modes of ventilation in treatment of OSAS

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Abstract:

Background: Long term compliance is generally suboptimal in the treatment of obstructive sleep apnea syndrome (OSAS)

Objectives: Efficacy and adherence of CPAP and BiPAP was compared in patients diagnosed with moderate-to-severe OSAS.

Methodology: After diagnostic polysomnography (PSG) and titration in 20 patients, patients were treated with CPAP and BiPAP for 8 weeks. Compliance and leakage were analysed night by night.

Results:

- The reduction in AHI and ESS score was more in patients on BiPAP compared to patients on CPAP.
- Leakage time was also lesser with BiPAP compared to CPAP
- Compliance and patient comfort was good with BiPAP compared to CPAP

Conclusion: Treatment efficacy and adherence was better with BiPAP.

Also there was a trend of lesser leakage with BiPAP therapy.

Patients preferred BiPAP over CPAP

Introduction:

OSAS is characterized by repetitive episodes of upper airways obstruction during sleep resulting in sleep fragmentation, daytime hypersomnolence, increased risk of motor vehicle accidents, neurophysiological and cardiovascular sequel and reduced quality of life. Continuous positive airway pressure (CPAP) is recognized as the treatment of choice for moderate-to-severe OSAS. Despite its proven efficacy in symptom reduction, long term compliance with CPAP therapy is suboptimal. CPAP machines can only be set to a single pressure that remains consistent throughout the night.

Bi-level positive airway pressure (BiPAP) devices have been developed to improve patient comfort and to increase acceptance and adherence to the treatment. In contrast to the fixed pressure level during conventional CPAP therapy, BiPAP machines can be set to two pressure settings as for inhalation (high-ipap) and for exhalation (low-epap).

Aims and objectives:

- To study the efficacy of BiPAP and CPAP in patients diagnosed with moderate to severe OSA

- To study the adherence of BiPAP and CPAP in patients diagnosed with moderate to severe OSA

Methodology:

- 20 patients were consecutively recruited having OSA newly diagnosed with AHI>15/hr based on full night PSG (Polysomnography)
- After performing full night PSG all patients underwent manual titration in second night to determine the optimal fixed CPAP pressure.
- The patients were than randomized in two groups. The first group was treated with conventional CPAP at fixed pressure obtained during manual titration and the second group began the study with BiPAP.
- After 8 weeks ambulatory monitoring was performed at home and the mode of device was switched.
- Finally after 16 weeks a full PSG was repeated

Inclusion criteria:

Patients more than 20 years of age

Patients with ESS score more than 10

Patients with BMI more than 25 kg/m^2

Patients with newly diagnosed OSA with AHI more than 15

Patients consenting for the study

Exclusion criteria:

Patients with congenital heart diseases

Patients with acute neurological disorders

Patients with acute psychiatric disorders

Patients with malignancy

Patients with active pulmonary tuberculosis

Patients on LTOT at home

Patients not consenting for the study

Statistical analysis:

Numeric variables such as anthropometric and PSG data were expressed as means ± SD. Calculations for significant differences between baseline measurements and each treatment mode and between two modes with rejection of the null hypothesis at $p < 0.05$

Results:

- Twenty patients (16 men and 4 women, aged 55.5±8.6 years, BMI 29.3±4.1 kg/m^2) were consecutively recruited.
- Reduction of AHI with BiPAP was 5.6 ± 3.6 compared to CPAP was 4.6±2.9 at 8 weeks with $p<0.01$ from baseline 32.9±19.1

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- Arousals with BiPAP was 8.1±6.2 compared to CPAP was 13.6±4.2 at 8 weeks with $p < 0.01$ from baseline 18.4±9.2
- Snoring episodes with BiPAP was 56.4±78.6 compared to CPAP was 76.8±66.4 at 8 weeks with $p<0.01$ from baseline 436.3±209.6
- Saturation (SPO2) with BiPAP was 88±2.8 compared CPAP was 83.4±5.2 at 8 weeks with $p<0.01$ from baseline 78.4±8.4
- ESS with BiPAP was 4.9±4.6 compared to CPAP was 9.6±5.2 at 8 weeks with $p <0.01$ from baseline 11.8±4.2
- Patient comfort and adherence was more with BiPAP compared with CPAP

Discussion:

Besides conventional CPAP therapy, BiPAP has been established as treatment mode in OSAS. A number of different BiPAP devices are commercially available varying in regards to technological aspects. Numerous studies performed to evaluate the clinical efficacy of BiPAP devices in treatment of OSAS demonstrated adequate reduction in AHI. Significant improvement in daytime sleepiness expressed as the decrease in ESS score could be achieved efficiently and easily with BiPAP. Patient compliance with BiPAP was significantly better compared to conventional CPAP.

Air leakage at skin-mask interface is one of the most reported adverse effect of positive airway pressure therapy directly affecting patient compliance with the therapy. However to date mask leakage during CPAP and BiPAP therapy at home and its effect on treatment compliance over period of time has not been determined in most of the previous studies. Although there was no significant difference in mean pressure between two modes a trend towards lower leakage time with BiPAP was observed. Interestingly older patients had lower mask leakage and a higher compliance with both treatment modes. The association between increasing age and treatment compliance is consistent with findings by McArdle et al. and Sin et al. The reason for age dependency of leakage remains speculative but one explanation can be less position shifts during the night. As De Koninck et al. described position shifts and body movements decrease with age. These findings emphasizes the importance of proper mask fitting particularly in younger OSAS patients.

In summery, our study findings proved that based on snoring, AHI and flow limitation BiPAP is more efficient mode of treatment compare to CPAP. There was a trend towards lower leakage with BiPAP. Another important result of this study is the fact that

younger patients have a lower treatment compliance and a greater amount of leakage. Particularly in younger patients careful selection of interface and close monitoring of side effects are essential for long-term compliance.

Conclusion: It can thus be said that BiPAP is better treatment modality compared to CPAP in patients with moderate to severe OSAS.

References:

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Result:

Variable	**Baseline**	**8 weeks CPAP**	**8 weeks BiPAP**
AHI events/hr	32.9±19.1	4.6±2.9	5.6±3.6
Arousals/hr	18.4±9.2	13.6±4.2	8.1±6.2
Snoring	436.3±209.6	76.8±66.4	56.4±78.6
SPO2	78.4±8.4	83.4±5.2	88.0±2.8
ESS	11.8±4.2	9.6±5.2	4.9±4.6
P<0.001 vs baseline			

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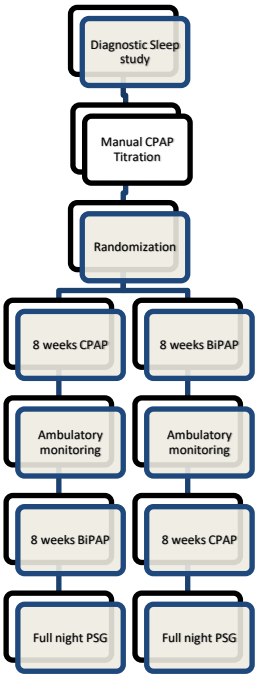
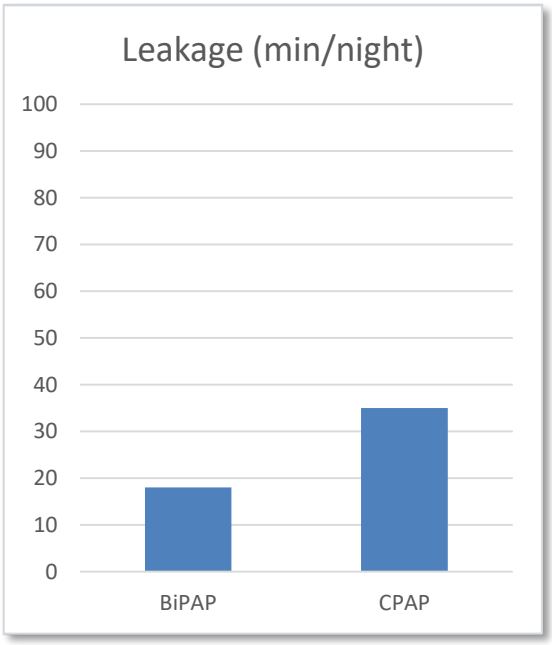
Study protocol:



Leakage:



Compliance: