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Title: Effect of continuous and bilevel noninvasive ventilation for acute asthma exacerbation – A randomized controlled trial

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Body: Guidelines for management of acute asthma exacerbation (AAE) centre on pharmacological interventions and invasive mechanical ventilation. The role of non-invasive positive pressure ventilation (NPPV) in AAE remains unanswered. Aims: We hypothesized that adding continuous positive airway pressure (CPAP) or bilevel positive pressure ventilation (BPPV) to standard therapy (ST) would improve lung function and clinical signs faster than ST alone. Methods: Thirty patients with severe AAE [peak expiratory flow rate percentage (PEFR%) predicted < 60%] presenting at an emergency unit were randomized to either ST, ST and CPAP or ST and BPPV. Results: Groups presented similar baseline characteristics. Mean baseline PEFR% predicted was 35.2 (10.7) % [ST], 30.5 (11.7) % [CPAP] and 33.5 (13.8) % [BPPV]. PEFR significantly improved in the CPAP group from the first 30 minutes of treatment (PEFR p = 0.00; PEFR% predicted p = 0.00) compared to the BPPV and ST groups. Improvement in respiratory rate (RR) (p = 0.05) and sensation of breathlessness (SB) (p = 0.00) was significantly better in the BPPV group from the first 30 minutes. Discussion: The significant improvement in PEFR in the CPAP group could be related to its intrinsic effect on the airway smooth muscle and/or its load. The positive effect of BPPV on RR and SB could be related to the inspiratory assistance provided. Conclusion: The addition NPPV to ST in acute severe asthma exacerbation, improved lung function and clinical signs faster than ST, yet CPAP was faster and more effective in reducing bronchospasm than BPPV.