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Full face mask for noninvasive positive-pressure ventilation in patients with acute respiratory failure

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Abstract

Background: Noninvasive positive-pressure ventilation (NPPV) is commonly used to improve ventilation and oxygenation in patients with acute respiratory failure (ARF). Mask leak and intolerance due to facial discomfort or claustrophobia often occur with NPPV and are frequently cited reasons for treatment failure.

Methods: Retrospective review of patient records from a tertiary-care referral hospital.

Results: We report the effectiveness of a full face mask in the application of NPPV for 10 nonambulatory patients (mean [SD], 61 [9] years) who had a combined total of 13 episodes of ARF. After these patients were unable to receive NPPV therapy via the more commonly available nasal or oronasal masks, care was provided using full face masks. Eight of 10 patients had hypercapnic respiratory failure; 2 patients, hypoxemic respiratory failure. All patients were placed on ventilation initially using a bi-level positive airway pressure device. Subsequently, patient ventilation was achieved using a Puritan Bennett 7200a ventilator for on-line respiratory monitoring. The mean (SD) duration of treatment with NPPV was 9.7 (2.7) hours per day for 3.0 (1.6) days. Following NPPV via full face mask, the patients' Paco(2) decreased (65 [20] vs 82 [27] mm Hg, P=.09) and pH increased significantly (7.36 [0.07] vs 7.26 [0.07], P<.05) in less than 2 hours. Moreover, the patients demonstrated decreased respiratory rate (18 [7] vs 32 [8] breaths/min, P<.01), heart rate (106 [13] vs 124 [16] beats/min, P=.008), and Acute Physiology and Chronic Health Evaluation II scores (12 [3] vs 17 [4], P<.005) after NPPV via full face mask. These cardiorespiratory alterations occurred as early as 1 hour after NPPV initiation and were maintained throughout treatment. Two patients required endotracheal intubation because of copious purulent secretions.

Conclusion: For individuals with hypercapnic respiratory failure who cannot tolerate NPPV using nasal or oronasal masks, use of full face masks may improve outcomes, allowing physicians to avoid ordering endotracheal intubation and mechanical ventilation.