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Title: The effects of heated humidification in patients on non-invasive ventilation (NIV) for acute respiratory failure

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Body: Background: During NIV patient airways experience high pressures and flows of dry gas.This,combined with an already compromised airway causes drying of the upper airway muscosa and may lead to loss of comfort,dry mouth,nose, and throat and nasal congestion. Objective: To determine whether heated humidification (HH) improves patient comfort and alleviates the side effects of NIV in acute respiratory failure. Method: Patients with type 2 respiratory failure caused by an exacerbation of COPD or Obesity Hypoventilation Syndrome requiring NIV were randomised to an open -label,parallel study to receive 4 hour 'washout' period of NIV ,followed by 8 hrs of NIV with either heated humidification (HH) or without heated humidification (No HH). Patient comfort (visual analogue scale) ,facial skin temperatures inside and outside of the mask were measured and a NIV side effects questionnaire were completed. Results: 33 patients were recruited to the study and data was obtained for 31,15 in the HH group and 16 in the No HH group.There was no significant difference in the change in comfort scores,from the end of the washout NIV to 8 hours of treatment NIV,between HH and No HH groups.However at 4 hours of treatment HH was significantly less comfortable (p=0.01).For facial skin temperatures,the difference between body temperature and chin temperature was significantly lower in the HH group compared to the No HH group(mean difference 3.2 C for HH and 5.4 C for No HH;P=0.03,indicating that facial skin temperatures within the mask were higher with HH. Conclusion: Using HH during NIV increases facial skin temperatures within the mask which had a varying effect on patient comfort.