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Title: Respiratory events during long term noninvasive positive pressure ventilation in children: Clinical implications and detection of events

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Body: **OBJECTIVE** The aims of the study were (1) to describe the respiratory events during noninvasive positive pressure ventilation (NPPV) and, (2) to analyze the clinical consequences. **METHOD** Nocturnal polygraphic (PG) recordings were performed in stable patients. Respiratory events were scored using the SomnoNIV Group definitions [1]. The consequences of an event i.e. a fall of $\geq 3\%$ of pulse oximetry (SpO_2) and/or a $\geq 30\%$ decrease in pulse rate amplitude (respiratory autonomic micro-arousals: RAM) were described. **RESULTS** PG tracings of 27 patients (13 boys, age range 1-18) were analysed: neuromuscular disease (n=7), obstructive sleep apnea (n=8) and lung disease (n=12). Unintentional leaks, partial or total upper airway obstruction without reduction of ventilatory drive, a decrease in ventilatory drive, mixed events, and patient ventilator asynchronies were observed in 61%; 37%; 28%; 7%; 53% of the patients, respectively. These events were associated with a decrease of SpO_2 in 21%; 37%; 18%; 4%; 12% of the patients respectively, and with a RAM in 38%; 27%; 8%; 3%; 32% of the patients respectively. The mean number of type of events per patient was 1.8 ± 1.1 . For a given patient, there was a predominant event representing $87 \pm 10\%$ of total time with respiratory events. The median duration spend in respiratory event was 39% (range 0.7 to 92%) of total recording time. Of the patients with a minimal nocturnal $SpO_2 > 90\%$ and a $PtcCO_2 < 50\text{mmHg}$, 12 (44%) had at least one respiratory event. **CONCLUSION** Respiratory events are common in stable children treated with long term NPPV and can be associated with desaturations and/or RAM. 1. Gonzalez J et al. Thorax 2011.