Critical Care Volume 10 Suppl 1, 2006

26th International Symposium on Intensive Care and Emergency Medicine

Brussels, Belgium, 21–24 March 2006
Published online: 21 March 2006

P43

Non-invasive mechanical ventilation can be useful during difficult weaning from invasive ventilation

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Critical Care 2006, **10(Suppl 1):**P43 (doi:10.1186/cc4390)

Introduction Non-invasive mechanical ventilation with positive pressure (NPPV) has been investigated in several acute respiratory failure situations. There are some doubts considering its benefits during weaning from invasive mechanical ventilation (IMV).
Objective To evaluate the use of NPPV in patients with difficult weaning characterized by failure in a spontaneous breathing trial (SBT).
Methods All patients under IMV for more than 48 hours from June 2003 to February 2005 were submitted to a SBT. Those that failed during the first 30 min of a T-piece trial, and without contraindications to NPPV, were randomized back to IMV (conventional treatment) or changed to NPPV. Contraindications to NPPV included patients with facial trauma or cranial surgery, recent gastric or esophagic surgery, tracheostomy, respiratory secretion excess, agitation and noncooperative behaviour that were excluded from the experiment. Inclusion in the experiment was authorized by signed informed consent. Previous to subjecting the patient to SBT we collected a sample of arterial blood gases and we measured the maximal inspiratory pressure (PImax). During spontaneous ventilation in the T piece, in the 1st and 30th min measurements of tidal volume (VT), minute ventilation (Ve), respiratory rate (f), rapid shallow breathing index (f/VT), heart rate and peripheral oxygen saturation were taken. After randomization to IMV or NPPV, patients were followed clinically and evaluated concerning the time of ventilation, length of stay (LOS) in the ICU and in the ward, complications and the mortality rate.
Results Out of 156 patients, 65 (42%) failed in the T-piece trial, of which 28 were submitted to NPPV and 37 were maintained under IMV. The average ages of the NPPV and IMV groups were 67.6 ± 15.5 and 59.7 ± 17.6 years, respectively. Chronic pulmonary disease aggravation, heart diseases and postoperative respiratory failure were the most frequent causes of IMV use. Ventilation time previous to SBT was 7.3 ± 4.1 days for both groups. Cardiac and respiratory parameters were similar for both groups, either at 1 or 30 min of SBT as well as during their follow-up. The percentage of complications in the NPPV group was lower than in IMV (28.6% vs 75.7%), with lower incidence of pneumonia and tracheostomy. Death occurred in 29% in the NPPV and 22% in the IMV group (not significant). LOS in the ICU was similar for both groups (10.3 ± 9.4 for NPPV vs 11.8 ± 9.1 days for IMV) and LOS in the ward was lower for the NPPV group (9.6 ± 12.7 vs 15.0 ± 18.6 days, not significant).
Conclusions NPPV can be used as a good ventilation procedure for patients with difficulties during weaning from mechanical ventilation. It is related to a lower incidence of ventilationassociated pneumonia and a lower need for tracheostomy.