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SCIENTIFIC ARTICLE

Non-invasive mechanical ventilation after the successful weaning: a comparison with the venturi mask

Adıyeke Esra, Ozgultekin Asu, Turan Guldem*, Iskender Altay, Canpolat Gamze, Pektaş Abdullah, Ekinci Osman

Haydarpasa Numune Teaching and Research Hospital, Department of ICU, Istanbul, Turkey

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KEYWORDS
NIMV;
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Abstract
Background and objectives: This study compared the rates of acute respiratory failure, reintubation, length of intensive care stay and mortality in the patients in whom the non-invasive mechanical ventilation (NIMV) applied instead of the routine venturi face mask (VM) application after a successful weaning.
Methods: Following the approval of the hospital ethics committee, 62 patients who were under mechanical ventilation for at least 48 h were scheduled for this study. 12 patients were excluded because of the weaning failure during T-tube trial. The patients who had optimum weaning criteria after the T-tube trial of 30 min were extubated. The patients were kept on VM for 1 h to observe the hemodynamic and respiratory stability. The group of 50 patients who were successful to wean randomly allocated to have either VM ($n = 25$), or NIV ($n = 25$). Systolic arterial pressure (SAP), heart rate (HR), respiratory rate (RR), PaO_2, PCO_2, and pH values were recorded.
Results: The number of the patients who developed respiratory failure in the NIV group was significantly less than VM group of patients (3 reintubation vs. 14 NIV + 5 reintubation in the VM group). The length of stay in the ICU was also significantly shorter in NIV group (5.2 ± 4.9 day vs. 16.7 ± 7.7 day.
Conclusions: The ratio of the respiratory failure and the length of stay in the ICU were less when non-invasive mechanical ventilation was used after extubation even if the patient is regarded as 'successfully weaned'. We recommend the use of NIMV in such patients to avoid unexpected ventilator failure.

* Corresponding author.
E-mail: gturanmd@yahoo.com (T. Guldem).

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PALAVRAS-CHAVE
VMNI;
Desmame;
UTI

Ventilação mecânica não invasiva após desmame bem-sucedido: uma comparação com a máscara de Venturi

Resumo
Justificativa e objetivos: Este estudo comparou as taxas de insuficiência respiratória aguda, reintubação, tempo de internação em UTI e mortalidade em pacientes sob ventilação mecânica não invasiva (VMNI) em vez da habitual máscara facial de Venturi (MV) após desmame bem-sucedido.
Métodos: Após a aprovação do Comitê de Ética do hospital, 62 pacientes que estavam sob ventilação mecânica por no mínimo 48 horas foram inscritos neste estudo. Doze pacientes foram excluídos devido à falha de desmame durante o teste de tubo-T. Os pacientes que apresentaram critérios de desmame ótimos após o teste de tubo-T de 30 minutos foram extubados. Os pacientes foram mantidos em MV por 1 hora para observação da estabilidade hemodinâmica e respiratória. O grupo de 50 pacientes que obtiveram sucesso no desmame ventilatório foram alocados aleatoriamente para MV ($n = 25$) ou VNI ($n = 25$). Os valores de pressão arterial sistólica (PAS), frequência cardíaca (FC), frequência respiratória (FR), PaO_2, PCO_2 e pH foram registrados.
Resultados: O número de pacientes que desenvolveram insuficiência respiratória no grupo VNI foi significativamente menor que o do grupo MV (3reintubações *vs*. 14 VNI + 5 reintubações no grupo MV). O tempo de permanência em UTI também foi significativamente menor no grupo NIV ($5,2 \pm 4,9$ dias *vs*. $16,7 \pm 7,7$ dias).
Conclusões: As taxas de insuficiência respiratória e do tempo de permanência em UTI foram menores quando a ventilação mecânica não invasiva foi usada após a extubação, mesmo se o paciente for considerado como ''desmame bem-sucedido''. Recomendamos o uso de VMNI em tais pacientes para evitar a falha inesperada do ventilador.

Introduction

Non-invasive ventilation takes a role in different stages of treatment in intensive care units. This method is commonly used as an alternative to invasive ventilation in patients who are clinically stable but suffer from acute hypercapnic respiratory failure.[1–3] NIV is also used for premature weaning and post extubation respiratory failure and positive results on reintubation and duration of intensive care unit stay is reported.[4]

In this study, we aimed to determine if prophylactic NIV applied to the patients who were extubated according to the standardized weaning criteria and who were appropriate for following with venture face mask (VM) would make any difference in terms of respiratory failure after extubation, reintubation, duration of intensive care unit stay and mortality.

Materials and methods

Sixty-two patients above 18-years old who were admitted to intensive care unit with acute respiratory failure and treated with invasive mechanical ventilatory support for more than 48 h were included in the study. Patients whose APACHE II (Acute Physiology and Chronic Health Evaluation II) score above 25, GCS (Glasgow Coma Scale) below 13 and who have contraindications for NIV (patients with maxillofacial trauma, gastrointestinal obstruction and severe secretion), severe irreversible organ failure and pregnancy were excluded from the study. Demographic data, diagnosis, comorbidities, and APACHE II scores of the patients were recorded. Weaning was planned for the patients who have optimal conditions: CPAP mode with invasive mechanic ventilation support who have $FiO \leq 40$, $PaO_2 \geq 60$, $PEEP \leq 5$, $SO_2 \geq 90$ and not having inotrope support; systolic arterial pressure between 70 and 180 mmHg, peak heart rate between 50 and 140 min, respiratory rate < 25 min, $GCS \geq 13$. Patients who fulfilled these criteria were taken under spontaneous respiratory trial with T-part for 30 min. Arterial blood gas was evaluated after 30 min spontaneous respiratory trial. If hemodynamic and respiratory parameters were stable, patients were extubated and supported with O_2 by VM. Patients were followed up for an hour to observe sufficiency in terms of weaning and the ones who had $SO_2 \geq 90$, systolic arterial pressure between 70 and 180 mmHg, peak heart rate between 50 and 140 min, respiratory rate < 25 min were included in the study. The patients were chosen into the groups according to the admission number as having odd or even number.

At the end of the first hour, the patients who could not provide these parameters and impaired hemodynamics or respiratory pattern, were return to mechanical ventilation (IMV or NIV) and excluded from the study. While one of the groups (Group VM) were continued to have O_2 support by VM from the first hour of extubation, the other group (Group NIV) were put on NIV from the first hour of extubation. The function of the NIV was explained to the patients in NIV

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