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Intrahospital transport of a patient with acute exacerbation of chronic obstructive pulmonary disease under noninvasive ventilation

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Sir: Noninvasive positive pressure ventilation (NPPV) is being used increasingly in patients with acute respiratory failure in the ICU setting. NPPV appears particularly advantageous in patients with acute exacerbations of chronic obstructive pulmonary disease as it decreases mortality, the need for endotracheal intubation, and the length of hospital stay [1]. ICU patients frequently require transportation to alternative locations, such as the radiology department or the catheter laboratory [2]. NPPV was not possible with older transport ventilators as these did not provide adequate ventilation modes for NPPV. Transport ventilators of the latest generation offer several advantages, including new ventilation modes (bilevel positive airway pressure mode, pressure-supported spontaneous breathing). Precise concentrations of oxygen can also be delivered, and both monitoring and alarm features are far more sophisticated than in the past.

We report the case of a 68-year-old woman admitted to our ICU because of respiratory insufficiency due to exacerbated chronic obstructive pulmonary disease. Oxygen saturation under 5l/min oxygen by a face mask was 90%, and blood gas

analysis showed respiratory acidosis (pH 7.21, pCO₂ 70.8 mmHg), while chest radiography findings were normal. Treatment was started with oxygen, inhaled β -adrenergic agonists, anticholinergic bronchodilators, corticosteroids, and antibiotics. NPPV was then initiated because of persistent respiratory distress. The patient's electrocardiogram was remarkable for ST segment depression in leads V1–V4, and further laboratory work up revealed elevated troponin of 2.24 μ g/l (–0.1), and echocardiography showed markedly reduced left ventricular function. After careful consideration of the patient's good tolerance of the noninvasive ventilation, ability to cooperate, and hemodynamic stability the decision was made to transfer her under NPPV to the catheter laboratory to rule out significant coronary stenosis. NPPV with a full-face mask was continued with a transport ventilator (Oxylog 3000, Dräger, Germany) using the bilevel positive airway pressure mode with an inspiratory pressure of 21 cmH₂O, a PEEP of 5 cmH₂O, a respiratory rate of 25 breaths/min, and fraction of inspired oxygen of 0.4. At these settings the tidal volume averaged 500 ml. A critical care physician and a nurse accompanied the patient and performed monitoring. Throughout the transport and cardiac catheterization SaO₂ consistently remained higher than 90%, and the patient was awake and cooperative. Angiography demonstrated normal coronary vessels with no significant stenosis. Ventriculography confirmed markedly reduced left ventricular function, a finding most consistent with a diagnosis of acute myocarditis. After 80 min the patient returned to the ICU without an incident. Repeat blood gas analysis showed a PCO₂ level of 60 mmHg.

NPPV has been used in the emergency department, intensive care unit, intermediate or respiratory care unit, or hospital ward. In the prehospital setting there are a few published reports [3] of continuous positive airway pressure being used in pulmonary edema. However, to our knowledge, the use of NPPV during intrahospital transfer has not previously been reported. The success of NPPV depends on appropriate patient selection. There are several accepted contraindications for NPPV, such as hemodynamic instability and severe encephalop-

athy [4]. In conclusion, our data show that with transport ventilators of the latest generation NPPV during transfer in selected patients is possible. Intensive monitoring and the ability to rapidly respond with intubation and cardiorespiratory support are required.

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