

Non invasive positive pressure ventilation: the sooner the better

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Non Invasive Positive Pressure Ventilation (NIPPV) is a respiratory technique used from several decades in intensive care units^{1,2}. This respiratory support has been investigated in lot of clinical studies and has become a first line treatment of several acute respiratory diseases. Historically, exacerbation of COPD was the main indication for NIPPV³. Non invasive Bi-level Positive Airway Pressure (BiPAP) ventilation has been shown to significantly improve pH, PaCO₂, and respiratory rate within the first hour, and the major benefit observed was the decrease in intubation rate³. Moreover, in COPD patients with exacerbation, early BiPAP use has demonstrated to reduce length of hospitalisation and above all hospital mortality². The second main indication of NIPPV is the cardiogenic pulmonary oedema (CPO). In this indication, if BiPAP has been already used from many years, another non invasive respiratory support, the Continuous Positive Airway Pressure (CPAP), is more popular among emergency physicians^{4,5}. CPAP which is not a true ventilatory mode, because it does not provide inspiratory support, is however often referred to as NIPPV. Cardiogenic pulmonary oedema (CPO) is the first cause of acute respiratory distress in the world and most of these patients are initially managed either in emergency department or out of hospital by pre-hospital medical (or paramedical) units. Thus, CPAP is for many emergency departments used as a standard therapy in patients with CPO. If CPAP is as effective as BiPAP in patients with CPO, it remains that only BiPAP is indicated in patients with severe COPD exacerbation. Whereas it is well established, for most of physicians working in intensive care or in emergency departments, that NIPPV is an unquestionable treatment of COPD and CPO patients, interest of non invasive respiratory

support use out of hospital is still debating. However, two clinical studies, one performed in intensive care, the other out of hospital, reported results which emphasize the major importance of the moment of NIPPV start. The first classical study from Brochard et al. has compared use of NIPPV (BiPAP) versus standard medical treatment in COPD patients with exacerbation². Results were impressive because NIPPV was able to decrease both intubation rate and in hospital mortality. A very interesting finding was that in the control group, ie patients not treated with NIPPV, more than half of all intubations were performed during the first hour following randomisation. This point seems very important to consider and underlines that NIPPV must not be a delayed treatment, even in COPD patients who may be breathless for several hours before first medical contact. The second interesting study has been recently published by Plaisance et al⁶. The authors have assessed use of CPAP in 124 patients with severe cardiogenic pulmonary oedema. In this trial, performed out of hospital by emergency medical units, classical medical treatment was given and CPAP was applied in all patients. The patients were randomised in two groups: one group received immediately CPAP (Early CPAP), the second group had CPAP only 15 minutes after medical treatment had been started (Late CPAP). Patients improved faster in Early CPAP group, intubation rate was much higher in the Late CPAP group (16 vs 6) and in hospital death was reported higher for the Late CPAP patients (8 vs 2). From these two major studies, it appears that the earliness of NIPPV employ is one of its success keys. These results argue therefore in a widely use of NIPPV in the out of hospital setting. However, feasibility of NIPPV out of the hospital was until recently ques-

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tionable. If CPAP is used for several years in pre hospital emergency medicine, BiPAP employ is very new in this setting. CPAP is a very easy-to-use method not requiring a ventilator. For instance the "pocket" Boussignac device has been shown to be very simple to use either in emergency department or in out of hospital setting by physicians or paramedics^{7,8}. However, it was not the same for the BiPAP mode. Until recently, the main barrier to widespread out-of-hospital BiPAP implementation was technical as most ventilators for BiPAP ventilation either had no battery or was relatively heavy and cumbersome. High-performance, small, lightweight (< 4 kg), battery-powered respirators have now become available, offering early high-performance ventilation in an out-of-hospital setting for patients with respiratory distress. A second limiting factor in out-of-hospital BiPAP implementation could be related to the operator skill need. It has been shown that the more experienced the operator, the higher the success rate of NIPPV. Nevertheless, it has been recently reported a large series of out of hospital patients successfully managed with BiPAP by physicians who had undergone only a short, highly focused initial training covering both the theory and practice of NIPPV⁹. All these emergency physicians had only practiced BiPAP ventilation with different settings on a colleague for one hour and had a yearly 2-hour update session.

To sum up, what we can say in 2008 is that firstly, strong clinical arguments to initiate NIPPV as early as possible in patients with acute respiratory distress caused by CPO or COPD exacerbation exist. Secondly, BiPAP has become easy to

perform in out of hospital because of the availability of new small and high-performance respirators. Lastly, formation to NIPPV appears be relatively simple and rapid. Therefore, today, NIPPV is a standard therapy which has to be known and performed by all physicians who are likely to manage respiratory distress patients in emergency setting in or out of hospital.

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