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Non-invasive ventilation in Poland — for whom the bell tolls?

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In the 17th century the ringing of a church bell at an unusual time always signified some extraordinary event, summoning the entire local community to take action. Ernest Hemingway, while trying to find a title for his novel about the civil war in Spain, used a poem by the English poet John Donne, who lived in the 16th and 17th century. Here is a fragment: "[…] any man's death diminishes me, because I am involved in mankind, and therefore never send to know for whom the bell tolls; it tolls for thee" [1].

Our intention is for this paper to be a dramatic appeal, a tolling of the bell, to the community of Polish pneumonologists to initiate a widespread use of non-invasive ventilation (NIV). In 1981, Sullivan et al. described the benefits of using continuous positive airway pressure (CPAP) delivered to the airways through a nasal mask in the treatment of obstructive sleep apnoea [2]. Using this technique, first attempts were made in the late 1980s to non-invasively support ventilation in acute [3] and chronic [4] respiratory failure. Over the next years many studies assessing the efficacy of NIV were conducted. Their results have considerably changed the principles of management of respiratory failure. It is estimated that about 30% of patients in Western Europe requiring ventilatory support due to acute respiratory failure are being managed with non-invasive methods [5, 6]. The use of NIV leads to similar physiological effects to those of invasive ventilation, as it reduces respiratory muscle work and improves gas exchange [7], while avoiding the complications associated with invasive ventilation [8]. As a method that is less expensive, associated with a lower number of complications [9] and more accessible than invasive ventilation, NIV has been applied in many clinical conditions.

Non-invasive ventilation in the management of acute respiratory failure

The principal indication for use of NIV is severe exacerbation of chronic obstructive pulmonary disease (COPD) accompanied by uncompensated respiratory acidosis [10]. A metaanalysis of 14 randomised studies showed a reduction of mortality of nearly 50% and a reduction of the need to intubate by 60% in the group of patients managed with NIV with very low numbers needed to treat (NNT) of 8 and 6, respectively. An additional benefit was the shortening of hospital stay by more than 3 days [11].

NIV has turned out to be effective in the management of cardiogenic pulmonary oedema [12], pneumonia in immunosuppressed patients [13], acute respiratory failure in patients with neuromuscular diseases, chest wall deformities [14] and obesity [15], weaning from mechanical venti lation [16] and postoperative respiratory failure [17].

In many countries, mainly Western Europe and North America, NIV is the domain of pulmonologists. It is them who also provide intensive care, and most of pulmonary wards have intensive care units. The organisation of healthcare in Poland, on the other hand, assumes that patients re-

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quiring ventilatory support should be managed in the intensive care unit (ICU) setting by a specialist in anaesthesia and intensive care. In practice, however, ICUs receive the most severely ill patients with multiorgan failure. And these patients usually are ineligible for NIV. This method is therefore very rarely used by anaesthetists. In light of the limited number of beds in ICUs, patients with single- or double-organ failure are managed at general wards. Often, at these wards, separate "monitored rooms" with a greater number of nursing staff are organised. This way intensive cardiac, haematological, neurological or diabetes care units are formed. Unfortunately, most of these units do not receive funding commensurate with expenses, which considerably limits the therapeutic and organisational possibilities of these facilities. This problem is also present at respiratory intensive care unit (RICU).

Given the principal indication for NIV, an exacerbation of COPD, and the high incidence of exacerbations, respiratory medicine specialists should routinely use this method in accordance with the Polish Respiratory Society guidelines [18]. Unfortunately, as demonstrated by a survey conducted last year, only 1/3 of pulmonary wards in Poland have equipment for NIV, while 2/3 of them are in possession of one respirator only [19]. These heroic efforts of doctors do not have the support of the National Health Fund and—with few exceptions—are not formally recognised as an integral element of pulmonary departments.

An RICU, which offers the possibility of continuous monitoring of the patient's vital functions, is the ideal place for NIV. Despite the lack of separate funding of care provided to patients with respiratory failure about 40% of pulmonary wards in Poland have such units with three beds on average [19]. The lack of an RICU may be the reason for not using NIV. Patients with moderate acidosis (pH 7.30–7.35) can equally effectively be managed at the general ward [10].

It is necessary for the Ministry of Health to recognise NIV as a life-saving procedure [11] provided by pulmonologist. If each patient with end-stage renal disease in Poland receives haemodialysis and each patient with acute myocardial infarction is referred to interventional cardiology wards, why can't patients with COPD take advantage of receiving NIV in an attempt to save their lives? The Executive Board of the Polish Respiratory Society and the National Specialist in Pulmonary Diseases supported by the "levy in mass" of Polish pneumonologists are bound to achieve this goal. The conference entitled: "The ABC of non-invasive positive pressure ventilation", to be held on 19 November 2011 in Warsaw and organised by the Respiratory Diseases Commission of the Polish Academy of Sciences Clinical Pathophysiology Committee, will be a good opportunity to integrate the community and to plan further actions.

Non-invasive ventilation in the management of chronic respiratory failure

NIV has changed the management of patients with chronic respiratory failure, who require home mechanical ventilation (HMV). Currently creating a tracheostomy is rarely necessary. Studies conducted in various European countries demonstrated that the percentage of patients ventilated via tracheostomy is 5–13% [20, 21]. A completely different situation is observed in Poland, where nearly 60% of patients have a tracheostomy [22]. Most of these patients suffer from neuromuscular diseases, while lung and chest wall diseases account for only 18% of the total number of patients [22]. Such patients in the Western European countries account for as many as two thirds [20]. The reason for this difference lies in the different organisation of healthcare systems as far as patients with chronic respiratory failure are concerned. In the majority of the European Union countries, care of chronic respiratory failure patients is provided by pulmonologists. In Poland, in line with the Ministry of Health guidelines [23], only anaesthetists are allowed to qualify patients for HMV. The reason for the low number of patients managed by HMV and the low percentage of "respiratory" patients is the faulty organisation [24].

An issue that needs to be urgently solved is the recognition of pulmonologists with experience in NIV used in the hospital setting as persons authorised to qualify selected patients with chronic respiratory failure for treatment with NIV.

Conclusions

NIV should remain within the domain of pulmonologists. Many reasons for the difficulties encountered while implementing this life-saving procedure may be found. So as not to complain about the low expenditure on healthcare or its faulty organisation, let us end this paper with another quote, one from Antoine de Saint-Exupery's "Citadelle": "The stronger you are, the more faults you take upon yourself". It is us, pulmonologists, that manage patients who may benefit from NIV. On their behalf and in agreement with our medical conscience, which tells us to use optimal treatments,

we should familiarise ourselves with the method, solicit the provision of appropriate equipment and report the need for changes in the organisation of healthcare provided to patients with respiratory failure.

References

1. Donne J. Medytacja XVII. Jn: Barańczak S. Antologia angielskiej poezji metafizycznej XVII stulecia. PIW, Warszawa 1991: 54–55.
2. Sullivan C.E., Issa F.G., Berthon-Jones M., Eves L. Reversal of obstructive sleep apnea by continuous positive airway pressure applied through the nares. Lancet 1981; 1: 862–865.
3. Meduri G.U., Conoscenti C.C., Menashe P., Nair S. Noninvasive face mask ventilation in patients with acute respiratory failure. Chest 1989; 95: 865–870.
4. Leger P., Bedicam J.M., Cornette A. et al. Nasal intermittent positive pressure ventilation. Long-term follow-up in patients with severe chronic respiratory insufficiency. Chest 1994; 105: 100–105.
5. Doherty M.J., Greenstome M.A. Survey of non-invasive ventilation (NPPV) in patients with acute exacerbation of chronic obstructive pulmonary disease (COPD) in the UK. Thorax 1998; 53: 863–866.
6. Vanpee J., Delaunois L., Lheureux P. et al. Survey of non-invasive ventilation for acute exacerbation of chronic obstructive pulmonary disease patients in emergency department in Belgium. Eur. J. Emerg. Med. 2002; 9: 217–224.
7. Vitacca M., Ambrosino N., Clini E. et al. Physiological response to pressure support ventilation delivered before and after extubation in patients not capable of totally spontaneous autonomous breathing. Am. J. Respir. Crit. Care Med. 2001; 164: 638––641.
8. Girou E., Schortgen F., Delclaux C. et al. Association of noninvasive ventilation with nosocamial infections and survival in critically ill patients. JAMA 2000; 284: 2361–2367.
9. Plant P.K., Owen J.L., Parrott S., Elliott M.W. Cost effectiveness of ward based non-invasive ventilation for acute exacerbations of chronic obstructive pulmonary disease: economic analysis of randomised controlled trial. BMJ 2003; 326: 956–970.
10. Keenan S.P., Sinuff T., Cook D.J., Hill N. When is the addition of noninvasive positive pressure ventilation effective in acute exacerbations of COPD? A systemic review. Ann. Intern. Med. 2003; 138: 861–870.
11. Ram F.S.F., Picot J., Lightowler J., Wedzicha J.A. Non-invasive positive pressure ventilation for treatment of respiratory failure due to exacerbations of chronic obstructive pulmonary disease. Cochrane Database Syst. Rev. 2004; 3: CD004104.
12. Vital F.M., Saconato H., Ladeira M.T. et al. Non-invasive positive pressure ventilation (CPAP or bilevel NPPV) for cardiogenic pulmonary edema. Cochrane Database Syst. Rev. 2008; 16:CD005351.
13. Hilbert G., Gruson D., Vargas F. et al. Noninvasive ventilation in immunosuppressed patients with pulmonary infiltrates, fever, and acute respiratory failure. N. Eng. J. Med. 2001; 344: 481–487.
14. Finlay G., Concannon D., McDonnell T.J. Treatment of respiratory failure due to kyphoscoliosis with nasal intermittent positive pressure ventilation (NIPPV). Ir. J. Med. Sci. 1995; 164: 28–30.
15. Perez de Llano L.A., Golpe R., Ortiz Piquer M. et al. Short-term and long-term effects on nasal intermittent positive pressure ventilation in patients with obesity-hypoventilation syndrome. Chest 2005; 128: 587–594.
16. Burns K.E.A., Adhikari N.K.J., Medea M.O. A meta-analysis of noninvasive weaning to facilitate liberation from mechanical ventilation. Can. J. Anaesth. 2007; 53: 305–315.
17. Auriant I., Jallot A., Herve P. et al. Noninvasive ventilation reduces mortality in acute respiratory failure following lung resection. Am. J. Respir. Crit. Care Med. 2001; 164: 1231–1235.
18. Pierzchała W., Barczyk A., Górecka D., Śliwiński P., Zieliński J. Zalecenia Polskiego Towarzystwa Chorób Płuc rozpoznawania i leczenia przewlekłej obturacyjnej choroby płuc (POChP). Pneumonol. Alergol. Pol. 2010; 78: 318–347.
19. Nasiłowski J., Leszczyk M., Bura M., Chazan R. Stosowanie nieinwazyjnej wentylacji w oddziałach pulmonologicznych w Polsce. Pneumonol. Alergol. Pol. 2010; 78 (suppl. 1): 43.
20. Lloyd-Owen S.J., Donaldson G.C., Ambrosino N. et al. Patterns of home mechanical ventilation use in Europe: results of the Eurovent survey. Eur. Respir. J. 2005; 25: 1025–1031.
21. Escarrabill J. Organisation and delivery of home mechanical ventilation. Breathe 2009; 6: 37–42.
22. Nasiłowski J., Szkulmowski Z., Migdał M. et al. Rozpowszechnienie wspomagania wentylacji w warunkach domowych w Polsce. Pneumonol. Alergol. Pol. 2010; 78: 392–398.
23. www.mz.gov.pl; rozporządzenie Ministra Zdrowia z dnia 30.08.2009r., §8; 7.03.2010.
24. Nasiłowski J., Zieliński J., Chazan R. Uneven use of noninvasive ventilation in acute respiratory failure in Europe. Eur. Respir. J. 2011; 37: in press.