Use of noninvasive positive pressure ventilation in emergency departments of public and private hospitals in Lebanon

Mohamad F. El-Khatib[a], Amin N. Kazzi[b], Salah M. Zeinelddine[c], Pierre K. Bou-Khalil[c], Chakib M. Ayoub[a] and Ghassan E. Kanazi[a]

Noninvasive positive pressure ventilation is increasingly being used in emergency departments across Europe and North America. To our knowledge, no similar data are available from other countries. The aim of this study is to describe the current use of noninvasive positive pressure ventilation in the emergency departments of Lebanese hospitals. A structured and validated questionnaire was sent to all emergency departments in Lebanon. In Lebanon, 48.4% of emergency departments use noninvasive positive pressure ventilation. It is mostly used for patients with chronic obstructive pulmonary diseases and cardiogenic pulmonary edema. Bilevel and continuous positive airway pressures are the two most widely used modalities for noninvasive positive pressure ventilation. Face mask is the most used patient interface. The use of uniform protocols and training is lacking. Noninvasive positive pressure ventilation in Lebanese emergency departments is underused, with significant potential for improvements in its current practice. ***European Journal of Emergency Medicine*** **21:230–232 © 2014 Wolters Kluwer Health | Lippincott Williams & Wilkins.**

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Departments of [a]Anesthesiology, [b]Emergency Medicine and [c]Internal Medicine, American University of Beirut, Beirut, Lebanon

Correspondence to Ghassan E. Kanazi, Department of Anesthesiology, American University of Beirut, PO Box 11-0236, 1107 2020 Beirut, Lebanon
Tel: +961 1 350000 x6380; fax: +961 1 745249; e-mail: gk05@aub.edu.lb

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Background

Noninvasive positive pressure ventilation (NIPPV) has been used effectively for a multitude of disease entities [1,2]. Initial studies have supported the use of NIPPV in closely monitored units such as ICU or in close specialized units or wards [1]. Recently, NIPPV has witnessed increased application in emergency departments (EDs) across the USA and Europe [3,4].

The aim of this study is to describe the current use of NIPPV in the EDs of public and private hospitals in Lebanon, a country outside North America and Europe.

Methods

This study was approved by the Institutional Review Board at the American University of Beirut (Beirut, Lebanon). A structured and previously developed and validated questionnaire [5] was sent to all EDs in Lebanon and was collected by a research assistant blinded to the study. The managers and/or the directors of EDs were asked to complete the questionnaire. E-mails and follow-up calls were used to improve the response rate. The survey was conducted between August 2011 and January 2012. The results were compiled and analyzed using descriptive statistics. P less than 0.05 was considered statistically significant.

Results

Overall, 62 (94%) of the 66 surveyed EDs completed the questionnaire. Eleven hospitals (17.7%) are public hospitals and 51 hospitals (82.3%) are private hospitals (Table 1).

The use of NIPPV is significantly higher in private compared with public hospitals ($P = 0.04$). However, all public hospitals currently not using NIPPV in their EDs are planning to do so as compared with 91.3% of private hospitals.

In Lebanon, 30 (48.4%) EDs currently use NIPPV, with an average length of use of 4.9 ± 3.1 years (Table 2). Most of these EDs use NIPPV for patients with acute exacerbation of chronic obstructive lung disease (93.3%) and acute cardiogenic pulmonary edema (90%), whereas almost half of the EDs in Lebanon use NIPPV to treat patients with status asthmaticus (40%), pneumonia (53.3%), and acute lung injury/acute respiratory disease syndrome (43.3%). The most used device for NIPPV is bilevel positive airway pressure (93.3%), whereas ICU ventilators are used the least (60%). Facial masks covering the nose and the mouth are the most widely used patient interface devices (90%). Nasal pillows and helmets are almost not used as patient interfaces. Emergency (90%), pulmonary (83.3%), and intensive care physicians (83.3%) are commonly involved in using and implementing NIPPV in EDs. Respiratory therapists are involved in implementing NIPPV in 43.3% of EDs of Lebanese hospitals. The majority of patients (83.3%) are managed with NIPPV in EDs for less than 12 h before they are transferred to special units or wards.

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Table 1 The use of NIV in 62 emergency departments of public and private hospitals in Lebanon

	Public hospitals ($N=11$)	Private hospitals ($N=51$)	P-value
Total number of beds	1175	6050	NA
Number of ED visits/year	91 090	410,211	NA
24 h/day/7 days/week presence of physician in ED [*n* (%)]	11 (100%)	50 (98%)	1.00
Use NIV in ED [*n* (%)]			0.04
Yes	2 (18%)	28 (55%)	
No	9 (82%)	23 (45%)	
If no, planning for NIV in ED [*n* (%)]	9 (100%)	21 (91.3%)	1.00

ED, emergency department; NIV, noninvasive ventilation.

Table 2 Characteristics of the use of NIPPV in the 30 hospitals in Lebanon using NIPPV in emergency departments

	N (%)
Average length of use of NIPPV in ED (years)	4.9±3.1
Types of patients treated with NIPPV	
Acute exacerbation of COPD	28 (93.3%)
Acute cardiogenic pulmonary edema	27 (90%)
Status asthmaticus	12 (40%)
Pneumonia	16 (53.3%)
ALI/ARDS	13 (43.3%)
Neuromuscular diseases	11 (36.7%)
Other	0 (0%)
Modalities of NIPPV	
CPAP	26 (86.7%)
BiPAP	28 (93.3%)
ICU ventilator	18 (60%)
High-flow device	0 (0%)
Types of interface used	
Nasal mask	20 (66.7%)
Nasal pillows	0 (0%)
Facial masks (nose and mouth)	27 (90%)
Total face mask	13 (43.3%)
Helmet	1 (3.3%)
Who applies NIPPV in ED	
Emergency physicians	27 (90%)
Pulmonary physicians	25 (83.3%)
Intensive care physicians	25 (83.3%)
Respiratory therapists	13 (43.3%)
Nursing staff	0 (0%)
Length of stay in ED	
<12 h	25 (83.3%)
12–24 h	3 (10%)
>24 h	1 (3.3%)
Training for using NIPPV in ED	14 (46.7%)
Training of NIPPV in ED by	
Emergency physicians	2 (6.7%)
Pulmonary physicians	3 (10%)
Intensive care physicians	1 (3.3%)
Respiratory therapists	11 (36.7%)
Medical representatives	3 (10%)
Protocols for using NIPPV in ED	13 (43.3%)

ALI, acute lung injury; ARDS, acute respiratory disease syndrome; BiPAP, bilevel positive airway pressure; COPD, chronic obstructive lung disease; CPAP, continuous positive airway pressure; NIPPV, noninvasive positive pressure ventilation.

Continuous training on the use and application of NIPPV is performed in 46.7% of EDs, where most of the training is carried out by respiratory therapists (36.7%). Protocols for the use of NIPPV in EDs are developed and implemented in only 43.3% of EDs.

Discussion

To our knowledge, this is the first study to assess the use of NIPPV in EDs outside of North America and Europe. Our study shows that the use of NIPPV in EDs of public and private hospitals in Lebanon is relatively recent [< 5 years of use but with a somewhat large range (1–15years)]. These findings are comparable with Spain [5], with an average use of NIPPV of 4 years but lower than the UK [6] and the USA [7]. Currently, only 48.4% of EDs in Lebanon are using NIPPV. This is similar to what has been reported in Spain in 2010 (45.7%) [5], but lower than what has been reported in Ontario in 2005 (62.9%) [8], in the UK in 2006 (67%) [6], and in the USA in 2009 (76%) [7]. However, EDs of Lebanese public and private hospitals are recognizing the importance of NIPPV and almost all EDs not currently using NIPPV are planning for the future introduction of NIPPV in their services. Our data show that Lebanese public hospitals are lagging behind private hospitals in implementing NIPPV in their EDs because of lack of financial support and bureaucracy.

Similar to other EDs in North American and European hospitals [5–7], greater than 90% of EDs of Lebanese private and public hospitals are using NIPPV for patients with chronic obstructive lung disease or cardiogenic pulmonary edema with the bilevel positive airway pressure (in the form of pressure support ventilation) as the most used modality of treatment and the facial face mask as the most used patient interface.

Our data show that emergency physicians are playing a greater role in the use and implementation of NIPPV in the EDs of Lebanese hospitals, with a significant role for respiratory therapists whenever applicable. Respiratory therapists are available in most Lebanese EDs. However, whenever a Lebanese hospital is staffed with respiratory therapists (13 hospitals), application of the NIPPV in the EDs is always carried out (100%) by the respiratory therapists as per the physician's orders, whereas training on NIPPV is carried out by respiratory therapists in 11 of 13 (84.6%) hospitals. This indicates that respiratory therapists can play an important role in the development of NIPPV programs throughout Lebanon. As such, with the continuous presence of emergency physicians in EDs and with adequate coverage of respiratory therapists, an NIPPV intervention for patients presenting to the EDs can be applied early, with the potential for increasing the probabilities of success and improvement of patients' outcomes [3,4].

Our data show that there is an obvious lack of use of protocols for and training on NIPPV in Lebanese EDs. The percentage of Lebanese EDs having protocols for the use of NIPPV (43.3%) is higher than that reported in the UK in 2006 (30%) and in Spain in 2010 (35.6%) but lower than that reported in Ontario in 2005 (80%) [8]. Obviously, these differences could be related to the fact that

our study was carried out in 2012 compared with the study in Spain, which was carried out in 2010, and the study in the UK, which was carried out in 2006.

Conclusion

Our national survey for the use of NIPPV in Lebanese EDs showed areas of consistency with evidence based practices but also identified areas for improvements particularly for training and implementation of protocols related to the implementation of NIPPV. Future similar studies or follow-ups should consider more detailed analysis and breakdown between public and private hospitals on the use of NIPPV in EDs as well as the mix and distribution of patients in terms of different etiologies.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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