

Letters to the Editor

Non-Invasive Mechanical Ventilation Versus Continuous Positive Airway Pressure in Cardiogenic Pulmonary Edema in an Intensive Care Unit*

Ventilación mecánica no invasiva versus presión continua positiva en la vía aérea en el edema agudo de pulmón cardiogénico en una unidad de cuidados intensivos

To the Editor:

We thank Dr. Carratalá (Arch Bronconeumol 2018; 54:594) and colleagues for their comments on our study on the use of non-invasive mechanical ventilation (NIMV) versus continuous positive airway pressure (CPAP) in patients with cardiogenic acute pulmonary edema (APE) in an intensive care unit (ICU).¹ The authors mention that our inclusion criteria were selective, as we excluded patients with chronic obstructive pulmonary disease (COPD) and respiratory infection causing heart failure. This exclusion was based on the fact that many patients with COPD exacerbations have severe respiratory acidosis, which might make the comparison of these two devices risky, particularly when NIMV is clearly indicated in COPD with respiratory acidosis.² Many of the papers we referenced in our article similarly excluded patients with COPD or severe respiratory acidosis.³

With regard the CPAP system used (Boussignac® or WhisperFlow®), the Boussignac® was used in 98% of cases (43 patients). The main reasons for this were: (1) the availability of that system in the hospital emergency department (ED) at the time of the study; (2) its interface is more comfortable, and also allows patients to speak; and, (3) it is quieter than the WhisperFlow® device. In terms of tolerance, oronasal interfaces (both CPAP and NIMV) often cause ulcers on the bridge of the nose,⁴ side effects that while not registered in our study, are widely recorded in clinical practice after prolonged use (9%–40%).⁵

From a methodological point of view, we included 43 patients from the ED who had not improved despite medical treatment (24 with use of CPAP; none had used NIMV, as this device was

Table 1

Comparison of Hemodynamic Variables and Arterial Blood Gases of Patients Referred from the ED.

	NIMV (n=22)	CPAP (n=21)	P-value
MAP, mmHg	90 (77–115)	105 (86–123)	.677
Heart rate, bpm	104 (92–124)	110 (89–125)	.854
Respiratory rate, rpm	36 (28–39)	36 (30–40)	.815
pH	7.24±0.125	7.29±0.109	.162
PaCO ₂ , mmHg	52±18	45±15	.291
PaCO ₂ >45, n (%)	14 (64)	11 (52)	.810
PO ₂ /FiO ₂	115±60	125±56	.536
Lactic acid, mmol/l	3±2	3±2	.898

CPAP: continuous positive airway pressure; ED: emergency department; MAP: mean arterial pressure; NIMV: non-invasive mechanical ventilation.

not available during the study period). In order to preserve homogeneity and avoid bias, patients were randomized irrespective of their previous use of CPAP. The study protocol did not contemplate any crossover between the ventilatory support modalities. With regard to variables on admission to the ICU after referral from the ED (Table 1), despite most patients being hypercapnic, this did not negatively impact on the device used. The authors stress the importance of avoiding undesirable derecruitment when switching from one device to another, and, indeed, we did not record the level of CPAP used in the ED. However, the CPAP levels and expiratory positive airway pressure (EPAP) used during the first hour in the ICU were 7±2 cm/H₂O and 6±1 cm/H₂O, respectively. These values were within the range set in the references used in our study,³ and in reviews conducted in the ED setting.⁴

Finally, the duration of ventilation in the hypercapnic CPAP group that failed (n=4) was very similar to that of the NIMV hypercapnic group that failed (n=4) (4 [2–6] h vs 4 [2–6] h, respectively), which supports the homogeneity of the sample and the results obtained.

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Translation and Validation of the Multidimensional Dyspnea-12 Questionnaire[☆]



Acerca de la traducción y validación del cuestionario multidimensional Disnea-12

To the Editor,

I read with interest the article recently published in your journal by Armado Diago et al.,¹ in which they discuss the translation and validation of the multidimensional Dyspnea-12 questionnaire. The article outlines the procedures and outcomes of reliability and validity testing of the instrument, and I would like to address some of these points.

Validation involves a sequential evaluation process in which data analysis helps demonstrate the accuracy of an instrument for measuring a theoretical construct or concept. One important factor in this process is the selection of the sample or number of participants. Some authors believe that the sample or number of participants should be between 5 and 20 for each item in the instrument, a factor that does not seem to have been taken into consideration by the authors of this article, since the questionnaire they describe consists of 12 items.^{2,3} Although they state that the sample was selected according to the validation study of the original version, it should be made clear that that process was conducted in 2 consecutive studies; the first was performed in 358 patients and consisted of 4 phases, during which the authors managed to reduce the number of items and perform an exploratory principal component analysis (PCA); the second was performed in 53 patients, and analyzed correlations with demographic variables and scores from the anxiety and depression scales.

Some authors question PCA because it tends to overestimate or spuriously increase factor loadings by ignoring the measurement error.^{2,4} Thus, in this validation study of the translated version, it was commendable that the authors performed the exploratory factor analysis (EFA) again, even though its use is only justified in recently created instruments, or when no psychometric studies are available in other populations, leading to the use of more appropriate procedures (e.g., the non-weighted least squares method).² However, we know that EFA does not determine the number of factors, nor does it define which items correspond to those factors, regardless whether they are related or not,

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Alberto Belenguer Muncharaz

Servicio de Medicina Intensiva, Hospital General Universitario de Castellón, Castellón de la Plana, Castellón, Spain

E-mail address: belengueralberto8@gmail.com

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since these items may behave differently when the measurement properties of the instrument are evaluated in another sample.^{2,4} Faced with this, confirmatory factor analysis (CFA) is commonly used with the application of structural equation models (SEM), in which the number, significance, associations, and the pattern of parameters are specified before analyzing the data. In this way, absolute, incremental and parsimonious goodness-of-fit indices are obtained (simplicity of the model), and these are used for a more rigorous examination of the factor structure of an instrument. Some studies even suggest the use of exploratory structural equation models (ESEM) that incorporate a cross-loading factor analysis (performed in the EFA) and the analysis of goodness-of-fit models (performed in the CFA) to appropriately explain a theoretical model.⁵

So, then, if a number of factors or dimensions with their respective items was established in the original version of the article in question, it would be appropriate to use more advanced methodologies to validate the instrument.

These comments are not intended to minimize the effort made by the authors in the translation and validation of the instrument. On the contrary, the progress made is admirable, since it sets a precedent for future research into the development and refinement of instruments for use in Spanish-speaking patients with dyspnea.

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Percy G. Ruiz M

Facultad de Ciencias de la Salud, Universidad Peruana Unión, Lurigancho, Lima, Peru

E-mail address: percygruiz@upeu.edu.pe

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