



## EDITORIAL

### Noninvasive ventilation in pneumonia due to N1H1 virus<sup>☆</sup>

### ¿Ventilación no invasiva en la neumonía por virus N1H1?

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During the year 2009, the Intensive Care Units treated critical patients affected by the N1H1 viral pandemic.<sup>1</sup> Posteriorly we attended the patients of the first epidemic in the last few weeks of 2010 and the first of 2011,<sup>2</sup> applying the measures learned during the pandemic. The common feature of these patients is serious respiratory disease and the development of acute respiratory distress syndrome (ARDS) characterized by severe hypoxemia and the need for ventilation strategies and rescue treatments (prone decubitus, nitric oxide, extracorporeal oxygenation, etc.)<sup>3,4</sup> to correct and overcome the situation. A poorer prognosis has been tied to the presence of multiorgan dysfunction, the need for mechanical ventilation (MV),<sup>5</sup> acute renal failure,<sup>6</sup> coinfection,<sup>7</sup> delays in administration of the antiviral drug oseltamivir,<sup>8</sup> and obesity<sup>9</sup> which together with coinfection<sup>7</sup> has been associated to increased resource consumption. In turn, pregnancy has been associated with an increased risk of developing primary viral pneumonia.<sup>10</sup> In the 2011 epidemic, hematological disease, general seriousness, infiltrations on the chest X-rays and the need for MV were the variables independently correlated to mortality.<sup>2</sup>

The SEMICYUC developed a series of management recommendations during the pandemic phase.<sup>11</sup> Of these recommendations, those referred to the use of noninvasive ventilation (NIV) have remained applicable in the 2010–2011 epidemic: *The use of noninvasive ventilation is not recommended in patients requiring respiratory support and who*

*are strongly suspected to be infected with the new influenza A (H1N1) virus, due to the risk of aerosol generation - which increases the risk of transmission to the healthcare personnel - and to the poor clinical results obtained with such ventilation in patients of this kind. If the decision is taken to use NIV, due evaluation is required of the corresponding risk-benefit ratio, considering especially the following aspects:*

- a. Reserve this type of ventilation for patients without ARDS criteria.
- b. Apply NIV preferably in rooms with negative pressure.
- c. Double-circuit respirators are to be preferred.
- d. Use the safest airway accessories (e.g., masks covering the entire face).
- e. Strictly comply with all the personnel protective measures (air isolation).
- f. Never use NIV in the emergency area or in shared rooms or wards.

Likewise, the *European Respiratory Society* and the *European Society of Intensive Care Medicine*<sup>12</sup> recommend the avoidance of NIV and the intubation of patients infected with the new H1N1 virus admitted to the Intensive Care Unit with severe hypoxemia, rapidly developing ARDS, multiorgan failure and refractory hypoxia. In the absence of these conditions, NIV only should be considered in patients with moderate hypercapnic acute respiratory alterations secondary to exacerbation of a chronic respiratory disorder, acute respiratory failure secondary to acute lung edema, and post-extubation respiratory failure after ARDS secondary to H1N1 viral infection.

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During the pandemic, the use of NIV was reported in 25–45% of the patients, with a 75% failure rate.<sup>13–15</sup> The cases that failed showed higher scores on the severity scales, and possibly required intubation from the start.<sup>13</sup> In the first epidemic of 2010–2011, the no. 2 GTEI informative bulletin of the SEMICYUC reported that 80.3% ( $n = 237$ ) of the patients required MV. Of these, 35% received NIV initially, with a 50% failure rate. These subjects posteriorly required intubation [...],<sup>16</sup> with improvement of the pandemic results probably as a result of adoption of the measures learned from the experience gained – the data being similar to those recorded in metaanalyses analyzing NIV use in patients with ARDS / acute lung injury.<sup>17</sup>

NIV has been successfully used in patients with acute respiratory failure secondary to acute lung edema, and in hypercapnic acute respiratory failure (level of evidence IA). However, its application in hypoxemic acute respiratory failure is subject to controversy, and the clinician in such situations must individualize each case. A relative contraindication to NIV in hypoxemic acute respiratory failure is the presence of  $PO_2/FiO_2 < 100$ .<sup>18</sup> However, of the patients included in the registry of Belenguer et al.<sup>19</sup> with  $PO_2/FiO_2$  at admission, 87 presented parameters indicative of a good prognosis in the first hour, as defined in the literature.<sup>18</sup> The presented series even reported a poorer prognosis for coinfection together with the viral pneumonia<sup>7</sup> – a circumstance not found in the series of Belenguer et al.<sup>19</sup>

The good results reported by Belenguer et al.<sup>19</sup> can be explained by: (1) exclusive respiratory involvement, with no dysfunction of other organs – this associating low APACHE II and SOFA scores, together with the absence of background disease and coinfection; (2) team experience described<sup>20–23</sup> as crucial for the success of NIV; and (3) rigorous isolation following the recommendations of the SEMICYUC<sup>11</sup> and the local Department of Preventive Medicine.

Experience added to the evidence possibly can contribute to define those patients who may benefit from less aggressive strategies for resolving the process. NIV during hypoxemic acute respiratory failure secondary to acute pneumonia caused by the H1N1 virus should be limited to highly selected patients, and always should be managed by teams with great experience, with the support of all the available treatment measures that are considered to be effective.

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