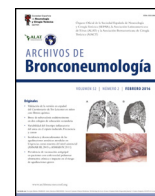




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## Editorial

## Is the Prone Position Useful During Spontaneous Respiration in Patients With Acute Respiratory Failure? ☆



### ¿Es útil el decúbito prono durante la respiración espontánea en pacientes con insuficiencia respiratoria aguda?

Acute respiratory failure (ARF) is a common reason for admission to intensive care units.<sup>1</sup> Management of this condition requires a therapeutic escalation strategy based on the application of a wide range of interventions, the initial conventional approach usually being standard low-flow oxygen therapy.<sup>1</sup> If this fails, other oxygenation strategies are available, including high-flow oxygen delivered by nasal cannulas<sup>2</sup> and non-invasive ventilation via a face mask or helmet,<sup>3</sup> aimed at reducing the risk of both orotracheal intubation (OTI) and mortality.

One strategy used in recent years in the treatment of ARF in intubated patients with acute respiratory distress syndrome (ARDS) has been prone positioning (PP).<sup>4–6</sup> Guérin et al.,<sup>5</sup> in a clinical trial of 466 intubated patients with severe ARDS, showed that PP for long periods of time (at least 16 h a day) improved oxygenation and decreased mortality at 28 and 90 days. However, few studies have investigated the usefulness of PP in non-intubated patients. In a recent report of only 20 patients, the authors showed that early application of PP associated with high-flow oxygen administration by nasal cannulas in patients with moderate ARDS and baseline SpO<sub>2</sub>>95% was not only well tolerated, it also helped to avoid intubation.<sup>7</sup>

Since the beginning of the Covid-19 pandemic, the use of PP in non-intubated patients with ARF has been increasing. The pathophysiology underlying Covid-19 that leads to disease progression is very similar to that of severe ARDS.<sup>8</sup> In these cases, activation of alveolar macrophages by SARS-CoV-2 leads to the release of potent proinflammatory mediators and cytokines, an accumulation of neutrophils and monocytes, and the release of toxic mediators that can cause loss of alveolar endothelium function and epithelial barriers, resulting in alveolar and interstitial edema, similar to the situation in ARDS.<sup>9</sup> The high number of patients presenting with ARDS during the Covid-19 pandemic has pushed many hospitals to the verge of collapse in terms of critical care resources, and has prompted the use of innovative approaches, such as PP, in an effort to keep these patients in conventional hospital beds and limit the need for OTI and invasive ventilation. In recent months, several articles have been published on the use of PP in non-intubated patients

in hospital wards,<sup>10,11</sup> intermediate care units,<sup>12</sup> and emergency rooms,<sup>13</sup> and it appears that the physiological effects of PP that improve oxygenation in intubated patients could be equally applicable to non-intubated patients with different grades of ARDS. As suspected, a large percentage of patients in these studies showed a significant improvement in oxygenation after being placed in PP, mainly due to an improved ventilation/perfusion ratio, a more homogeneous distribution of transpulmonary pressure along the ventral-dorsal axis, and greater recruitment of non-aerated dorsal pulmonary zones.<sup>4</sup> Coppo et al. demonstrated that patients are more likely to respond to PP if the maneuver is performed early.<sup>11</sup> Similarly, it has been observed that in patients with Covid-19 and severe hypoxia, early PP improves oxygenation, thoracic CT images, and survival at 90 days, compared to late PP (76% vs. 44%).<sup>14</sup> This is probably due to the fact that in the early stages of Covid-19-induced ARDS there is a higher proportion of potentially recruitable lung compared to the late phases. The lower mortality in intubated patients has been linked to the ability of PP to reduce lung damage associated with mechanical ventilation.<sup>6</sup>

However, the results of these series should be interpreted with caution, as none of the studies was randomized. In some, patients were selected; in others, PP tolerance and improved oxygenation were low; and, finally, in other studies, nearly half of the patients required OTI.<sup>10</sup> Several clinical trials are currently underway. Some are evaluating the different grades of ARDS in which PP might reduce the number of critical bed admissions, the need for IOT, and mortality. Others aim to define which patients would benefit most from the maneuver, and the number of hours or sessions that would yield better outcomes. A group of patients who might benefit from PP are those with ARF whose ceiling of treatment would not extend to OTI and invasive ventilation, and who would be candidates for high-flow oxygen through nasal cannulas or non-invasive ventilation. PP would be used to gain time to allow already initiated treatments to take effect, thus offering patients a greater chance of survival.

In short, while tolerance to PP may be a limitation, its physiological effects are still unclear, and the benefits of short sessions are questionable, the protocolized use of this technique<sup>15</sup> during spontaneous breathing in patients with ARF and different degrees of ARDS *may be useful*. It is a simple, inexpensive maneuver that the patient can perform alone or with minimal help that can improve

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oxygenation, at least while it is being performed, so it seems very likely that in the future it will be common to see ARF patients undergoing PP in conventional hospital facilities. However, it is important to remember that decisions on OTI should not be made solely on the basis of improved hypoxemia (although that is a good parameter); doctors should also take into account the work of breathing of their patients to avoid late intubation and poor outcomes.

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