

# Letter to the Editor

## Respiratory physiotherapy in the ICU: Effectiveness and professional certification

Dear Editor:

Respiratory physiotherapists are increasingly in demand and are ever more frequently seen in intensive care units (ICUs). However, training and qualification are not always sufficient to meet the needs of this demanding environment and to allow these specialists to rise to the level of competence required to be an effective member of a multidisciplinary team. Therefore, the physiotherapist must have a solid education and practical background in order to prescribe, select and apply specific respiratory physiotherapy procedures in resolving complex cases. Otherwise, both the effectiveness of the work and the risks to the patient may increase prohibitively.

As an example of a successful performance, we cite a case of acute lobar atelectasis caused by the accumulation of bronchial secretion. Respiratory physiotherapy is the first course of action in such cases since it involves noninvasive procedures of proven efficiency<sup>(1)</sup>. The 22-year-old patient, having suffered an automobile accident resulting in fracture of the C2 vertebra and a medullary lesion, was interviewed and fitted with a halo device for cranial traction, then admitted to the ICU at the *Hospital Universitário Regional do Norte do Paraná* (Northern Paraná Regional University Hospital) located in the city of Londrina, in the state of Paraná, Brazil.

After initial clinical improvement, the patient developed acute respiratory insufficiency, requiring invasive mechanical ventilation, which, despite the fact that pressure-controlled ventilation (PCV) was 18 cmH<sub>2</sub>O, positive end-expiratory pressure (PEEP) was 12 cmH<sub>2</sub>O and fraction of inspired oxygen was 60% (all relatively high settings), was not sufficient to guarantee adequate oxygenation and alveolar ventilation, as evidenced by the arterial oxygen tension (PaO<sub>2</sub>) of 61 mmHg and arterial carbon dioxide tension (PaCO<sub>2</sub>) of 55 mmHg.

Static compliance was assessed at 18 ml/cmH<sub>2</sub>O. The clinical exam revealed the absence of vesicular

murmur, fluid upon percussion and reduced chest expansion, all in the right hemithorax. The chest X-ray showed complete opacification of the right lung and deviation of the mediastinal structures to the right. These findings indicated total atelectasis of the right lung.

The physiotherapy session consisted of the following procedures:

1. Slow thoracic expiratory pressure maneuvers in the right hemithorax<sup>(2,3)</sup> for 30 minutes.
2. Orotracheal tube aspiration (due to a great quantity of thick mucous secretion).
3. Adjusting the PCV to 25 cmH<sub>2</sub>O above PEEP, combined with manual restriction of the left hemithorax for 15 minutes.

Due to the cervical traction, the patient remained in the horizontal dorsal decubitus position throughout the treatment. There were no hemodynamic changes during the procedures, and the oro-tracheal tube was never repositioned.

Thirty minutes after the end of the session, additional tests were conducted. The results of the clinical examination were normal, the chest X-ray showed no abnormalities, static compliance was 30 ml/cmH<sub>2</sub>O, PaO<sub>2</sub> was 126 mmHg, and PaCO<sub>2</sub> was 29 mmHg. Mechanical ventilation parameters were adjusted accordingly.

The reversal of atelectasis in intubated patients is achieved through bronchoscopic aspiration<sup>(4)</sup>, manual hyperinflation and periodic aspiration<sup>(5)</sup> or through respiratory physiotherapy consisting of bronchial hygiene<sup>(2,3,6,7)</sup> and pulmonary re-expansion techniques<sup>(2,6)</sup>. The choice of techniques to be applied basically depends on initial evaluation of the clinical conditions as well as on patient monitoring, availability of material resources and the personal preferences of the physiotherapist.

In this case, the cervical traction device precluded placing the patient in any position other

than the dorsal decubitus. Therefore, it was not possible to use the left lateral decubitus position, which is the most favorable for right-side drainage of bronchial secretions and pulmonary re-expansion<sup>(6,8)</sup>. The application of thoracic expiratory pressure maneuvers directly to the costal grid<sup>(9)</sup>, a manual technique based on increasing expiratory flow in order to carry secretions towards the proximal airways (from where they can be aspirated), was therefore indicated.

After the bronchial hygiene therapy had been performed, the PCV was increased (from the previous setting of 18 cmH<sub>2</sub>O above PEEP) to 25 cmH<sub>2</sub>O above PEEP, with the objective of recruiting collapsed alveolar units and promoting pulmonary re-expansion. This procedure can be considered a mechanical hyperinflation maneuver, having an advantage over the manual procedure due to greater control of the peak inspiratory pressure (PIP) applied (PCV at 25 cmH<sub>2</sub>O + PEEP at 12 cmH<sub>2</sub>O = PIP at 37 cmH<sub>2</sub>O), an important factor in the prevention of barotrauma<sup>(10)</sup>. The manual containment of the left hemithorax by the physiotherapist has the objective of driving the flow volume to the right hemithorax, promoting greater recruitment of collapsed areas. Such a maneuver would have been unnecessary if the patient could have been placed in the left lateral decubitus position.

In the case cited, the complexity of the job of the physiotherapist is explicit in terms of the need for effectiveness in carrying out procedures and for controlling patient risk. Therefore, appropriate certification of these professionals, perhaps through physiotherapy residencies, is imperative. Only physiotherapists who have had adequate training and experience can be fully integrated into multidisciplinary teams acting in ICUs.

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