Rapid Resolution Of A Complete Lung Atelectasis Using Intrapulmonary Percussive Ventilation: A CASE REPORT.

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BACKGROUND

Intrapulmonary Percussive Ventilation (IPV) is a technique proposed in the early 1980s by FM Bird to promote airway clearance, to recruit pulmonary areas and to improve gas exchange.

IPV devices deliver a continuous pulsatile flow rate, superimposed on the patient’s breathing pattern; the percussions are subtidal volumes of gas delivered through an open breathing circuit (Phasitron®); the adjustable parameters are pressure, I/E ratio and frequency.

TARGET

Describe a clinical case of a complete lung atelectasis, treated with Intrapulmonary Percussive Ventilation.

PRESENTATION OF THE CASE

We received from a general ICU a 24/7 ventilator dependent tracheostomized patient, age 77, smoker of 730 packages/years for 55 years, affected by ALS (with progressive motion impairment, impossibility to maintain the supine position, dysphagia since 2016 and recent onset of severe respiratory failure). The chest X-Ray demonstrated an elevated left hemidiaphragm with an increased opacity of the medium-basal parenchyma of the left lung. Oxygen supplementation was necessary to maintain a pulse oxymetry of 95% despite effective invasive mechanical ventilation.

MATERIALS AND METHODS

To manage a condition of massive hypersecretion we started IPV (“IPV2-C”®, Percussionaire) twice a day to treat the peripheral pulmonary areas, followed by mechanical in-exsufflation (“E70™”, Philips Respironics) to clear out secretions from the trachea and the main bronchi.

After five days we registered an abrupt fall in O2 saturation, with dyspnea and a silent left lung at auscultation. A CT scan revealed a complete left lung atelectasis.

We decided to intensify IPV, adopting a setting able to ventilate the patient but also to mobilize the secretions from the distal airways toward the trachea (settings: pressure 20-25 cmH2O, I/E ratio 1/1-1.5/1, frequency 200-300/min). The treatment was well tolerated and performed in right lateral decubitus to promote ventilation of the affected lung.

After four consecutive hours of such a treatment, the patient was still comfortable and declared to feel better; we performed a thoracic ultrasonography (US) that suggested a better aerated left lung, with consolidation limited to its lower part. A second CT scan was performed confirming an almost complete resolution of the atelectasis.

CONCLUSION

In expert hands, IPV is an excellent tool for promoting lung recruitment in neuromuscular patients. In our opinion its low diffusion is due to the lack of expertise, at least in our country. In 2002 we had the great opportunity to be trained by dr P. Soudon and dr M. Toussaint in Brussels: their profound knowledge of IPV allowed us to acquire a good experience too. This case report demonstrates the possibility of treating atelectasis rapidly, effectively and without distress for the patient, using IPV. Incidentally we appreciated the usefulness of thoracic ultrasonography in revealing pulmonary modifications without irradiation; in this case US was crucial in determining the timing for a second CT scan control.