



Haemodynamics and oxygenation improvement induced by high frequency percussive ventilation in a patient with hypoxia following cardiac surgery: a case report.

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INTRODUCTION: High frequency percussive ventilation is a ventilatory technique that delivers small bursts of high flow respiratory gas into the lungs at high rates. It is classified as a pneumatically powered, pressure-regulated, time-cycled, high-frequency flow interrupter modality of ventilation. High frequency percussive ventilation improves the arterial partial pressure of oxygen with the same positive end expiratory pressure and fractional inspiratory oxygen level as conventional ventilation using a minor mean airway pressure in an open circuit. It reduces the barotraumatic events in a hypoxic patient who has low lung-compliance. To the best of our knowledge, there have been no papers published about this ventilation modality in patients with severe hypoxaemia after cardiac surgery.

CASE PRESENTATION: A 75-year-old Caucasian man with an ejection fraction of 27 percent, developed a lung infection with severe hypoxaemia [partial pressure of oxygen/fractional inspiratory oxygen of 90] ten days after cardiac surgery. Conventional ventilation did not improve the gas exchange. He was treated with high frequency percussive ventilation for 12 hours with a low conventional respiratory rate (five per minute). His cardiac output and systemic and pulmonary pressures were monitored. Compared to conventional ventilation, high frequency percussive ventilation gives an improvement of the partial pressure of oxygen from 90 to 190 mmHg with the same fractional inspiratory oxygen and positive end expiratory pressure level. His right ventricular stroke work index was lowered from 19 to seven g-m/m²/beat; his pulmonary vascular resistance index from 267 to 190 dynes•seconds/cm⁵/m²; left ventricular stroke work index from 28 to 16 gm-m/m²/beat; and his pulmonary arterial wedge pressure was lowered from 32 to 24 mmHg with a lower mean airway pressure compared to conventional ventilation. His cardiac index (2.7 L/min/m²) and ejection fraction (27 percent) did not change.

CONCLUSION: Although the high frequency percussive ventilation was started ten days after the conventional ventilation, it still improved the gas exchange. The reduction of right ventricular stroke work index, left ventricular stroke work index, pulmonary vascular resistance index and pulmonary arterial wedge pressure is directly related to the lower respiratory mean airway pressure and the consequent afterload reduction.

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