

Whole lung lavage using high frequency chest wall oscillation in the treatment of pulmonary alveolar proteinosis.

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Introduction

Pulmonary Alveolar Proteinosis (PAP) is a rare respiratory disease that is characterised by the build-up of alveolar surfactant. There are three types of PAP; hereditary, secondary and auto-immune (1). A whole lung lavage (WLL) is the recognised treatment for PAP and involves washing out the lung with saline and secretion mobilisation before drainage.

High Frequency Chest wall Oscillation (HFCWO) uses positive and negative pressure to encourage the movement of mucus from peripheral to larger airways. Air pulses are transmitted into a garment at a high frequency creating oscillatory chest wall compressions (2).

There is a lack of evidence to guide Physiotherapist treatments and Multidisciplinary Team management of secretion clearance of the patient using HFCWO.

Results

This case study demonstrated benefits of the use of HFCWO to assist with secretion clearance in WLL which include;

- Less labour intensive and physically demanding for the Physiotherapist.
- The utilisation of the Vest ensured all areas of the patients lungs received HFCWO, something not achieved with manual techniques.
- The day after the procedure the patient reported no pain or discomfort and was mobilising, eating and drinking as normal.
- No movement of the ETT was seen on bronchoscopy whilst using HFCWO.
- The procedure was safe and there was no adverse reactions post-procedure.

Methodology

WLL was previously performed by Physiotherapists performing manual techniques to the chest wall. A team of Physiotherapists were required due to the duration of the procedure (up to 7 hours). For this case study HFCWO was used as an alternative to manual techniques.

The patient in this case study was a 37 years old male with PAP who underwent a WLL using the Vest Airway Clearance System (Hill Rom, Chicago, USA) due to disease exacerbation.

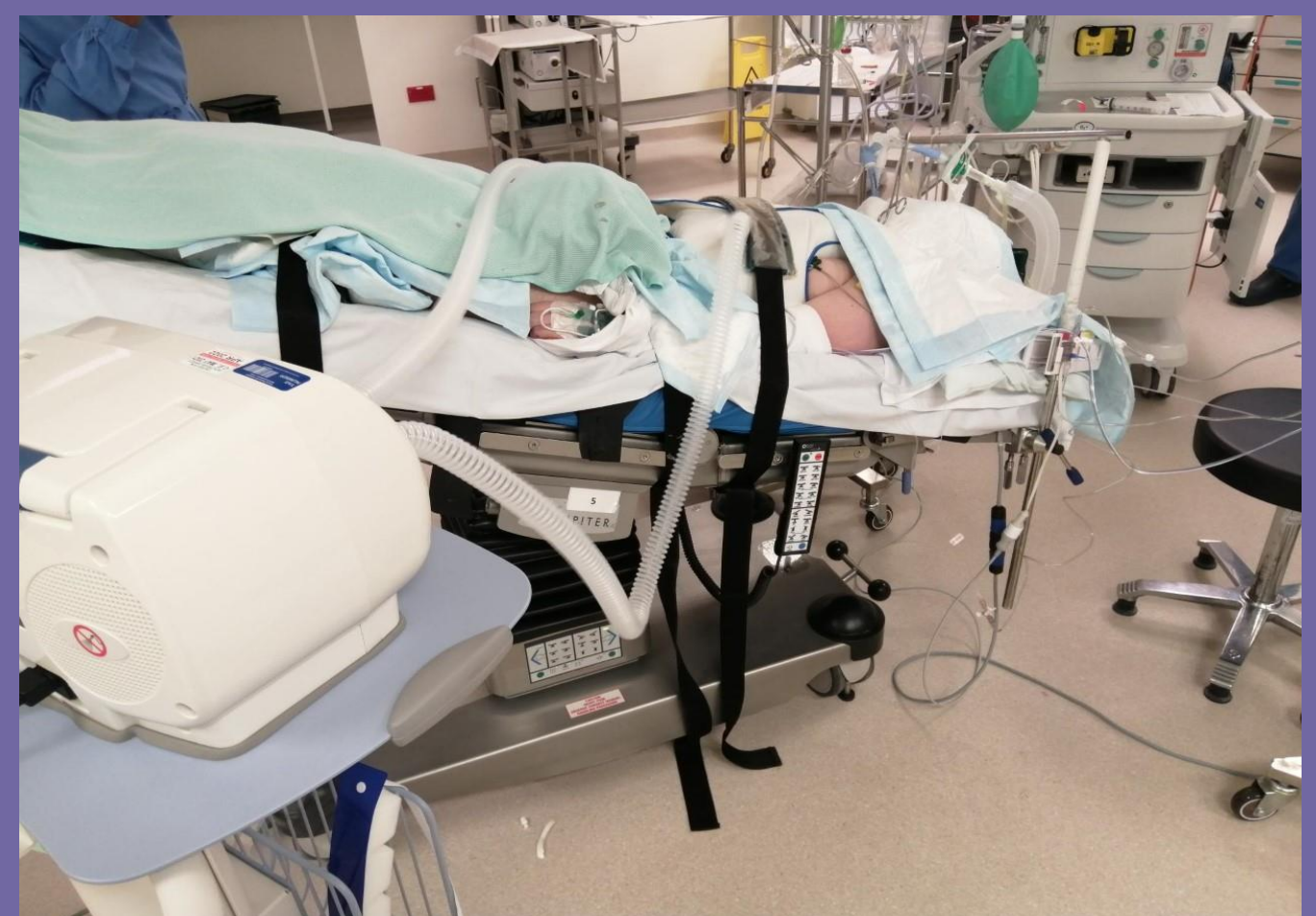
The patient was sedated and intubated with a double lumen endo-tracheal tube to facilitate the lavage of one lung whilst the contralateral lung was ventilated. The Vest machine was set to a frequency of 20Hz and the duration ranged from 5 to 10 minute cycles.

These cycles continued until the lung was completely lavaged, a total of 13 times. And after an arterial blood gas was taken, the process was repeated on the other lung.

Conclusion

Further data needs to be collected to investigate the effectiveness of Physiotherapy using HFCWO during WLL on disease exacerbation, infection rates and secretion clearance effectiveness.

Also to investigate if changing the frequency of oscillations and adding postural drainage will improve patient outcome by improving airway clearance and decrease the frequency of WLLs.



References

- (1) Fijołek J, et al. Atypical image of pulmonary alveolar proteinosis — a case report. *Alergologia polska*. 2015.
- (2) Hill Rom. *The Vest® Airway Clearance System, Model 105*. Available from: <https://www.hillrom.co.uk/en/products/the-vest-system-105>

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