HIGH FREQUENCY VENTILATION WITH TOPICAL ANAESTHESIA AS AN AID TO PHYSIOTHERAPY.


INTRODUCTION.

High frequency ventilation (HFV) with topical anaesthesia and without tracheal intubation has been used in our hospital in patients with chronic obstructive lung disease and progressive CO₂-retention, due to exacerbations. In these patients conventional mechanical ventilation has several disadvantages. It often requires general anaesthesia or sedation, is associated with additional risks and usually it takes several days to wean the patient off the respirator. ¹) It was thought that in this kind of patients HFV with topical anaesthesia might improve alveolar ventilation and reduce the need for conventional mechanical ventilation. However, HFV led to excessive mobilization of sputum and these patients with severely compromised pulmonary function and flaccid lungs had serious difficulty in handling large quantities of sputum. ²) The observation that HFV mobilized sputum was the reason for the application of HFV in a patient, in whom retained secretions were thought to form a clinical problem and whose pulmonary function and lung compliance seemed acceptable.

PATIENT.

The patient was a 38 year old housewife with chronic asthma since the age of 15, and extensive peripheral bilateral bronchiectasis. There were no indications for the presence of allergy, cystic fibrosis, ciliary dysfunction or allergic aspergillosis. In 1961 the left basal segments

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and the inferior segment of the lingula had been resected because of recurrent left sided infections. In 1978 the left hypertrophied aa. bronchiales were embolized because of recurrent massive hemoptysis. In 1979 the apical segment of the left lower lobe was resected because of recurrent left sided infections and hemoptysis.

Nevertheless a chronic Pseudomonas infection persisted and in spite of extensive medical treatment including daily physiotherapy and inhalation therapy she had to be hospitalized with increasing frequency because of febrile episodes, hemoptysis and dyspnea. During these admissions, adding up to 4 months a year, daily sputum volume was between 100 and 300 ml.

The pulmonary function was as follows:

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\begin{align*}
\text{VC} & = 2.5 \text{ L, BTPS} \\
\text{VC}_{\text{predicted}} & = 3.8 \text{ L} \\
\text{VC}_{\text{predicted, corrected}} & = 2.8 \text{ L} \\
\text{FEV}_{1} \% \text{ VC} & = 59 - 69 \% \\
\text{RV} \% \text{ TC} & = 45 \% \\
\text{P.F.R.} & = 170 \text{ L/min.} \\
\text{P}_{\text{a}, \text{ O}_{2}} \text{, rest} & = 8.8 - 11 \text{ kPa.} \\
\text{P}_{\text{a}, \text{ CO}_{2}} \text{, rest} & = 3.5 - 5.5 \text{ kPa}
\end{align*}
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METHODS.

HFV was used in 8 weekly sessions of 40 - 50 minutes on an out patient basis during two months. During this period maintenance therapy was kept constant, but minor adjustments to prednisone requirements had to be made. Daily sputum volume was recorded and peak flow rate (P.F.R.) using the mini Wright Peak Flow Meter was measured three times a day.

HFV was administered through a straight Metras sonde, ch. 19, which was positioned halfway the trachea after topical anaesthesia (0.5% tetracaïne) had been applied to the mucosa of pharynx, larynx and trachea. No premedication was used. A selfmade high frequency device (techn. A.H.)