Title: WEANING FROM RESPIRATORY SUPPORT BY HIGH FREQUENCY JET VENTILATION

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Introduction. Weaning of patients from short-term respiratory support, usually after anesthetic procedures, is often accompanied by a dilemma: the patient starts to breath on his own but his respiratory effort is not sufficient to fully support adequate gas exchange. The transition from controlled ventilation to assisted ventilation and spontaneous breathing might be long if additional sedatives are administered to calm the patient who is "fighting" the ventilator. High Frequency Jet Ventilation (HFJV) under these circumstances offers a significant advantage because it can be superimposed on spontaneous breathing and tuned to the needs of the patient without the need for additional sedation (1).

Weaning of ventilator dependent patients at times presents also a very difficult problem. A certain number of patients become ventilator dependent with progressive hypoventilation when attempts at weaning are made. HFJV allows smooth transition from controlled to spontaneous ventilation with easily adjusted levels of respiratory support. It does not interfere with spontaneous respiration, decreases the need for sedatives and facilitates mobilization of the patient.

Methods and Results. In 20 patients who were admitted to the recovery room or to the intensive care unit after surgical procedures respiratory support was begun with HFJV at frequencies of 100-150 per minute and an I:E ratio of 1:2. The support was decreased at 30 minute intervals by decreasing the driving pressure, stepwise, from 40 to 10 PSI thereby decreasing the controlled minute ventilation.

All the patients were able to progressively increase their spontaneous breathing. The progress of spontaneous breathing was monitored by capnographic tracings using a mass spectrometer (Perkin-Elmer RMS III). The superimposed oscillations were clearly demonstrable on the capnographic tracing. As weaning progressed the spontaneous breathing curve became more and more prominent and the end-tidal CO2 reached normal values. At this point, the patients were extubated.

HFJV was also used in 9 patients with various degrees of COPD who were on respiratory support for more than 3 weeks. Several attempts at weaning by IMV failed. An IDC VS 600 ventilator was used with the initial setting of 100-150 per minute and I:E ratio of 1:2. Existing tracheostomy or endotracheal tubes were used for insertion of jet catheter. After the patient was switched from a volume ventilator with IMV to HFJV, the desired level of respiratory support was achieved by changing the driving pressure, I:E ratio and/or level of PEEP. The patients tolerated the HFJV well and were able to start spontaneous breathing without being disturbed by HFJV pulses. The ventilatory support was then step-wise decreased, decreasing the driving pressure from 40 to 10 PSI and increasing the respiratory rate from 100 to 400/minute. Each step was maintained at least 4 hours and maximally for 2 days. The longest weaning lasted 9 days. In 2 patients it was necessary to continue with HFJV for 3 nights to prevent hypercarbia and hypoxia during sleep.

Conclusions. This clinical experience indicates that HFJV can be successfully used for weaning from mechanical ventilation not only in postoperative patients but also in ventilator dependent patients when other methods of weaning have failed.

References.