Ultrasonic Conversion of the Emerson PV3 Respirator

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A potent high capacity heated mainstream vaporizer is included as original equipment on the Emerson PV3 respirator. Although the quantitative output of the vaporizer is consistently high, we believed that some of our patients would benefit by substituting saline for the distilled water usually used. We also felt it would be useful to humidify the inspired air by means of the ventilator during the periods that the patient was off the respirator and after final removal, but before closure, of the tracheostomy.

To accomplish the above an ultrasonic nebulizer was incorporated into the Emerson PV3 respirator itself. The ultrasonic amplifier portion was mounted on a rack supplied by the Emerson Co. (fig. 1), and the original vaporizer in the body of the ventilator was removed and replaced with a vaporizer (fig. 2) big enough to contain a float valve for maintaining fluid level and the ultrasonic transducer. The fluid enters the vaporizer from a reservoir bottle also attached to the standard rack. Although the fluid level in the vaporizer is not critical, fluid should be maintained at a reasonable constant level to insure a constant output. Output is continuously variable but not linear from 0–200 ml. per hour. Par-

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ticle size claimed by the manufacturer is 73.5 per cent below 0.4 microns in diameter. By plugging the normal air intake of the PV3, and directing a carrier gas through the normal oxygen input nipple of the PV3 it is practical to use the nebulizer with the respirator shut off to supply a dense mist to a tracheostomy mask, face tent or similar equipment thus eliminating the need for a separate unit for use during periods when the patient is disconnected from the respirator.

Although the large volume of liquid required to fill the nebulizer chamber precludes the use of anything but bulk liquids, the amplifier includes a tuning mechanism making it possible to unplug the main crystal and substitute a different crystal which could in the future be used for intermittent nebulization of medications.

The conversion was done to our specifications by the Emerson Company in cooperation with the Macrosionics Corp.

CASE REPORT

An Unusual Cause of Hypoxia Under Anesthesia

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In most instances, the cause of hypoxia occurring during anesthesia can be determined. The following case illustrates an unusual cause of hypoxia, which could be explained with certainty only in retrospect.

CASE REPORT

The patient was a 58 year old white man who had a squamous cell carcinoma of the carina. His only symptom was hemoptysis, and he was essentially healthy except for mild hypertension. Chest roentgenogram was normal. It was planned to resect the carina on total cardiopulmonary bypass.

Premedication consisting of droperidol 10 mg. (Inapsin-McNeil) intramuscularly was given one hour preoperatively. Anesthesia was induced and maintained with an intravenous infusion of droperidol and fentanyl (Sublimazie citrate-McNeil) supplemented with nitrous oxide and oxygen in a 1:1 proportion. The patient was intubated and placed in the lateral position. Blood gas analysis one hour after induction of anesthesia showed the following results: $P_{O_2}$ 155 mm. of mercury, $P_{CO_2}$ 24.5 mm. of mercury, pH 7.6. The course of anesthesia was entirely uneventful until the chest was opened and the lesion palpated at which time it became obvious from the color of the blood that the patient had become suddenly and severely hypoxic. Blood gas analysis at the time showed: $P_{O_2}$ 19 mm. of mercury, $P_{CO_2}$ 41 mm. of mercury, pH 7.39. Nitrous oxide was discontinued immediately and on 100 per cent oxygen, the blood gas analysis showed: $P_{O_2}$ 35 mm. of mercury, $P_{CO_2}$ 39 mm. of mercury, pH 7.45. The right lung, which was exposed, could be seen to be well aerated, and there did not appear to be any interference with its blood supply. The endotracheal tube could be seen to be correctly placed, and perfectly patent. It was felt that in the left main stem bronchus was probably obstructed. Immediate bronchoscopy not being feasible, it was decided to place the patient on cardiopulmonary

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