

A Device for the Removal of Waste Anesthetic Gases from the Extracorporeal Oxygenator

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The presence of trace concentrations of anesthetic gases in the operating room has been well documented.^{1,2} Various devices have been constructed for the removal from the operating room area of anesthetic gases emanating from the anesthesia circuit, via the pop-off valve, and from the anesthesia ventilator. However, there is no such device for the removal of anesthetic vapors discharged

from extracorporeal oxygenators. These units require high flows of gas to permit adequate oxygenation. The Bentley Temptrul unit, used widely, requires flows of gas approximately three times that of blood. The use of either halothane or enflurane during bypass requires the removal of as much as 16 to 20 l/min of these anesthetic gases. Thus, the exposure of operating room personnel, especially the pump technician, to high concentrations of vapor anesthetic may produce potentially serious problems. We have developed an inexpensive simple device for removing these excess gases from the operating room (fig. 1).

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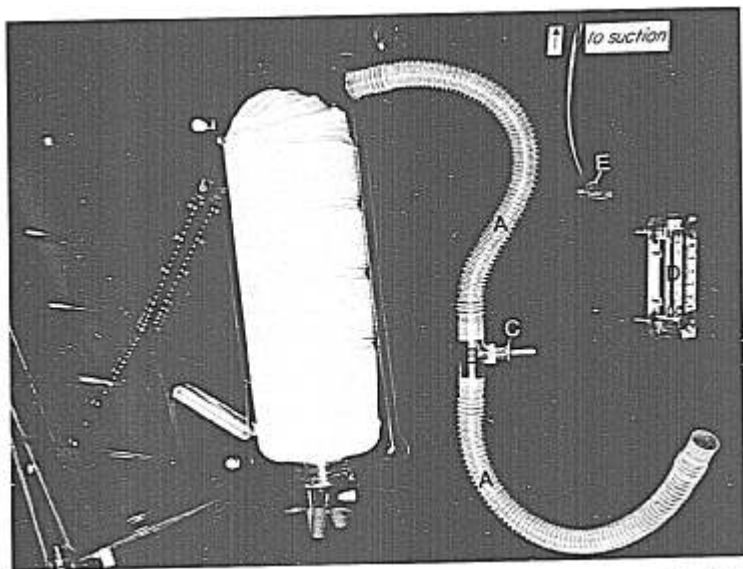


FIG. 1. A, 22 mm x 15 inch sterile corrugated plastic tubes; B, T connector; C, 6-mm endotracheal tube adaptor; D, vacuum flowmeter; E, pinch clamp.

EQUIPMENT

The cap on the gas-outlet port of the Bentley Oxygenator is removed aseptically and a sterile corrugated tube placed in the hole (U-mid/15 22 mm × 15 inch Bard-Parker Cat. #5012). A T connector (Hudson #1077), a 6-mm endotracheal tube connector, and a second corrugated tube 22 mm × 15 inches are placed on the other ports of the T connector. The 6-mm connector is attached to suction via 3/16 inch Tygon tubing; a small pinch clamp (VWR Cat. #21705-004) on the Tygon tubing controls the rate of flow. The absence of moisture beyond the T connector assures that adequate exhaust flows are present. These may be more accurately assessed using a vacuum flowmeter (Dwyer Instruments, VFA 25, Michigan City, Indiana). If the flowmeter is used continuously, vacuum flows should be approximately 25 l/min to prevent moisture build-up on the flowmeter. The T connector and two corrugated tubes may be gas-autoclaved for reuse or disposed of as required. The small ports of the oxy-

genator used for priming and addition of medication can be easily plugged with two three-way stopcocks or the caps initially present on these ports may be replaced, thus preventing any leakage of gas through these outlets.

Only a small reservoir tube is required because the exhaust from the oxygenator is a continuous flow. This system has been tested and does not produce either excessive positive or negative pressure at the exhaust port of the oxygenator. The danger of a defective T adaptor, as reported by Millar and Ketcham,³ must be guarded against.

REFERENCES

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A Variation of the Intermittent Mandatory Ventilation Assembly

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Intermittent mandatory ventilation (IMV) is a relatively new technique that can be useful in weaning patients from ventilators and in synchronizing respiratory efforts with a ventilator.¹⁻⁶ The benefits of positive end-expiratory pressure (PEEP) in certain patients are well recognized,⁷ and the IMV system

may be instituted with or without PEEP. Certain physiologic benefits of IMV over the standard controlled ventilation have been described.^{1,3,6}

The IMV assembly, given the proper equipment, is rather simple to attach to almost any volume ventilator. The assembly requires introduction of a T-piece anywhere on the inspiratory limb of the circuit, a one-way valve allowing flow toward the inspiratory limb, a reservoir, sources of compressed air and oxygen, a reliable oxygen-mixing device, a flowmeter, and a humidifier (fig. 1). The flowmeter is usually adjusted to keep the reservoir filled and the one-way valve just open. Numerous variations of the assembly have been described.⁸

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