formed with ease and tracheal intubation could have been readily accomplished. Salivation occurred occasionally, but in no instance was it objectionable with either agent, despite the absence of a belladonna drug.

Summary

Ethrane appeared similar to halothane in this small crossover study. Both were readily accepted by volunteers. Induction and emergence were alike in duration. Muscular relaxation of the jaw was acceptable with both agents.

The principal difference was that spontaneous respiration was well maintained with Ethrane at levels where serious depression occurred with halothane.

Ethrane was supplied through the kindness of Mr. James Vitcha of Ohio Medical Products, Division of Air Reduction Company, Incorporated.

References

1. Virtue, R. W., Lund, L. O., Phelps, M., Vogel, J. H. K., Beckwitt, H., and Heron, M.: Difluoromethyl 1,1,2-trifluoro-2-chloroethyl ether as an anesthetic agent: Results with dogs and a preliminary note on observations with man, Canad. Anaesth. Soc. J. 13: 233, 1966.
2. McDowell, S. A., Hall, K. D., and Stephen, C. R.: Difluoromethyl 1,1,2-trifluoro-2-chloroethyl ether: Experiments in dogs with a new inhalational anaesthetic agent, Brit. J. Anaesth. 40: 511, 1968.
3. Dobkin, A. B., Heinrich, R. C., Israel, J. S., Levy, A. A., Neville, J. F., and Ounkasem, K.: Clinical and laboratory evaluation of a new inhalation agent: Compound 347 (CHF$_2$-OCF$_2$CHFCl), Anesthesiology 29: 275, 1968.
4. Botty, C., Brown, B., Stanley, V., and Stephen, C. R.: Clinical experiences with Compound 347, a halogenated anesthetic agent, Anesth. Analg. 47: 499, 1968.

A Safe Method for Discharging Anesthetic Gases

R. Anthony Marrese, M.D.*

Of increasing concern to every anesthetist is his daily exposure to potentially toxic vapors. Davis[1] discusses contamination of the operating room by effluent anesthetic gases, and Bruce *et al.*[2] point out the possible relationship of toxic vapors to the incidence of lymphoidal malignancy. A new method † has been developed to provide a way to vent excess gases from high-flow semiclosed or nonrebreathing anesthesia circuits into central hospital vacuum systems without exposing operating room personnel to the potential environmental hazards of these vapors.

Description

In this closed-discharge-into-vacuum-line system, a needle flow valve is attached in parallel with the conventional pop-off valve (fig. 1). The discharge side of the flow-reducing valve is connected to a central vacuum line. In most hospitals, the vacuum line is attached to a central pump and a roof vent. Figure 2 shows the Marrese "Safe-vent" adapter in place with a flexible suction hose attached; the pop-off is above.

Operation

When discharging into the vacuum system, the pop-off valve is closed. Gas flows around the primary anesthesia circle to the pressure-relief valve area, where the volume of discharge is regulated by the needle valve, which allows the vacuum line to remove from the circuit only that volume of gas which is in excess, while maintaining gas bag tension and pressure at the desired levels.

Results

This method of discharging gases was used without untoward incident in several hundred anesthetic administrations. Proper adjustment of the "Safe-vent" adapter was accomplished easily, and no patient was subjected to mea-

* Staff Anesthesiologist, Pensacola Naval Hospital, Naval Air Station, Pensacola, Florida 32512.
† The method utilizes the Marrese "Safe-vent" adapter. Patent pending. This adapter is available from the Marosul Company, Post Office Box 216, River Forest, Illinois 60305.

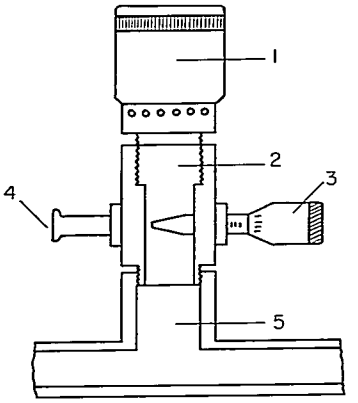

FIG. 1. Cross-section of valve. *1*, pop-off relief valve; *2*, "Safe-vent" adapter; *3*, micrometer needle flow valve; *4*, valve seat and vacuum hose connector; *5*, "T" gas conduit.

FIG. 2. "Safe-vent" adapter in place.

surable positive pressures except when intentionally used in pulmonary edema, laryngeal spasm, controlled hypotension, or ventilatory assistance. Gas flows ranged from 2 to 12 l/min. Since the safety of discharging explosive gas mixtures into a vacuum system could not be ascertained in our hospital, this method was confined to use with non-explosive mixtures. If the hospital vacuum system should fail, the needle valve can be closed and the pop-off relief valve used in the traditional manner.

This closed-discharge-into-vacuum-line method has the following substantial advantages over most pop-off valves: 1) complete elimination of anesthetic gas pollution of operating rooms; 2) rapid reproducible micrometer adjustments of anesthesia circle pressures to zero levels in the steady state; 3) no opening valve pressures required to vent gases; 4) fewer valve adjustments with controlled, assisted, or spontaneous ventilation; 5) no change in valve adjustment necessary to sigh the patient; 6) quieter operation than that of pop-off discharging; 7) complete compatibility with existing gas machines.

The device described was developed by the author on his own time, without the use of government funds, materials or personnel.

REFERENCES

1. Davis, D. A.: The operating room: An unhealthy environment. *In* Historical Vignettes of Modern Anesthesia. Volume 2. Philadelphia, F. A. Davis Company, 1968.
2. Bruce, David L., Eide, K. A., Linde, H. W., and Eckenhoff, S. E.: Causes of death among anesthesiologists: A 20-year survey, ANESTHESIOLOGY 29: 565, 1968.