CALIBRATION OF A METHOXYFLURANE VAPORIZER FOR TRICHLOROETHYLENE

Sir,—As methoxyflurane is a very potent anaesthetic, it is administered routinely from vaporizers specifically designed and calibrated for its use (e.g. Cyprane Pentec, Foregger Pentomatic). The recognition of the nephrotoxicity of methoxyflurane has resulted in a decline in its usage, thereby putting out of use a substantial number of vaporizers. Conversion of these unused vaporizers for use with an alternative anaesthetic agent would be economically advantageous.

The ideal alternative anaesthetic should have physical properties similar to those of methoxyflurane. Of all the volatile agents, only trichloroethylene has physical properties similar to those of methoxyflurane (Dorsch, 1975). At 18 °C, the corresponding vapour pressures are 23 mm Hg for methoxyflurane and 60 mm Hg for trichloroethylene. Substitution of trichloroethylene for methoxyflurane should result, therefore, in an output nearly threefold greater than the indicated dial concentration. Furthermore, the change in vapour pressure with temperature for the two anaesthetics is linear throughout the range of ambient temperatures. Were the vapor pressures nonlinear, the trichloroethylene output would vary with changing ambient temperature from a temperature-compensated methoxyflurane vaporizer. Lastly, the anaesthetic potencies for both agents are virtually identical (Wylie, 1972).

The concentrations of trichloroethylene delivered from a Cyprane Mark I Pentec were measured by gas chromatography using a trichloroethylene standard (obtained from Liquid Carbonic) as a reference. The temperature of the vaporizer was maintained constant by partially submerging the unit in a temperature-controlled water bath. Determinations were performed with an oxygen flow rate of 6 litre min⁻¹ at 20 °C. It was apparent that trichloroethylene ranged from an initial value of 0.45% to a maximum of 4.8% and, as predicted, the trichloroethylene output was approximately three times the dial setting (fig. 1).

The use of trichloroethylene may be debatable in view of the current controversy associated with this agent, based on its alleged carcinogenicity (NCI, 1976). Also, the upper range of trichloroethylene delivered with this vaporizer is much greater than safe clinical concentrations (Lee, 1968).

If a methoxyflurane vaporizer is used to vaporize trichloroethylene, it is imperative that the following precautions be taken:

(a) The vaporizer should be clearly labelled to indicate that it is vaporizing trichloroethylene and not methoxyflurane.
(b) The anaesthetist should be aware of the performance characteristics of the methoxyflurane vaporizer with trichloroethylene.
(c) The dial of the methoxyflurane vaporizer should have a mechanical stop immediately following the 0.4% setting to prohibit the administration of trichloroethylene in concentrations exceeding 1.5%.

With these stipulations, one should be able to use such a modified vaporizer to administer trichloroethylene safely and effectively.

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REFERENCES


USE OF NEOSTIGMINE AFTER SNAKE BITE

Sir,—We feel that the paper by Naphade and Shetti (1977) does not reflect modern concepts in the management of snake bite. The opening sentence “Snakes and cretes are found all over the world...” fails to define “cretes”; and the summary begins with “Cobra venom consists of neurotoxin which is...”, but in the text the authors mention 11 distinct entities known to be in cobra venom.

The writers ignore the principles of management of snake bite which have been established over many years and are summarized by a number of workers such as Reid (1971), Minton (1974) and Sutherland (1975, 1976). These principles consist of:

(1) Immobilization of the bitten limb.
(2) Strict rest—the victim should not be permitted to walk.
(3) Application of an appropriate firm roller bandage—an arterial tourniquet is not necessary to prevent absorption of venom through lymphatics.
(4) The only specific life-saving therapy is the appropriate antivenom infused promptly in the correct dosage if significant envenomation has occurred.

If the venom is inadequately neutralized then a number of complications may arise. In the modern literature...