LETTERS TO THE EDITOR

SIR:

In his paper "Methoxyflurane Nephrotoxicity," *Canad. Anaesth. Soc. J.*, 21: 294 (1974), Dr. Desmond suggests that this anesthetic be abandoned. The experimental design used in this study, and the data presented, cast serious doubt on the validity of this conclusion.

In the discussion, the author completely ignores the postoperative serum creatinine, serum osmolality, BUN, creatinine clearance value, all of which are within physiological range and not statistically different from the pre-operative values, and retains only the urine volume and osmolality as the criteria of kidney dysfunction. Declaring methoxyflurane a toxic agent on the basis of values obtained for these two parameters is scientifically invalid for two reasons. First, these criteria are the least significant ones in the evaluation of kidney function, especially since these patients were all given the same amount of intravenous fluid, irrespective of their weights. Second, the absence of pre-operative values obtained under identical clinical conditions, including the administration of intravenous fluids, or the use of a similar control group, does not permit a true evaluation of whether the reported figures are clinically or statistically abnormal.

The absence of any statistical analysis does not facilitate the interpretation of the author's discussion. In fact, a simple calculation of the means of the urine volume and osmolality for the first three postoperative days does not give the impression that these results are grossly abnormal. We obtained 2631 ml, 1660 ml and 1338 ml, respectively, for urine volume, while the mean urine osmolality for the same three days was 448.4, 403.5 and 447.3, respectively.

If the first day means the first 24 hours postoperative, the patients having a fluid intake of 2400 ml show an average deficit of 231 ml between the fluid output and intake, which can hardly be judged as a manifestation of nephropathy. During the second and third days there is a substantial reduction of more than 1000 ml in urine volume. It is also worthwhile mentioning that during these same three days the urine osmolality remained fairly constant, suggesting the kidney concentrating ability did not change despite this difference in urine volume. Examination of the data reveals that, during the first day, six patients out of eleven had a urine volume greater than 2500 ml, but had a mean urine osmolality of 503, which is higher than the other five patients with a smaller urine volume and an osmolality of 381. It would appear, therefore, that the higher urine volume detected during the first day was not a manifestation of nephrotoxicity and was not associated with a lower urine osmolality. This fact is in conflict with Dr. Desmond's statement that a large volume of urine of low osmolality was the most striking finding of this study.

We would like here to re-emphasize the importance of a control group as a reference point from which to interpret the results obtained in the test group. In one of our clinical studies we observed that, among a group of twenty-five patients with narcotic-N₂O anesthesia lasting between 60 and 120 minutes, four patients on the first postoperative day had a urine output greater than 2500 ml with a mean of 2957 ml. The mean fluid intake was 2235 ml for the same period. The deficit of

722 ml between the output and intake might have been considered erroneously as a sign of nephropathy.

We do not contest the results obtained by the author, but rather the interpretation of his findings and recommendations, which appear in figure 3. If these are based on clinical results obtained during the reported study, they are certainly questionable and also confusing. For instance, in figure 3, the anesthetic concentrations which are shown, and which are said to be likely to cause renal dysfunction, are alveolar and not delivered concentrations. This point should be made absolutely clear. The figure also does not specify the minute volume, which is such an important variable in the uptake of a volatile anesthetic.

As far as we are concerned, our recommendations appear in our package insert and are based on a nomogram which recommends decreasing delivered vapor concentration of methoxyflurane in such a way that a constant alveolar concentration of 0.1 per cent is maintained. Such a concentration is adequate when the drug is used with 50 per cent N_2O/O_2 and can be even further reduced in certain conditions explained in the document.

The knowledge accumulated on methoxyflurane in the past four years is greater than on any other halogenated anesthetic agent and indicates that nephrotoxicity associated with its use can be avoided. We therefore emphatically disagree with Dr. Desmond's suggestion that his drug be abandoned.

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SIR:

With regard to the recently described hazard connected with the re-use of the Bain's circuit by R. Hannallah and J.K. Rosales, September 1974, page 511, I would like to suggest a method of ensuring that the inner tube of the Bain's circuit is intact by using the oxygen by-pass.

When the circuit is intact flushing with oxygen causes a high velocity flow of gas in the inner tube. Provided there is no obstruction to flow at the distal end of the circuit this high flow, by Venturi effect, lowers the pressure in the outer tube and the reservoir bag can be seen to completely collapse. If, however, the inner tube is disconnected from its mounting this effect is not seen, in fact the bag inflates slightly.

This simple procedure of flushing the circuit with the oxygen by-pass and observing the reservoir bag seems to be an effective way of detecting proximal disconnection or fracture of the inner tube and may be especially valuable in circuits made of black tubing where it is not possible to see the inner tube.

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