MALIGNANT HYPERPYREXIA IN A NEGRO

Sir.—In the autumn of 1968, a well-built Negro soldier from the Sudanese Regiment was brought to Ismailia Military Hospital with signs of acute appendicitis with low-grade fever.

Anesthesia was induced with thiopentone 500 mg combined with atropine sulphate 1 mg, and intubation of the trachea was facilitated by suxamethonium 50 mg. Although relaxation was not satisfactory, intubation was performed, and a Guedel airway was put in his mouth beside the tube.

Positive pressure ventilation was continued using nitrous oxide, oxygen and halothane 2.5%, but muscle relaxation was not obtained and resistance to inflation was felt. The suxamethonium was repeated in the hope that relaxation of the abdomen would result, but instead the patient developed trismus and masseteric spasm. Resistance to inflation increased and on account of peripheral circulatory failure intravenous fluids were given. The hyperpyrexia, which reached above 41°C in 1½ hours, was treated by applying ice-dipped towels to the patient's body, but the muscle rigidity never decreased in spite of the 160 mg dose of gallamine.

The patient died 2 hours after the beginning of anaesthesia from cardiorespiratory failure. Because of the unusual nature of the course of the anaesthetic, a team consisting of a bacteriologist, a pathologist and a toxicologist examined the patient postmortem and found no abnormality apart from those associated with acute heart failure due to pyrexia.

This case of malignant hyperpyrexia in a Negro may be of interest to readers of the British Journal of Anaesthesia as most of the previous case reports have been in patients of European extraction.

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CORRESPONDENCE

METHOXYFLURANE IN CAESAREAN SECTION

Sir.—Dr Latto and Dr Wainwright are to be congratulated on their paper "Anaesthesia for Caesarean section" in which they analysed the results of blood investigations and clinical enquiry following a technique using 0.1% methoxyflurane and 40% oxygen (Latto and Wainwright, 1972).

This technique is similar to that followed by the obstetric anaesthetic staff in Leeds Maternity Hospital over a period of about 18 months until 12 months ago. During this period we used a technique of general anaesthesia for Caesarean sections and other obstetric anaesthetics utilizing 50/50 mixture of nitrous oxide and oxygen supplemented by 0.1% methoxyflurane which was exhibited prior to the delivery and terminated some minutes before the end of the operation; the duration of administration of the methoxyflurane was on an average for 15 min. We also investigated awareness and attempted to discover the concentrations of methoxyflurane in maternal and umbilical vein blood at the time of delivery. Unfortunately, this part of the investigation proved impossible to achieve in the case of one of the mothers for technical reasons. We did, however, in 7 cases investigate the occurrence of metabolites of methoxyflurane in maternal urine following Caesarean section. In conjunction with MRC Mineral Metabolism Unit, General Infirmary, Leeds, we measured both free fluoride ion and oxalic acid occurring in the mother's urine prior to, and for 8 days following, Caesarean section in 7 cases (Wilson, Marshall and Hodgkinson, 1972). In all the cases investigated the urine levels of fluoride were discovered to be raised to 10–20 times the preoperative control level on the first postoperative day and to be raised to 5–10 times the control level on the second postoperative day. In all cases, the urine levels of inorganic fluoride had returned to the control level between 3 and 8 days postoperatively. In the case of oxalic acid the levels were raised above that likely to give rise to crystalluria in 3 of the 7 patients: in the other 4 patients the level did not rise following the administration of methoxyflurane.

In none of these patients, nor in any of the other patients to whom methoxyflurane had been administered for obstetric anaesthesia, has any clinical evidence of nephrotoxicity developed. It is unfortunate that our investigation was unable to reveal maternal and umbilical vein methoxyflurane concentrations but it must be assumed from the duration of administration and the delivered concentration of the agent that the total dose delivered to the mother was insignificant and certainly no greater than that used in the series of Drs Latto and Wainwright. This being so, it seems unjustifiable to suggest, as these authors do, that the administration of this concentration of methoxyflurane for this period of time is entirely free from nephrotoxicity. It must be remembered that nephrotoxicity is not entirely dose-dependent; and as our series proved the level of nephrotoxic metabolites in the urine is not dose-dependent, but may well be related to other concurrent factors such as sub-clinical renal dysfunction (as may be present in pre-eclamptic toxemia) or the administration of other drugs, e.g. tetracyclines.

Following our results we adopted a technique, modelled on that described by Moir (1970), using 50/50 nitrous oxide/oxygen, supplementing this with 0.1 or 0.2% halothane in a similar manner to that in which we had used methoxyflurane. This technique has provided, to date, freedom from awareness and no evidence of uterine relaxation in 250 cases so treated in Leeds Maternity Hospital and the Simpson Memorial Maternity Pavilion, Edinburgh.

Methoxyflurane is used by several obstetric anaesthetists for anaesthesia, and in many centres for analgesia, and has, apparently, given rise to no overt nephrotoxicity. I feel that in view of our findings it is incumbent upon us, however, to consider seriously the use of this agent, particularly in the ante- or intra-natal situation when it has been proved that even such low concentrations can produce high levels of metabolites which are acknowledged to be nephrotoxic.

J. WILSON
Edinburgh

REFERENCES


Sir.—In our paper in which the uptake of methoxyflurane at Caesarean section was analysed it was stated that nephrotoxicity was unlikely to occur under these conditions when methoxyflurane was used for a short period of time and in low concentrations. However, no direct measurements of renal function were made and the evidence for this claim was indirect. Rosen, Latto and Asscher (1972) on the basis of detailed tests of renal function, showed that there was no evidence of nephrotoxicity when 0.35% methoxyflurane was used as a self-administered analgesic.
in labour. It was subsequently calculated that less than half this amount of methoxyflurane was required for Caesarean section when using a 0.1% supplement.

Cousins and Mazze (1972) qualified the findings that there was no evidence of nephrotoxicity following the use of 0.35% methoxyflurane in labour by stating: "The agent appears not to be nephrotoxic under most conditions of low dosage administration." It would certainly appear prudent to avoid the use of this agent in patients who have grossly impaired renal function or who are receiving nephrotoxic agents, such as tetracycline. Wilson, Marshall and Hodgkinson (1972) noted that elevated levels of free fluoride ion and oxalic acid appeared in urine following the administration of small quantities of methoxyflurane at Caesarean section. No clinical evidence of renal dysfunction was noted, however, and no direct measurements of renal function appear to have been made. Work is at present in progress in Cardiff to determine whether there is any evidence of renal calculus formation as a result of the oxalic acid excretion which follows methoxyflurane analgesia.

Cases of renal dysfunction have been reported in the literature following the use either of 0.1% methoxyflurane as part of a balanced anaesthetic technique for Caesarean section or of 0.35% methoxyflurane for analgesia in labour. Since the nephrotoxicity following methoxyflurane is dose-related it would appear desirable to limit the quantity administered to a minimum. The use of a balanced anaesthetic technique with a 0.1% methoxyflurane supplement for a limited period appears to be the optimum method of administering the drug providing that it is also efficient in preventing awareness. It can indeed be argued that this is the only justifiable method of administering the agent and that the use of high concentrations in patients breathing spontaneously should be avoided. We agree both with Cousins and Mazze (1972) and Wilson, Marshall and Hodgkinson (1972) that the effect of these metabolites on the foetus should be assessed.

I. P. LATTO, Cardiff
A. C. WAINWRIGHT, Bristol

REFERENCES

PRE-STRETCHED CUFFS ON TRACHEOSTOMY TUBES
Sir,—We very much support the warning given in the November issue (Brit. J. Anaesth. (1972), 44, 1222) by J. G. Wandless and his colleagues, concerning the hazard encountered following the use of one of our tracheostomy tubes after they had pre-stretched the cuff. This most certainly is an inherent risk where carefully controlled and reproducible conditions of manufacture are not available.

Earlier experimental work by Grenvik, Safar and Caroll (personal communication), as well as those mentioned by your correspondent, preceded commercial assistance by several years, and much useful work was done. (See also Caroll, Hedden and Safar, 1967.)

The hazards involved were probably clearer to the experimenters than to those who subsequently used the technique, and great care in manufacture and subsequent testing is most important.

An important aspect relating to the problem of selective herniation of the cuff is in producing one with a constant wall thickness. This is of little significance in cuffs used in the normal manner before pre-stretching, but in the pre-stretched condition, herniation is very likely where the wall is at its thinnest. Current advances in manufacturing techniques will overcome this problem but in view of the current vogue in do-it-yourself pre-stretching, the warning is timely.

D. R. LAWSON (Technical Manager)
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REFERENCE

SIR,—Partial occlusion of the right main stem bronchus by a pre-stretched tracheostomy tube cuff was reported recently by Drs Wandless, Emery, Evans and Foley (Brit. J. Anaesth. (1972), 44, 1222).

We wish to report another hazard which arose from the use of a similar tracheostomy tube (Portex with pre-stretched cuff).

A 50-year-old man had been on long-term ventilation in an intensive care unit following trauma causing a flail chest. After recovery, removal of the tracheostomy tube was planned. The cuff was deflated and the lumen occluded to evaluate his ability to mouth-breathe. This was impossible around the deflated cuff; and, therefore, the possibility of tracheomalacia was considered. The patient was scheduled for bronchoscopy and evaluation of the trachea below the tracheostomy site.

Upon arriving in the operating room and before the bronchoscopy was performed the tube was again occluded with the cuff deflated, the pilot balloon was noted to be deflated, airway obstruction again occurred. At this point the remaining air in the endotracheal tube cuff was aspirated with a syringe and the patient was able to breathe easily around the tube.

At bronchoscopy the trachea was normal and it was concluded that the patient's "difficulty in breathing around the tracheostomy tube" could have been prevented by prior aspiration of residual air in the tracheostomy tube cuff.

The use of pre-stretched cuffs appears to be increasing, and knowledge of this complication may prevent unnecessary bronchoscopy or prolonged tracheostomy.

PAUL E. BERKEBILE
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SIMPLE AND RELIABLE METHOD OF INSERTING A NASOGASTRIC TUBE DURING ANAESTHESIA
Sir,—The notes by Matsuki and Zsigmond in your June number, and that by Wedley in the October issue, prompt me to suggest a method for inserting a nasogastric tube fairly easily by those of us who are not so musically inclined as to be equipped with guitar strings.

One slits a smooth non-cuffed tracheal tube along the entire length of its lesser curvature, and lubricates the outside of the distal end well. It is then inserted through the nose into the oesophagus. The tube which one wishes to leave in place is then lubricated well and pushed through the slit tube. By holding the inner tube firmly, the outer tube can easily be withdrawn.

ROBERT W. VIRTUE
Denver

REFERENCES
Wedley, J. R. (1972). Simple and reliable method of inserting a nasogastric tube during anaesthesia. (Correspondence.) 44, 1117.