appeared to be preferable to retrospective estimation of pain relief. In this category of investigation graded scoring systems afforded marginally greater sensitivity than the quantal approach. The observer’s impression, although recorded before the patient was interrogated, gave results very similar to those of the introspective procedures, but improvement in v.c. and p.e.f. following treatment appeared to be greatly influenced by the degree of drowsiness engendered. Thus, for example, pethidine 100 mg proved markedly inferior, in this parameter, to saline. In the case of the spirometric parameters, quantal scoring appears to be most suitable.

Patients who had undergone the most prolonged operations were found to obtain the least satisfactory response to postoperative analgesic drugs. A marked trend (not statistically significant) was found in favour of successful pain relief after lower, as opposed to upper, abdominal operations.

REFERENCES


ANAESTHESIA FOR SURGICAL RESEARCH

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The importance of satisfactory and suitable anaesthetic techniques for surgical experiments on animals was stressed. Species variation in relation to clinical pharmacology and physiology was emphasized. There are both economic and humane reasons for the selection of suitable anaesthetic methods in surgical research. The majority of anaesthetic techniques employed are similar to those which are used in veterinary clinical practice although some experiments require special techniques of anaesthesia.

As surgical diathermy was used for the majority of procedures it was necessary to avoid the use of explosive and inflammable anaesthetic agents. Rapid recovery from anaesthesia was considered to be essential in order to avoid postoperative complications. This was particularly necessary in the neonatal animals in order that they could be returned to their dam as soon as possible after the termination of the surgical procedure. In order to expedite recovery, anaesthesia was induced with a short-acting barbiturate or a volatile agent and maintained with a parenteral or volatile agent. Despite the well-documented objections to the use of inhalational anaesthesia in poultry, a satisfactory technique has been developed in turkeys (Jones, 1966) and in chickens and ducks. The place of the dog as an experimental animal was discussed and the reasons for the selection of an alternative species such as the rabbit were outlined. The problems of general anaesthesia in the ruminant species were outlined. The relatively large capacity of the rumen and the possibility of the occurrence of regurgitation and tympany during the course of anaesthesia was emphasized. The usual technique which was adopted in this group of animals was to induce anaesthesia with pentobarbitone and after intubation to maintain with oxygen and halothane in a closed circuit. Animals have been anaesthetized for a variety of surgical procedures which include lung transplantation and thyroidectomy. The pig presented most of the problems in our series of experiments. This was due both to the intractable nature of this species and to the surgical procedures which were performed. Neonatal pigs of 1–2 days of age and weighing 1–2 kg were anaesthetized for periods of up to 1 hour for resection of up to a total of one-half of the length of the small intestine. Oxygen and halothane were administered from a Boyle machine through an Ayre T-piece and a Hall cat mask. The neonatal pig is particularly susceptible to hypoglycaemia and hypothermia. Glucose saline and atropine were administered before induction of anaesthesia. A heated Palmer small animal operating table was used to prevent hypothermia. Adult female pigs were anaesthetized for surgery of the gall bladder of the foetus in utero some 14–28 days before parturition. After premedication with acetylpromazine and atropine, anaesthesia was induced with pentobarbitone. Endotracheal intubation was carried out with the aid of a specially modified laryngoscope, and anaesthesia was maintained with oxygen and halothane in a closed circuit.

REFERENCES


CORRESPONDENCE

THE EFFECT OF INDUCTION OF ANAESTHESIA ON PERIPHERAL HEMODYNAMICS

Sir,—We read the paper by Dr. W. J. Thomson (Brit. J. Anaesth., 1967, 39, 210) with interest but also with considerable disquiet. In his opening paragraph Dr. Thomson implies that, in our studies of cyclopropane and halothane, we assumed that the measurement of forearm blood flow by plethysmography represents muscle blood flow only. It is well known that such an assumption is erroneous. As long ago as 1957 one of us was concerned with this problem and it was considered routine to attempt to differentiate between skin and muscle blood flow when interpreting data obtained from forearm plethysmography. The methods used included hand plethysmography which is adequate for the detection of significant changes in skin blood flow, i.e. those of a degree sufficient to obscure changes in muscle blood flow as measured by the forearm plethysmograph. Dr. Thomson has ignored the fact that we presented data for hand blood flow in our paper on halothane. In a study of cyclopropane we suggested that vasoconstriction occurred in both skin and muscle but this was of secondary importance as the conclusions in this work were based on changes in total forearm vascular resistance.

Dr. Thomson states that the heat clearance technique permits differentiation between skin and muscle blood flow. It is difficult to understand why he choose to compare the muscle blood flow in the forearm with skin blood flow in the finger. It is well known that, unlike the skin of the forearm, resting vasocnstrictr...
tissue in the finger is high. It follows that factors which permit the release of this high resting vasoconstrictor tone will produce an increase in blood flow in this region. It is not surprising that large increases in skin blood flow were seen when some patients fell asleep following pre-anaesthetic medication. In such circumstances it is difficult to understand how one could determine the role of the anaesthetic preparation.

The study of peripheral vascular changes is of prime importance for the better understanding of the general haemodynamic effects of anaesthetic agents. In this context alterations in limb vascular resistance, whether due to changes in skin or muscle blood flow, provide the most meaningful information.

Plethysmography is a method which provides for quantitative assessment of vascular resistance and we believe, that correctly interpreted, it is a most valuable aid in evaluating peripheral vascular changes brought about by general anaesthesia.

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REFERENCES

DANGER OF CUFFED ENDOTRACHEAL TUBE DURING TRACHEOSTOMY

Sir,—Anaesthesia for tracheostomy, while sometimes presenting problems during induction on account of the patient's disease or for technical reasons, is not usually associated with subsequent difficulties. A recent experience may be of interest to others because of a complication encountered during the operation.

Induction presented no problems, the airway being established by means of an inflated cuffed endotracheal tube. The cuff was deflated and the tube withdrawn after the incision had been made into the trachea and when the surgeon was ready to insert the tracheal dilators. This procedure was uneventful. Anaesthesia for the laryngectomy was maintained through the tracheostomy connection. The discarded endotracheal tube, after a cursory examination, was removed by a technician. A few moments later he returned the tube with a query about the condition of the cuff of the tube which was incomplete (fig. 1). Bronchoscopy was carried out immediately and from a point about 1 inch above the site of the incision a rectangular piece of thin rubber approximately 12 × 9 mm was removed. This corresponded with the bare area of the cuff. Had it not been for the alertness of the technician, there is little doubt that the presence of the cuff remnant in the trachea would not have been appreciated, with consequences that can be imagined.

This incident serves as a reminder that it is most important to examine tubes on removal wherever they have been in close proximity to a surgical manoeuvre, and that when tracheostomy incisions are being made the cuff should be deflated beforehand. Indeed when cuffed tubes are being used it is advisable for them to be withdrawn, at least partly, to ensure that this incident is avoided.

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METHAEMOGLOBINAEMIA IN MOTHER AND FOETUS FOLLOWING CONTINUOUS EPIDURAL ANAESTHESIA WITH PRilocaine

Sir,—I would like to congratulate Drs. Climie, McLean, Starmer and Thomas (1967) on their excellent paper. Their results corroborate our findings (Adamson and Spoerel, 1966; Spoerel, Adamson and Eberhard, 1967) and their explanation of the lower values reported by American workers agrees with ours.

The discussion on the mode of methaemoglobin production in the foetus is of great interest. Although prilocaine crosses the placental barrier I am unaware of any reports of methaemoglobinemia occurring 2 to 3 hours postpartum when infants are delivered 20 to 30 minutes after a single epidural injection or a pudendal block. Perhaps the total dose of prilocaine is too small or the newborn's liver metabolizes prilocaine more slowly, with consequently less methaemoglobin-producing metabolite being present at any given time. I would be interested in learning of any data on this question.

While this is an academic question, I agree with the authors that the possibility of reduction in oxygen-carrying capacity in maternal and foetal blood is an undesirable property which outweighs the advantages this drug may have over other agents.

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REFERENCES