AN ANAESTHETIC TECHNIQUE OF USE IN THE RECONSTRUCTIVE SURGERY FOLLOWING PHARYNGO-LARYNGO-ŒSOPHAGECTOMY

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Modern anaesthesia, in association with blood transfusion and antibiotics, has opened up fresh fields to surgery. As a corollary, the confidence of surgeons in their anaesthetists tends to put increasing demands upon the skill and ingenuity of the latter. This is a healthy and desirable situation. When, however, a request is made which involves the relinquishment of control of the airway, an anaesthetist is entitled to pause and take stock before acceding to the request.

An anaesthetist may be confronted with such a situation in the reconstructive surgery which is necessary following the operation of pharyngo-laryngo-oesophagectomy. In the interests of asepsis and a clear operating field, unimpeded by rubber tubing of doubtful sterility, with its tendency to kink or become disconnected, such a request on the part of the surgeon is entirely reasonable. This article is an attempt to show how the interests of patient, surgeon and anaesthetist can be satisfactorily met.

STAGES OF THE OPERATION

Prior to dealing with the anaesthetic problems, it may not be out of place to give a brief description of the anatomy displayed when the first stage of the operation has been completed. A rect-angular skin flap has been deflected from the anterior cervical region and the underlying hyoid bone, larynx (with a number of tracheal rings), hypopharynx and some inches of oesophagus with the contained neoplasm removed. A total thyroidectomy is also an incident in the operation.

The skin flap is replaced, but now lies against the prevertebral fascia and carotid sheaths. The superior edge is sutured to the mucous membrane lining the posterior part of the gap in the floor of the mouth. The skin of the sub-mandibular region is sutured to the remaining free mucous membrane. The lower edge of the cervical skin flap is attached to the posterior lip of the oesophagus, while the tracheal opening just above the sternum is attached anteriorly to the pectoral skin.

When the dressings are removed for the stage of reconstruction, the spectator is left with a vivid impression of two large raw areas separated by a deep central cleft. Through this cleft runs a feeding tube, from the nares above to the intact oesophagus below. The surgeon's aim is to reconstruct the hypopharynx and oesophagus, using the same cervical skin previously reflected, and now firmly attached to the vertebral region and receiving its blood supply therefrom.

From this skin a tube is formed which,
superiorly at its freed margin, is attached to the floor of the mouth, and inferiorly to the anterior margin of the oesophagus. The oesophagus, in turn, requires to be separated from the posterior lip of the trachea. When this stage is completed, the artificial skin tube now formed is covered by two large skin flaps taken from the anterior triangles and pectoral regions.

At the lower end of the operation field, the restriction of space and peculiar liability to fistula formation makes a clear field of great advantage to the surgeon. It can readily be seen that the presence of any anaesthetic apparatus would add to the surgical difficulties at this stage.

**ANAESTHETIC PROBLEMS**

The anaesthetic problems now become reasonably clear. They are:

1. There must be uninterrupted access to the operating field for the surgeon; therefore no tubing is permissible.
2. Because no endotracheal tube is in situ, the patient must retain the use of his own respiratory apparatus.
3. Respiratory depression must be avoided (a) to prevent oxygen lack, (b) to prevent CO₂ build-up. In connection with the latter attention is drawn to the remarks of Orton (1952) and Pask (1948) who emphasize that CO₂ build-up can occur with a depth of respiration sufficient to prevent cyanosis. This apparently adequate oxygenation is illusory, and the patient may slowly develop CO₂ poisoning, leading to respiratory depression and death.
4. No blood must be allowed to enter the trachea. This is important because, though the reflexes may not be completely obtunded, the cough reflex becomes ineffective in the presence of an open tracheotomy.

**ANAESTHETIC TECHNIQUE**

The intravenous route seems the logical choice for anaesthesia in these circumstances. The phenothiazine derivatives with pethidine were used to produce a form of basal narcosis, and the anaesthesia continued with thiopentone and suxamethonium. The method is as follows.

One hour prior to operation a solution of chlorpromazine, 50 mg, promethazine, 50 mg, pethidine, 100 mg, is made up in 10 ml normal saline and injected deep into the gluteal muscles. Both buttocks are used because of the bulk of solution and to minimize the irritating effects that might be expected to follow the injection. In this objective, full success was obtained.

The patient arrives in the anaesthetic room asleep, but can be roused. Here a solution of the same drugs, in the same dosage, but diluted now in 250 ml saline has been prepared and is administered in the form of an infusion through a vein in the lateral surface of the forearm. At first, the drip is allowed to run freely (130 ml in approximately 10 minutes). The rate of flow is then slowed down, and the whole infusion is given in 25–30 minutes. At this stage the patient is soundly asleep, no longer rousable, but reflexes, e.g. the lash reflex, may still be present.

Thiopentone 1 g and suxamethonium 100 mg are dissolved in 500 ml of normal saline and the bottle connected to the drip tubing already in use. A very slow rate of
flow (20 drops per min) is permitted. The interaction of the thiopentone with the solution remaining in the drip chamber causes a turbidity, which disappears in a matter of seconds.

The patient is now taken to the theatre. In the early stages of the operation it may be found necessary to speed up the drip for one or two minutes. As soon as the patient settles, the earlier rate of flow is resumed. Suitable adjustments are made in the course of operation to meet individual requirements.

Figure 1 gives some details of one patient's condition during operation, who was anaesthetized by the method described. It will be agreed that they provide almost monotonous satisfaction. The slight rise in systolic blood pressure and pulse rate is attributed to some straining and coughing produced by a little blood that had found its way into the trachea. It is emphasized that continual vigilance is necessary on the part of the surgical assistant to avoid this possibility, otherwise the patient's reflexes come rapidly into action and the even rhythm of anaesthesia upset.

It is perhaps the smoothness of anaesthesia, which creates the most vivid impression. At no time is the patient's respiration in jeopardy; the rhythm is slow, deep and regular throughout.

Postoperative recovery is uneventful. Signs of returning consciousness are evident in about one hour after return to the ward and full consciousness is present in three hours. Rectal temperature rises slowly from around 96°F. and is normal in six hours. Pulse and blood pressure readings indicate no adverse effect on the cardiovascular system.

It will be appreciated that this type of case is a rarity in a provincial hospital and that the anaesthetist's experience is, in consequence, limited. I have had experience of no more than five cases and, of those five, one only has been anaesthetized by the method described. It must be added, however, that this patient required two further plastic operations to repair a fistulous opening around the tracheotomy, and the same method of anaesthesia was used on those occasions with equally satisfactory results.

**DISCUSSION**

If it be accepted that anaesthesia by the intravenous route provides the best conditions for this type of surgical operation, the following questions might be asked: Why this somewhat elaborate technique when simpler methods are available?

Intravenous alcohol (3 ml of 90 per cent alcohol per kg body weight) in a 5 per cent glucose solution would secure a light anaesthesia, which would possibly be suitable for this type of surgery (Hewer, 1953).
The writer has some misgivings about its use in the presence of diathermy.

Rectal bromethol with intravenous thiopentone is mentioned to be condemned. Both drugs are respiratory depressants, and the combined effect on the respiratory centre would be undesirable, if not dangerous, when control of the airway has been relinquished.

The writer's experience during the war of continuous intravenous thiopentone was unsatisfactory. Using a 1 per cent solution in saline, it was found that individual variability to dosage, and the rate of degradation made it very difficult to maintain an even level of anaesthesia. Postoperative narcosis was too prolonged.

On the other hand, the basal narcosis produced by suitable doses of promethazine and chlorpromazine allows the use of fractional quantities of thiopentone as supplementation to secure an even plane of light anaesthesia. Eastwood and Harbord (1955) draw attention to the fact that it is possible to produce a satisfactorily spontaneous pulmonary respiration with these drugs. Sufficient has already been written on the properties of these drugs to render unnecessary any further elaboration except to refer to the properties of absence of postoperative pain and discomfort. To a patient, who has undergone the operation of pharyngo-laryngo-oesophagectomy these two factors are of paramount importance and alleviation of his distress will earn his gratitude.

The addition of suxamethonium to the solution of thiopentone may provoke inquiry. The idea behind this was to promote a mild but continuous degree of relaxation, and to obtund the vagal reflexes, thus avoiding straining and coughing. The recently published work of Fraser (1954) on the hydrolysis of suxamethonium salts strongly suggests that the activity of suxamethonium is quickly reduced when used in combination with thiopentone, because of the high pH of the latter. It is questionable, therefore, if suxamethonium has any advantages to offer here.

CONCLUSION

"It could be argued that were anaesthetists to pay as much attention to the problems involved in dealing with oto-laryngological surgery in children and adults as they do those of specialized cardiac surgery, more widespread good for the general community would follow" (Annotation, 1954).

The above is a verbatim quotation from an Annotation on E.N.T. Anaesthesia in a recent number of this journal. It is hoped that the method of anaesthesia described above may be of value in the surgery of the upper air passages and digestive tract, where the anaesthetist is unable to control the airway.

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