CUFFED OROTRACHEAL INTUBATION FOR REMOVAL OF TONSILS AND ADENOIDS

BY

W. D. STEEL AND R. E. NEEDS*

Worcester Royal Infirmary and Ronkswood Hospital, Worcester, England

SUMMARY

The Worcester orotracheal connection simplifying the use of the Doughty tongue plate in the Boyle-Davis gag is described. This permits the use of intravenous thiopentone and intermittent suxamethonium with nitrous oxide and oxygen through a cuffed orotracheal tube for removal of adenoids prior to dissection of tonsils, an anaesthetic technique which combines perfect control of the airway and relaxation for surgical access with rapid recovery, resulting in improved postoperative condition, less bleeding and consequent reduction in nursing care. Further, the unpleasant sequelae of ether and the dangers of halothane, should the surgeon wish to infiltrate with adrenaline, are avoided.

Following the work of Doughty (1957) in England and McAlpine and Bowering (1958) in Canada, the authors have, for some time past, used an anaesthetic technique consisting of thiopentone, intermittent suxamethonium and nitrous oxide and oxygen with oral intubation using a cuffed tube for the removal of tonsils and adenoids. Since the method has real advantages, it is felt that the technique which has been developed by the authors may be of general interest.

The advantages of the method of cuffed orotracheal intubation for removal of tonsils and adenoids are as follows:

1. It allows complete control of the airway.
2. The presence of perfect relaxation provides easy surgical access.
3. It is possible to remove the adenoids with deliberation prior to tonsillectomy, and thus be assured of nasopharyngeal haemostasis at the end of the operation.
4. The use of intermittent suxamethonium promotes rapid recovery and reduction in the amount of postoperative care required, avoids the use of ether with its unpleasant postoperative sequelae, and escapes the dangers of halothane, if the surgeon wishes to infiltrate the tonsil fossae with adrenaline.
5. It eliminates the possibility of intranasal damage and the introduction of infection or tissue into the bronchial tree.

For some two years anaesthesia for tonsillectomy with or without adenoidectomy was provided using the technique of thiopentone induction followed by nitrous oxide, oxygen and ether with orotracheal intubation using a cuffed tube. During the last ten months 130 patients ranging in age from 5 to 50 years have been anaesthetized using thiopentone, suxamethonium, orotracheal cuffed intubation followed by nitrous oxide and oxygen with intermittent injections of suxamethonium.

TECHNIQUE

The patient is premedicated with pethidine (20–75 mg), the dose being adjusted according to size and age, together with atropine 0.6 mg, irrespective of age, 1 hour before operation. Anaesthesia is induced with enough thiopentone to abolish the eyelash reflex. It is given through a fine Mitchell needle using the dorsum of the left hand wherever possible. This is followed by suxamethonium 25–50 mg, for children according to size, and in the usual dose for adults. A careful note is made of the time of administration. After inflation of the patient's lungs with oxygen, a McGill orotracheal cuffed tube is passed and the cuff inflated.

* Now at St. Mary's Hospital, Portsmouth.
The tube is fitted with a metal connection, called the Worcester connection. This was designed by one of the authors (W.D.S.) to replace the usual McGill type (fig. 1). It has a long straight section on which the tube is threaded for an inch or more and the end is flanged to maintain a good grip of the tube. The other part is fully curved so that it passes over the lower incisors, extends to the level of the symphysis menti, and terminates in the same size of bell-shaped orifice as a McGill connector. By using this device there is no danger of the McGill endotracheal tube being nipped between the incisor teeth and the underside of the tongue plate, which almost invariably happens with a normal McGill connector, either nasal or oral.

The anaesthetic is continued with nitrous oxide and oxygen from a Boyle apparatus via a McGill attachment, McGill catheter mount and Ruben valve (fig. 2). The latter avoids rebreathing or the use of cumbersome twin corrugated tubes. It is necessary to tape the pilot tube from the cuff to the catheter mount to facilitate the introduction of the Doughty gag. Ventilation is maintained by manual compression of the bag and the anaesthetist is more mobile if the bag is connected to the bag mount by a length of corrugated tubing.

The time which elapses between the first dose of suxamethonium and the return of pharyngeal movements or adequate respiration is noted and a further dose of suxamethonium is given. This is usually the same as the first unless the elapsed time has been prolonged or unduly short, in which case the dose is suitably modified. This then becomes the patient's own individual basic dose and is repeated as necessary for the maintenance of relaxation. Usually in children a
CUFFED OROTRACHEAL INTUBATION FOR REMOVAL OF TONSILS

50-mg dose lasts 4–6 minutes and the interval between doses remains remarkably constant even after about 20 minutes of anaesthesia.

Towards the end of the operation the dose is halved and the frequency of administration is doubled in order to obtain finer control with the object of having the patient leave the theatre with good spontaneous ventilation.

The Doughty modification of the Boyle-Davis gag is used in which the tongue-plate has a longitudinal slot. The McGill tube mounted on the straight section of the Worcester connection fits into this, which holds it firmly between the tongue and the tongue-plate.

At first the introduction of the Boyle-Davis gag seems anything but easy. To facilitate its introduction the anaesthetist holds the tube in the midline of the chin. The surgeon then slides the tongue-plate along the orotracheal tube, taking care that the pilot tube from the cuff lies with it, and completely ignoring the position of the tongue (fig. 3). He opens the gag a little to hold the tube in the slot, before centering the tongue with a pillar retractor (fig. 4), and then finally fixes both tongue and tube by opening it fully. The gag is held in position with a Draffin bipod and the anaesthetist withdraws from the field (fig. 5). The surgeon is now free to perform a leisurely adenoidectomy and subsequent tonsillectomy so that he can assure himself that nasopharyngeal bleeding has ceased before the patient is extubated. The Boyle machine is on the left of the patient and the rectangular shape of the Ruben valve completes a neat, light set-up. The connection is gripped between the incisor teeth and the tongue-plate. No adhesive tape or harness is required and surgical access is quite unobstructed (fig. 6).

After the surgeon has finished, the patient is turned into the right lateral position as is usual after tonsillectomy. Ventilation is continued as necessary until adequate reflexes have returned when extubation is performed. This usually occurs within 1 or 2 minutes but with experience can be much less. The patient is transferred to the trolley and the Mitchell needle removed. On return to the ward the patient is usually sufficiently conscious to obey commands and, in the words of sister, "We only have to wash their faces, tell them to lie still and keep an eye on them."

DISCUSSION

The ward staff have no doubt about the improvement in the postoperative state of the patients and certainly there is a much quieter atmosphere in the ward at the end of the list. There is thus less oozing of blood and no need for postoperative sedation.

The following table shows the frequency of recorded postoperative bleeding in the series anaesthetized using the present technique by comparison with the frequency using the older techniques.

<table>
<thead>
<tr>
<th>No. of Anaesthetic Postoperative Returned to theatre</th>
<th>cases</th>
<th>technique</th>
<th>bleeding (%)</th>
<th>theatre</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>New</td>
<td>10.0</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>Old</td>
<td>23.8</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

It is considered imperative, in order to avoid overdosage, that there should be observed either pharyngeal movement or respiratory efforts before any maintenance dose of suxamethonium is given. This is referred to as the golden rule. On one occasion this rule was broken and the patient was given an extra 25 mg, estimated to be necessary to tide over to the end of the operation, at a time when there was no respiratory effort or pharyngeal movement. This was followed by apnoea for 2½ hours with no after-effects. The child, aged 12, was found to have a low blood pseudocholinesterase and so had one of her brothers. The parents and the rest of the family were normal.

Apart from this there has never been any anxiety with the method, no bradycardia has been noted, no vein damage and no complications from the use of a cuffed tube. Venepuncture has
FIG. 3
First stage of introduction of gag.

FIG. 4
Adjusting the position of the tongue.

FIG. 5
Lateral view showing the position of the anaesthetic circuit, the Boyle-Davis gag and the Draffin bipod.

FIG. 6
Showing completely unobstructed surgical field.
nearly always been possible for induction, but when it was not, anaesthesia was induced with nitrous oxide and oxygen, venepuncture being performed later. The technique is not time-consuming, induction and recovery being rapid, so that by comparison with more usual methods there may be a slight saving in theatre time.

Occasionally it has happened that too short an endotracheal tube has been passed. This is recognized by difficulty in properly placing the gag. The tongue tends to be pushed to one side or the other by tension of the tube between the incisor teeth and the cuff holding it firmly into the larynx. The remedy is to change the tube. It is also possible to defeat the object of this connection by not leaving enough protruding from the mouth to reach the chin. In these circumstances kinking can occur beyond the tongue plate at the end of the straight metal section at the base of the tongue. It is recognized when the Draffin bipod is inserted, by the inability to inflate the patient. The remedy is to pull the tube out a bit after slackening the Draffin bipod and the gag.

The Worcester connections are made by Medical and Industrial Equipment Ltd., in three sizes.

ACKNOWLEDGMENTS

We wish to express our thanks to T. S. Stewart, F.R.C.S., E.N.T. consultant, who has shown so much patience and co-operation during our experimental period, and for his most helpful criticism of this paper during its preparation.

Our work has been greatly facilitated by the encouragement of Miss Sansome, sister in the E.N.T. ward, the help of Mrs. Brooks and Mrs. Powell, our anaesthetic room nurses, and the efficiency of the staff of the Medical Records Department under Miss Matthews. The photographs are the work of Mr. Holland, hospital photographer.

REFERENCES


ASSOCIATION OF ANAESTHETISTS OF GREAT BRITAIN AND IRELAND

Annual Meeting—1963

The next Annual Meeting of the Association will be held on October 31 and November 1, 1963, at Harrogate. Those wishing to read papers are asked to submit summaries of about 200 words to the Honorary Secretary not later than May 31, 1963, for consideration by the Programme Committee.

Downloaded from https://academic.oup.com/bja/article-abstract/35/1/43/342489 by guest on 30 July 2018