In any case the appendix is not of vital importance—in health at least; it is true that a proportion of patients who have had appendicectomy performed suffer afterwards from constipation, but, as will be shown in the series considered in another paper, the disability in uncomplicated cases is seldom great and generally tends to right itself with time.

REFERENCES.
¹ *Researches on Rheumatism*. ² *Fortschritte für Röntgenologie*, vol. xx, H. 2. ³ *Physiologie des Blinddarmmanhanges*, *Beiträge zur Klinischen Chirurgie*, vol. xciii, 1914.

ANAESTHESIA IN TONSIL AND ADENOID OPERATIONS.

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The purpose of this note is to advocate the use of nitrous oxide or local anaesthesia, in preference to ether and chloroform, in the removal of tonsils and adenoids.

FIG. 1.—A. Principal artery to tonsil. B. Plica triangulæ. X. Sites for novocain injection.

In children below the age of 14 or so the operation can always be efficiently performed under gas. In adults the same is true where adenoids only require removal; if in them tonsils are to be enucleated, some can be dealt with under gas, but the majority must be dissected out, and for such a procedure gas is not suitable. A more prolonged anaesthesia is necessary, and it is in these cases that I strongly recommend local anaesthesia rather than ether or chloroform.

In stating the grounds on which the discontinuance, as far as possible, of the use of ether and chloroform for tonsil and adenoid work is urged, it will be convenient to consider separately the case of children and adults.

I. Operations in Children.

Anyone who has had considerable experience of removing tonsils and adenoids in children knows that, with a guillotine of suitable size and form, enucleation of the tonsils can be easily and rapidly performed, while with a sharp curette the adenoids can be removed with one clean sweep.

Nitrous oxide anaesthesia affords ample time for the completion of the operation, if the following method is adopted:

FIG. 2.—A. Outline of buried part of tonsil. B. Capsule of tonsil exposed.

The child lies on the back, with the head extended over the end of the table. The operator stands immediately behind the head, while the anaesthetist places himself on one side of the table and a nurse on the other. A strap above the knees secures the legs, while the arms are held by the nurse. Just before commencing the anaesthetic a scissor gag is introduced, but only slightly opened, so as to cause no alarm. As the child goes under the gas the gag is fully opened, and when the anaesthesia is complete the anaesthetist puts the facepiece on one side and securely holds the head in a well-extended position. The tonsils are first dealt with and enucleated by a modification of Sluder's method. In this procedure the tongue is depressed with a spatula and the lower tonsil pole is then engaged in the ring, and the whole organ drawn upwards and forwards against a tubercle on the lower jaw, just behind the last molar tooth. By dint of strong pressure of the guillotine, combined with manipulatory movements, the aforementioned tubercle is made to forcibly thrust the tonsil through the ring of the instrument.

It is, of course, understood that a size of ring has been chosen which is large enough to allow the upper tonsil

pole to pass through with a moderate degree of ease. It is the upper pole of the tonsil which is most likely to be left behind if the pressure and manipulation are inadequate. The method of finger pressure advocated by Whillis and Pybus takes longer, and in my experience is no more efficient. The method described is competent to deal with any case, unless the adhesions to the faucial pillars and peritonsillar tissues are such as to prevent evagination of the tonsil. After the enucleation of the tonsils the adenoids are removed. The whole operation does not occupy more than twenty seconds. The position of the head allows the blood to gravitate away from the larynx, and on turning the head to one side at the conclusion of the operation the blood flows out of the mouth. The child is made to sit up almost immediately, and will cough or spit out the blood instead of swallowing or inspiring it. The return to consciousness, together with the upright posture, arrests the haemorrhage directly and the child can be safely returned to its home within an hour.

The whole proceeding is simple and safe, and free from any anxiety. Haemorrhage is reduced to a minimum, and the child is fit and well again in a very short time. The one untoward circumstance that may arise is a sudden cessation of breathing from overgagging, but if the cause be recognized the trouble can be rectified in a moment by easing the gag. In my opinion overgagging as a cause of asphyxia in young children is not sufficiently recognized and taught.

The foregoing remarks concerning the use of gas in tonsil and adenoid operations require qualifying in this very important respect, that the best results can only be obtained with "team" work. The anaesthetist must be skilled in the administration of gas, and must understand exactly how to hold the head and assist the operator. An experienced nurse is also invaluable.

To instance the safety of tonsil and adenoid operations under gas I should like to refer to the statistics of school children operated on by me during the past three years for the Education Committees of Liverpool, Bootle, and Southport. These statistics have not been worked out by myself, but have been furnished me by those responsible for the care of the children after the operation.

Altogether 3,577 children have been operated on, with no fatalities, immediate or subsequent, and no recurrences. In 25 cases only (considerably under 1 per cent.) has severe bleeding occurred, that is, bleeding sufficient to cause faintness and collapse.

When I review all my work during the past eight years I must certainly have operated on upwards of 6,000 children under gas, and I have never experienced any fatal case, either at the time or subsequently. Of course, I am well aware that very striking statistics have been published of series of cases in which the major anaesthetics had been used, but, broadly speaking, I am convinced that with ether and chloroform anaesthesia, especially the latter, there is much greater risk, firstly

FIG. 3.—A. Tonsil bed. B. Scissors used both for cutting and blunt dissection. C. Upper tonsil pole drawn out from between the pillars.

FIG. 4.—A. Lingual attachment divided with the guillotine. B. Buried part of tonsil shaded.

of collapse under the anaesthetic, secondly, of serious haemorrhage, and thirdly, of pulmonary, middle-ear, and other complications. Deaths during tonsil and adenoid operations have occurred far too frequently in the past. An analysis of 700 inquests on anaesthesia deaths appeared in the *Proceedings* of the Royal Society of Medicine some years ago, and out of that number no fewer than 56 were in cases of tonsils and adenoids.

With regard to haemorrhage, in my experience there is usually a much greater loss of blood under ether anaesthesia than with nitrous oxide, and that, I think, is just what one would expect. Under ether a child continues unconscious for a considerable time. The head is low, the vessels are all relaxed, and the bleeding is further aggravated by retching and vomiting. Even with the most careful swabbing of the tonsil beds it is inevitable that blood must be swallowed and inspired. Firm pressure with a swab, after the removal of one tonsil, will certainly momentarily arrest the bleeding, but it is not feasible to continue this pressure since the other tonsil, as well as the adenoids, are waiting to be done and the child is rapidly coming out of the anaesthetic. The secret of the small loss of blood with gas is the speed with which the patient recovers consciousness and can be placed in the sitting position. Cold sponging of the face is a useful adjunct in arresting haemorrhage. I have never once had to have recourse to stitching the faucial pillars together or tying a bleeding point, and the use of a temporary clamp has been extremely rare. Should haemorrhage be severe it can nearly always be adequately dealt with by pressure with an adrenalin swab applied at the end of a forceps, or, better still, pressed to the bleeding spot by the point of the finger, counter-pressure being kept up for some minutes by the finger-tips of the other hand placed just behind the angle of the jaw. Morphine is a most valuable aid in any case of persisting haemorrhage.

Concerning other risks in tonsil and adenoid operations, no one, I think, will deny that they are greater with a major anaesthetic. The swallowing or inspiring of blood, the malaise and sickness, and the general lowered vitality which follows ether or chloroform administration, render pulmonary, middle-ear, and general infective conditions much more frequent than with nitrous oxide.

II. Operations in Adults.

The scope of local anaesthesia for tonsil operations is naturally restricted to adults, and its use is indicated wherever the embedded position or adherent character of the tonsil renders the operation of dissection necessary. The advantages of local anaesthesia in these cases are enormous. Under ether the dissecting out of adherent tonsils in an adult is a difficult and often anxious operation. Very deep anaesthesia is necessary to abolish the throat reflexes, the tongue requires to be retracted well forward, and good artificial light must be used. The work of the operator is greatly hampered by haemorrhage and salivation and the need for frequent swabbing, and also by the rapidity with which the throat reflexes return, necessitating a further dose of anaesthetic. Considerable haemorrhage is common, and the patient not infrequently suffers from severe malaise and prostration for several days after operation.

With local anaesthesia, however, the state of things is quite different. The patient sits in front of the operator. The tongue lies quietly in the floor of the mouth and need hardly be touched. The operation can be conducted quietly and deliberately, and may be frequently interrupted to allow the blood to be expelled. With suitable technique haemorrhage is usually slight and pain hardly present. Should the bleeding be free it can be most easily controlled, and, if thought advisable, the second tonsil left to another occasion.

Very briefly, the various steps in the removal of tonsils by dissection, under local anaesthesia, are as follows:

1. A preliminary injection of $\frac{1}{2}$ grain of morphine and $\frac{1}{100}$ grain of atropine is useful in nervous patients.
2. The fauces, soft palate, and pharyngeal wall are swabbed several times with a 10 per cent. solution of cocaine.
3. A 2 per cent. novocain solution (containing 5 minims of adrenalin to 1 drachm of novocain) is injected into both pillars of the fauces and deeply into the junction of the lower pole of the tonsil with the tongue. The injection into the anterior faucial pillar is the most important one. It must be made just beneath the mucous membrane, and the fluid must

be seen to diffuse widely, causing a raised anaemic area the size of a shilling. The posterior faucial pillar is so thin and mobile that injection into it is often difficult.

4. The upper pole of the tonsil is seized with tenaculum forceps and pulled inwards.

5. By means of a pair of scissors, curved on the flat, the upper pole of the tonsil is exposed by snipping through the mucous membrane covering it. This is the most important step in the operation. It is vitally necessary that the mucous membrane only be divided, since, if the wound be carried too deeply into the tonsillar substance, the capsule is missed and the operation is apt to degenerate into a mere tearing through the glandular tissue.

6. The capsule of the tonsil having been laid bare it is comparatively easy to free the whole of the upper pole and deliver it from between the faucial pillars.

7. The upper pole is now seized with the tenaculum forceps, the tonsil dragged inwards, and the dissection carried downwards to the lower pole—still using no other instrument than the curved scissors, which serve both for cutting and blunt dissecting.

8. The operation is completed by cutting through the lingual attachment of the tonsil with the guillotine.

9. Bleeding is easily checked by means of gentle pressure with an adrenalin swab. Any bleeding vessel can be temporarily clamped.

10. The tonsil bed is swabbed out with Whitehead's varnish, which acts both as a styptic and antiseptic.

I have endeavoured to illustrate, by the accompanying drawings, the salient points in the above description, and, in conclusion, confidently assert that in adults the operation for the removal of tonsils by dissection is easily feasible under local anaesthesia, while the avoidance of ether and chloroform for the purpose confers very great advantages on both patient and surgeon.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

EARACHE DUE TO LARVAE IN THE EXTERNAL AUDITORY MEATUS.

A GARDENER, convalescent from double peritonsillar abscess, came to me complaining of violent pain in the right ear; it had commenced suddenly the previous day, and during the night had become almost maddening. On examination there was seen to be a discharge of blood from the canal. With strong illumination and a speculum it was therefore difficult to see anything clearly; but, whilst trying to view the membrane, I was astonished to see what looked like small worms passing across the field of vision. With the aid of bent sinus forceps I succeeded in extracting three maggots, alive and wriggling. A remaining maggot refused to be caught until stupefied by chloroform vapour. The patient was instantly relieved, and the next morning the canal and membrane looked perfectly healthy. It was fortunate that the creatures revealed themselves, for in view of the history, acute otitis media was a very probable diagnosis. I learnt afterwards that during the previous week a fly had entered the ear, and was only removed after a considerable number of minutes.

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RABBIT-SHOT IN THE APPENDIX.

A WOMAN aged 30 was sent to me as a case of chronic appendicitis of some two years' standing; there had been no acute attacks. The symptoms were those of reflex dyspepsia, with slight rigidity and tenderness over the appendix. This organ proved to be $5\frac{1}{2}$ in. long, and on opening it after removal I found thirty-seven rabbit-shot and a few minute fragments of splintered shot. They were all collected at the apex; there was no faecal concretion, but the mucous membrane was chronically inflamed and thickened. The patient made a normal recovery. She is a servant at a farm, and rabbits have formed a larger proportion of her diet than is usual for people in other walks of life. She is somewhat hysterical, but I can obtain no evidence of her having eaten rabbit-shot as such. It seems inconceivable that so many shot should have strayed into the appendix without a pre-existing abnormal patency of the lumen; I suggest that this patency was due to long-standing inflammatory changes and not caused by the foreign bodies. The further interest in the case