ON THE ENUCLEATION OF TONSILS WITH THE GUILLOTINE.

BY

SAMUEL S. WHILLIS, M.D., B.S.DURH.,

SURGEON IN CHARGE OF THE THROAT AND EAR DEPARTMENT,
ROYAL VICTORIA INFIRMARY, NEWCASTLE-ON-TYNE, ETC.

AND

FREDERICK C. PYBUS, M.S., M.B.DURH., F.R.C.S.ENG.,

SURGICAL REGISTRAR, ROYAL VICTORIA INFIRMARY, ASSISTANT
SURGEON, HOSPITAL FOR SICK CHILDREN, NEWCASTLE-
ON-TYNE.

In a recent paper¹ we called attention to certain important facts regarding the anatomy and pathology of the faucial tonsil. We also showed that by means of the guillotine, combined with finger pressure on the anterior pillar of the fauces, the tonsil could in many cases be driven through the ring and so completely removed.

In a series of 200 cases we were able to enucleate 42 per cent. of tonsils complete in their capsule in one piece. In a more recent series of 100 cases 74 per cent. were enucleated complete in one piece, while only six tonsils were incompletely removed. In answer to repeated inquiries concerning the method, we give a more complete description of the technique, together with some modifications which we have adopted, and also some causes of failure.

That the tonsil can be readily removed entire in its capsule depends on the fact that it is largely covered by this dense membrane, which surrounds the major portion of it. This capsule blends near the inner surface of the tonsil with the mucous membrane, passing on to the pillars of the fauces on the one hand, and the mucous membrane covering its inner or faucial surface on the other. The capsule is loosely attached by areolar tissue to the pharyngeal aponeurosis, on which it can be moved or readily drawn away by means of the volsellum. This

Fig. 1.—Embedded tonsil enucleated with the guillotine. Almost the entire surface is covered by capsule. A narrow band of mucous membrane is seen where the tonsil joins the faucial pillar. In front of this the lower part of the tonsillar cleft is visible.

same laxity of attachment allows the tonsil to be pushed right through the ring of the guillotine, and its connexions to the faucial pillars cut through behind it. In cases where there have been attacks of peritonsillitis the capsule becomes adherent to the pharynx, rendering enucleation more difficult.

The diseased tonsil gives rise to inconvenience of two different kinds: (1) Obstruction to swallowing and disturbances of articulation; (2) to septic infection. As regards the latter, locally, there may be repeated attacks of sore throat. If lymphatic infection occurs there may be peritonsillar abscess or enlargement of the cervical lymphatic glands. Infection of the alimentary and respiratory tracts may occur; finally general ill-health may be caused, or even a systemic infection. It seems probable that a primary infection is responsible for the hypertrophy, and a tonsil once infected generally remains so. It has been repeatedly pointed out that the size of a tonsil is no criterion of its septicity.

After removal, the tonsil may show little evidence of gross infection to the naked eye; in about 50 per cent. of cases, however, on pressing the tonsil into the guillotine ring some of the lacunae are emptied of their contents, made up of decomposing foodstuffs and caseous debris, which has often a disagreeable odour. More important than this, careful examination of the deepest part of the tonsil, namely, the bases of the lacunae, lying immediately under the capsule, shows them to be infected, the material appearing as yellow spots which can be seen through the capsule. When the capsule is incised over one of these yellow masses the caseous material can be squeezed out,

like ointment from a collapsible tube. No amount of pressure can force this debris through the natural orifices of the lacunae. It is the existence of this deep infection which makes enucleation the operation of choice. It is frequently asked, Does total removal of the tonsil lead to any ill effects in the bodily economy? An examination of cases some years after total removal of the tonsils shows no abnormality or defect that can be discovered. A further important question is, Should every tonsil be enucleated? We believe that if the tonsil requires removal, it should be completely removed.

Although 50 per cent. of enlarged tonsils show no evidence of gross lacunar infection on removal, it is impossible by ordinary clinical examination to tell which tonsils will exhibit deep lacunar infection, and, seeing that the most infected portion is often left after tonsillotomy, it is necessary that the whole structure should be removed. This is essential in order to get rid of the whole infected portion, and leave no lacunae which may subsequently become infected. This necessity is repeatedly brought to the notice of surgeons and practitioners in the number of cases which present themselves in early adult life for the removal of diseased tonsillar tissue after previous operation, especially when that was performed in early life.

The instruments required for the operation are two, some form of suitable gag, and a guillotine.² The gag we use is of large size, and is a modification of Doyen's. It is

Fig. 2.—Tonsil enucleated in two pieces. The major part is removed, but on examination is found to be incomplete. The remainder, which consists of a small piece of capsule with some adherent lymphoid tissue, can then be stripped from the pharyngeal wall by the guillotine. On placing these parts together the tonsil is found to be complete.

introduced on the left side of the mouth, the shaft fits against the cheek while the handles lie near the ear, and are sufficiently large to be readily grasped and opened. When a short anaesthesia is used, such as that given by ethyl chloride, the gag is introduced before the mask is applied to the face. The guillotine is a modification of the Mackenzie pattern. Its important points are that the shaft should be long and specially strengthened, while the handle is set at an obtuse angle. The ring should be sufficiently large to allow the tonsil to be completely pushed through it. We use size No. 1; it is too small to allow the largest tonsils to be completely pushed through, and in such cases the tonsil must be removed in two or more pieces, a proceeding readily carried out. The blade is blunted before use, for if too sharp the tonsil is apt to be cut instead of being stripped from the pharyngeal wall. In order to removed every tonsil in one piece a series of guillotines would be required, or one with a movable shield, so that the ring aperture might be increased or diminished at will. A small tonsil is readily pushed through the ring, but, even where there is an apparent disparity in size, a little extra pressure or coaxing will often force the tonsil through.

The technique of the operation is as follows: The patient lies in the supine position on a table of convenient height and close to the right side of it. The head, neck, and

* Messrs. Mayer and Meltzer make the instruments we use.

shoulders are supported on a low pillow, with the head slightly extended and the shoulders on the lower margin of the pillow. The neck must not be unduly stretched. The gag having been introduced on the left side of the mouth, the mask is placed on the face, and the anaesthetic administered. In the practice of this hospital ethyl chloride is used; it gives a sufficiently long anaesthesia to allow the enucleation of the tonsils and the removal of the adenoids. In private practice ether is more generally the anaesthetic administered, as this can be prolonged if necessary, in case of haemorrhage or other accident. With good anaesthesia the tonsils may be enucleated almost to a certainty. The gag should not be opened to its fullest extent, as this hinders respiration and tends to stretch the faucial pillars unduly. Insufficient anaesthesia is an important cause of partial removal; any retching or tongue movement puts the faucial pillars on the stretch and prevents the tonsil being pressed through the guillotine ring. The average time taken for each case is under five minutes.

When the breathing becomes stertorous, the mask is removed and the gag opened by the anaesthetist, who stands at the head of the table. The patient's head is now turned over towards its right side, so that the mouth looks toward the operator, who stands on the right side of

Fig. 3. — Tonsil enucleated in two pieces. The lower portion consists of most of the projecting part. The upper part, composed of the embedded portion, presents an unbroken capsule, and is removed by a second application of the guillotine.

Fig. 4. — Appearance of a tonsil enucleated in one piece by the guillotine. Common form of enlargement. (1) Projecting portion; (2) embedded part, covered by capsule; (3) band of mucous membrane which passes from the surface of the tonsil to the anterior pillar of the fauces.

the patient, and faces the patient's head. The guillotine is held in the right hand, and the shaft is passed into the mouth, being first used as a tongue depressor, in order to expose the lower pole of the tonsil. The lower part of the cheek is also drawn aside, if necessary, by the index finger or thumb of the left hand. The ring of the guillotine is now hooked under the lower pole of the projecting tonsil, the blade surface lying nearest the tonsil (not away from it, as in the usual method). The hand is then depressed, so that the tonsil lying partly in the ring is elevated towards the anterior part of the mouth, the handle of the instrument by this time lying over the patient's left cheek between the bars of the gag. The forefinger or thumb of the left hand, already inside the right cheek, now presses on the outer part of the anterior pillar of the fauces, and drives the tonsil through the ring. When the tonsil is felt to slip through the ring of the guillotine, the blade is driven home with the right thumb. It is sometimes necessary to use both thumbs to press home the blade. When the connexions have been cut through in this way the hand holding the guillotine is pronated. The tonsil is now lifted out of the mouth on the under surface of the guillotine, which has now become uppermost, and can be released by drawing back the blade. If the tonsil projects, and especially if it should have a process hanging towards the tongue, it is important that the guillotine be hooked under this process, otherwise, though the major portion of the tonsil may be removed, this lower portion will be dis-

covered later as a definite mass lying between the lowest parts of the faucial pillars. When the tonsil is too large to be pressed through the ring the projecting portion may be removed; then the guillotine is reinserted, and the

Stage 1. — The guillotine being hooked round the lower pole of the tonsil. The finger draws aside the cheek. Note. — The blade surface of the guillotine (A) lies nearest the tonsil.

remainder can be readily pressed through the ring and stripped from the pharyngeal wall.

Small projecting tonsils, and especially those with a narrow base, readily pass into the ring, and are just as

Stage 2. — The guillotine lies across the mouth. The tonsil has been pushed through the ring by the index finger on the anterior faucial pillar. The blade is now driven home.

easily removed. In larger tonsils the amount of pressure exerted may cause the tonsil to become everted, and at first sight it appears cut; the plica semilunaris can, however, be turned forwards again and the tonsil resumes its

Stage 3. — The connexions of the tonsil to the pharynx have been cut through. The hand is pronated, lifting the tonsil out of the mouth on the under surface of the guillotine.

characteristic shape. The plica semilunaris is, as a rule, removed with the tonsil, together with the supratonsillar fossa, an additional factor in favour of enucleation. This fossa, wrongly called supratonsillar, is really the upper

portion of the original and natural tonsillar cleft, and only becomes relegated to the upper pole of the tonsil when the remainder of the cleft is obliterated by hypertrophy of the anterior or posterior masses of lymphoid tissue. Flat tonsils, by which we mean those which have a considerable surface area but do not project beyond the faucial pillars, would appear more difficult to enucleate, but in our practice we find no difficulty in enucleating this type of tonsil.

When there have been attacks of peritonsillitis the capsule of the tonsil becomes adherent to the pharyngeal aponeurosis and makes enucleation more difficult. These adhesions can, in some cases, be seen as definite strands of tissue adherent to the capsule; in others, a small hole is left in the capsule, and though not anatomically complete, clinically the removal of the tonsil is entire. In very large tonsils, if a small-sized guillotine be used, the tonsil may require to be removed in two or more pieces. In other cases the greater portion of the tonsil is removed, but a small piece of capsule, about the area of a sixpence, with some adherent lymphoid tissue, is left; such a small amount of tonsil as this can then be readily removed by the method described. Embedded tonsils are treated in just the same manner.

After the right tonsil has been removed the patient's head is returned to its supine position. The surgeon, still on the right side of the patient, now faces towards the left side. The gag remains in position while the guillotine is introduced from the right side; the ring is hooked under the left tonsil, which is then raised, towards the orifice of the mouth. The shaft of the guillotine lies across the mouth, the handle being parallel to the right cheek. The operator's left arm passes over the patient's head, while the left index finger or thumb draws aside the cheek and, later, presses the tonsil into the ring of the guillotine. When the tonsil has been pressed through the ring the blade is driven home; after this the hand is pronated and the tonsil lifted out on the under surface of the guillotine. Should adenoids require removal this part of the operation can then be proceeded with.

The certainty of the operation is such that incomplete removal is rare, and is usually due to incomplete anaesthesia or other technical defect. Recurrent growth after previous incomplete removal can also be readily dealt with. Such growths appear either as a further enlargement or a basal portion of the tonsil with septic lacunae which often give rise to recurrent attacks of tonsillitis.

The advantages of this method are as follows: It is rapid—five minutes for each case from the time the patient is brought into the theatre, transferred to the operating table, towels arranged, anaesthetic administered, the operation performed, cleaning carried out, and the patient finally transferred to an ambulance and removed. The tonsils can be completely removed, whatever variety of size or shape they may be. There is a minimum amount of trauma; the pharynx looks quite healed by the end of ten days. In 3 cases a small perforation made by the finger through the anterior faucial pillar was observed, but this rapidly healed and no bad effect resulted. In the hospital cases no serious haemorrhage occurred, the bleeding ceasing spontaneously in a very short time; in fact it appears to be no more severe than after partial removal. A recent case illustrates the result of gross infection of the tonsils.

A child had all the subjective symptoms and signs of adenoids, and had suffered general ill health for a year. The tonsils were found to be considerably enlarged, though they were embedded and only visible on retching. On one side there was considerable proliferation of lymphoid tissue (with large open lacunae), which was beginning to project beyond the faucial pillars. The tonsils were enucleated. On the left side the tonsil, though large, exhibited no caseous debris in the lacunae; that on the right side, which was larger than its fellow, exhibited some recent growth, leading to commencing projection; it contained a number of yellow foci under the capsule which were situated in those lacunae which showed the surface proliferation.

In the above 100 consecutive cases the large tonsils formed the majority, there being 49 per cent. The medium sized formed 31 per cent., while the tonsils were small in the remaining 24 per cent.

In the accompanying analysis it is seen that 74 per cent. of the tonsils were removed completely with an unbroken capsule. In a further 13 per cent. there was some slight defect in the capsule, so that the tonsils, while not

anatomically complete, were so clinically. Thus, 87 per cent. were removed completely in one piece. Of the remainder, 9.5 per cent. were completely removed but in two or more pieces, while in only 3 per cent. was the tonsillar tissue incomplete.

Analysis.				
Number of cases	...	...	...	100
Number of tonsils	...	...	...	200
Operating days	...	...	...	13
Average number per day	...	...	...	7.6
Size of tonsils—				
Large	...	...	...	89=49.5%
Medium	...	...	...	63=31.5%
Small	...	...	...	48=24%
Tonsil removed complete in its capsule in one piece	...	...	...	148=74%
Tonsil removed completely, not quite all capsule, clinically but not quite anatomically complete	...	...	...	27=13.5%
Tonsil removed complete in two pieces with complete capsule	...	...	...	18=9%
Tonsil removed in three pieces with complete capsule	...	...	...	1=0.5%
Incompletely removed	...	...	...	6=3%

Specimens illustrative of this paper were exhibited at the annual meeting of the Association in Birmingham in July, 1911.

REFERENCE.
¹ *Lancet*, September 17th, 1910.

THE USE OF HYPERTONIC SALINES CONTROLLED BY ESTIMATIONS OF THE SPECIFIC GRAVITY OF THE BLOOD IN INFANTILE DIARRHOEA.

By LEONARD ROGERS, M.D., F.R.C.P., I.M.S.

THE remarkable success of injections of hypertonic salines in cholera has long made me wish for an opportunity of trying them in so-called infantile cholera or summer diarrhoea. Curiously enough, this disease is not very commonly seen in the Calcutta hospitals, in spite of the high temperatures prevailing there. Possibly this is due to the practically invariable custom of boiling all milk used for home consumption in the tropics. On my return from cholera work at Palermo at the end of August last infantile diarrhoea was very prevalent in London. The late Dr. Coutts—whose recent death is so widely deplored—most generously allowed me to try the treatment in his wards at the East London Children's Hospital at Shadwell.

Estimation of the Specific Gravity of the Blood as a Guide to the Frequency and Amount of the Injections.

The principle I have introduced in the treatment of cholera, of basing the frequency and amount of saline to be injected on the degree of loss of fluid from the blood as indicated by its specific gravity, was adapted to the treatment of infantile diarrhoea. For this purpose it must be borne in mind that the specific gravity of the blood in infants from 2 weeks to 2 years old was found by Lloyd-Jones to be only from 1048 to 1049, or some eight points below the normal for adults. During a week's work at the Shadwell Hospital, I found that in typical fairly severe cases of infantile diarrhoea the specific gravity was commonly raised to 1056, to 1058, or even more.

The method of taking the specific gravity of the blood by means of a series of bottles of glycerine and water of each two degrees over the required range, into which a small drop of blood is gently blown from a capillary pipette until the one is found in which it just floats in the centre of the bottle for a second or two, is described in my book on cholera and in a paper on Cholera at Palermo in the BRITISH MEDICAL JOURNAL of November 18th, 1911. Messrs. Down Brothers will shortly be able to supply small boxes containing the necessary glycerine solutions, with a range covering both infantile diarrhoea and cholera, and directions for their use.

Method.

As this disease is usually much less acute than Asiatic cholera, the saline solution was given subcutaneously by means of the ingenious thermos flask arrangement which has recently been described in this JOURNAL. The solution contained 120 grains of sodium chloride and 4 grains of calcium chloride to a pint of sterile water. The sub-