necessary, and was done in the manner and with the result already mentioned. A certain amount of comfort was obtained for our patient by this means, but not to such an extent as could have been wished, and for a day or two it appeared as if the fluid were reaccumulating, especially as no increase in the outflow of urine occurred. The new diet was commenced within a day or two of the tapping. It consisted of bread, rice, green vegetables, and fruit; the amount of milk was increased, and in addition he had two or more eggs daily; as he had been told that his diet was to be increased he asked if he might have rabbit, so rabbit cooked in various ways formed part of his menu, alternating with fish. The amount of fat in the previous diet was cut down, and this he felt to be a distinct deprivation, inasmuch as he no longer had butter. The nutritive value of his diet under the new regimen increased till it corresponded roughly to 2,625 Calories, a much larger proportion of this amount being derived from albuminous foods and little from fats. The result of this change in the dietary was remarkable. In three days after the new diet was commenced the amount of urine had increased from a daily output of from 16 to 20 oz. to 42 oz.; it remained for a week at the level of 36 to 48 oz. daily; the amount then increased again largely to 48 to 64 oz., and in seventeen days from the commencement of the new, highly albuminous dietary the output was no less than 94 fluid oz. in one day—the true “polyurie libératrice” was established. Concurrently with this polyuria a fall occurred in the specific gravity of the urine from 1.038 to 1.015, the amount of albumin diminished from 14 parts per 1,000 to 0.5 part per 1,000, and the anasarca vanished. His general condition underwent a marked change for the better, so much so as to allow of his getting up and moving about the ward and into the open air. The remarkable feature of this change for the better was the rapidity with which the favourable conditions made their appearance. Within three weeks our patient had passed from the condition of a man whose life was threatened by a dangerous illness to that of a convalescent who feels so well that he begs to be permitted to return to work at the earliest moment.

This experience may be claimed as another piece of evidence that the plan of underfeeding our patients suffering from chronic nephritis with dropsy as the chief symptom, especially by diminishing the amount of albuminous foods in the dietary, requires reconsideration and amendment, and that the recommendations made by Dr. Epstein, of the Mount Sinai Hospital, New York, have firm foundation in clinical experience. You will recollect that Sir Clifford Allbutt has given his favourable experience of the dietetic treatment of such cases on the plan which has given so good a result in this case.

During the summer session I have drawn your attention to certain aspects of recent experimental and clinical observation on the subject of renal disease recorded by various workers in France, in the United States, and in this country, and to certain tests that have been employed with the view of ascertaining the efficiency of various functions of the kidneys. At the close of the session I would recommend you all to read a paper by Dr. Albert A. Epstein in the *American Journal of Medical Sciences* for November, 1917 (vol. cliv, No. 5, p. 638), in which he gives his views on the subject of treatment; and not to forget to study a Report to the Medical Research Committee on an Investigation into the Effects of War Nephritis on Kidney Function by Drs. H. MacLean and De Wesselow, published in the *Quarterly Journal of Medicine* for July, 1919 (vol. xii, No. 48, p. 347).

THE fund of the Harvard Infantile Paralysis Commission has reached a total of £8,050.

IN the *Medical Journal of the Siamese Red Cross* for December, 1918, Dr. M. E. Barnes, Representative of the International Health Board, Rockefeller Foundation, states that in Northern Siam of 20,209 persons examined for hookworm disease 15,458, or 76.4 per cent., were found infected. *Necator americanus* (Stiles) is the species of nematode ordinarily found in Northern Siam. Very advanced cases are seen occasionally in the northern provinces, though at present they are somewhat infrequent in Siam as compared with Ceylon and Java. Measures are being taken by the Government which, it is hoped, will stamp out the infection. Among the anthelmintics used thymol and oil of chenopodium have proved especially valuable.

SOME PRACTICAL CONSIDERATIONS ON THE OPERATION FOR REMOVAL OF ADENOIDS AND ENUCLEATION OF TONSILS.

BY

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THIS paper makes no pretence to an elaborate review of the indications for operation nor yet the methods of operating, but aims rather at setting out practical considerations gradually forced upon one by an experience covering some fourteen years. The relatively new operation of complete enucleation of tonsils by the guillotine alone, as opposed to the crude and uncertain cutting which had been the custom for so long, opened up a satisfactory era to the surgeon in charge of a special clinic. It gave confidence in the results of the operation, since he felt that now the whole infective focus could be removed, with the most ordinary attention to a simple method, thus making the probability of cure much greater. Disappointment was inevitable to those who, like the writer, watched the result of the older operation of cutting for many years after the operation had been performed, and saw recurrence of trouble follow in the remnants of the tonsil. Dispassionately considered, many cases could only be described as failures; and until some method had been devised whereby the disease could be removed completely, without having recourse to the dangerous and exhausting methods of enucleation then employed, it seemed that these disappointing half-measures must be tolerated.

The method of complete enucleation introduced by Drs. Whillis and Pybus¹ solved the problem. It is simple and quickly mastered, the diseased tonsils are removed in their entirety, the ordinary Mackenzie guillotine can be used (reversed), and, as is so important, the whole operation can be performed in sixty seconds or less after very little practice by anyone used to the guillotine; that is to say, the operation can be performed as quickly as the former cutting operation, and with incomparably greater benefit to the patient.

Haemorrhage and sepsis, the former having a distinct bearing on the latter, are the two risks of the operation. Their avoidance demands anxious attention. The plan of preparation with this end in view set out below has been gradually evolved, and, whilst it is difficult to prove its worth, the comparative study of a large number of cases has been sufficiently convincing to justify its being tried by others.

The aims of the operation are by removing adenoids to eliminate a source of continuous infection from the nasopharynx and to make nose breathing possible, and by enucleating the tonsils to remove an actual or potential infective focus from the throat. Furthermore, it must be strongly insisted that the proper time to perform the operation is early childhood. Probably the ideal time is from three to six years of age, for childhood is the time of these hypertrophies, and failure to treat them in the early stages, especially the enlargement of the nasopharyngeal tonsil (adenoids), leads to the troublesome complications which the aurist especially sees in later years.

The relation of enlarged tonsils and adenoids to diphtheria carriers is worthy of the closest attention, and this paper endeavours to emphasize its importance.

Indications.

Of all the indications for operation the forestalling of deafness is the most important. It is no unusual thing for a mother to bring a child and to say that he is inattentive and will not listen to what she says. It is often called “naughtiness,” but can easily be shown to be due to loss of hearing power by turning the child's back to the speaker and then asking for a repetition of words said. It is usually quite easy to assure the mother that the child is deaf by getting her to ask the child to do something whilst its back is turned to her. The child will hear words spoken but not pick up the individual words, and is therefore unable to grasp the order or request. On turning round and facing the mother, and getting the additional assistance of watching her lips, the child will respond,

showing that it is not a question of obedience. It is the limitation of a sense, not a perversion of the brain.

On examining the membrana tympani, it will be found that there is some thickening of the drum as a whole, and already retraction. At times there may be marked foreshortening of the malleus, and a condition which in an adult would almost make one despair. In a child it may be viewed with the greatest optimism, for the drum will recover absolutely when the cause has been removed. In other cases there are attacks of pain in the ear or ears due to subacute catarrhal inflammation of the middle ear. If neglected it may lead to an acute inflammatory infective process with suppuration and perforation. All these conditions may occur independent of adenoids. Acute infective catarrhal rhinitis and nasopharyngitis may lead to infection of the middle ear, for instance, but such diseased conditions are usually secondary to enlargement of the nasopharyngeal tonsil (adenoids). Justice has not been done to deafness, otalgia, or discharging ears in a child until the question whether adenoids are present has been answered in the negative. In acute mastoid disease, which comes under observation as a definite surgical disease demanding immediate treatment, unless the surgeon keeps in mind the fact that it is the result and not the cause he may relieve the immediate acute symptoms but leave a chronic infective process behind. The operation on the mastoid should invariably be followed by an examination of the nasopharynx (it can easily be done at the end of the operation), and if there are any adenoids at all they should be removed, for the disease, if there be no definite pneumococcal lesion elsewhere, begins in the nasopharynx; if adenoids are present and are allowed to remain as a focus for continuous reinfection, the chances are that whilst the wound behind the ear heals the discharge from the meatus continues, so that later on a discouraged surgeon is driven to a radical mastoid operation with all its drawbacks.

Other conditions calling for attention and differential diagnosis are those associated with catarrhal rhinitis. This may be due to an ordinary infective cold, to ethmoid disease, or to irregularities of the nasal septum; but the commonest cause of persistent cold in the nose in children, or of recurrent winter colds, is adenoid growth. There are degrees of obstruction produced by adenoids, varying with the varying congestion of the parts. A parent may say of a child that his breathing is so heavy that she fears he will "choke in his sleep," and on the other hand an intelligent mother, when told that her child's deafness is due to adenoids, will exclaim: "But he always sleeps with his mouth closed." This is quite possible with a small hypertrophy of the nasopharyngeal tonsil in a roomy nasopharynx.

Sometimes the child is brought for mouth breathing without a history of deafness or of colds. In young children, having put out of court deflection of the nasal septum and polypoid formation from ethmoid disease, the diagnosis of adenoids is safe; their removal imperative. It is interesting to note the dental decay which sometimes follows on mouth breathing. Sometimes mouth breathing is denied when it is possible to demonstrate that the incisor teeth of the upper jaw are dry over a crescentic area exposed by the slight retraction of the upper lip. This crescentic area arches from biting edge to biting edge of each lateral incisor with the concavity down. It is due to exposure of the lower part of these teeth by the slight retraction of the upper lip; they become pitted and decayed, and then destruction from biting edge to gums often follows. It is quite possible that a focus of infection is thus produced which is followed by the extensive dental caries so often found in these cases. Children are often brought for a chronic irritable cough which to the parents is the only clinical manifestation of chronic catarrhal pharyngitis secondary to the hypertrophic lymphoid tissue. A cure can be promised on removal of the cause and on the establishment of nose breathing.

Enlarged glands in the neck may or may not be due to enlarged tonsils. In the majority of cases no gross lesion is discoverable, and the advisability of operation for removal of the glands, primarily diseased, must be judged by the rules generally laid down. When, however, the enlarged glands are associated with the definite clinical manifestations of tonsillar enlargement, it may be, and probably is, sound to look upon the throat condition as the primary lesion. The primary focus should obviously

be dealt with first, with a hope that the enlarged glands, reasonably regarded as secondary, will disappear later. It has always been my aim to safeguard the patient by minimizing loss of blood, shock, and any possible later exhaustion. It is quite wrong to operate on such patients in the out-patient department and send them home afterwards. In some cases the glands may require operative interference later, being too far involved in tuberculous disease to recover naturally; but where it is possible to prepare in advance and impose sound hygienic surroundings at the time of operation and afterwards I have never known the "breaking down" of the glands to follow immediately on operation on the throat and nose.

The subject of the tonsils and adenoids as carriers of the *B. diphtheriae* has been of great interest to the writer ever since he accidentally stumbled on a case some years ago. The case was reported at the Cambridge Medical Society, and briefly stated was as follows:

A boy aged 16 was sent home from a training ship where an epidemic of diphtheria had prevailed, and before his return a negative swab from the throat was demanded. He had never had diphtheria, and was apparently in the best of health. To my surprise the swab was returned as positive. The boy was isolated and antiseptic swabbings and gargles employed; but at the end of fourteen days the swab was still positive. The tonsils were large and congested, and it seemed quite possible that the crypts of the tonsils harboured the organisms. At this time I did not know that this view of the matter had been anticipated by some German practitioners, who, acting upon it, had removed the tonsils. I decided to remove the tonsils, and was prepared to give antitoxin beforehand. Dr. Graham Smith, lecturer on hygiene to Cambridge University, of whom I sought advice, agreed with the advisability of removal of the tonsils, but did not think there was any need to give antitoxin. His advice I followed. The operation was performed on March 27th. Convalescence was uneventful, and on April 13th the throat was free from *B. diphtheriae*. After the boy's return to the ship another epidemic of diphtheria broke out, and the boys were sent home again. Examination of his throat showed a few *B. diphtheriae* present on one occasion. They soon disappeared. The operation was incomplete. It was in the days before I attempted enucleation; the tonsils were removed without anaesthesia, and no attempt was made to clear the nasopharynx (he was a nose breather).

Dr. Graham Smith took the matter up, and at the time war broke out had accumulated a large amount of valuable material. He has allowed me to refer to some of the microscopical sections of tonsils removed in carriers of diphtheria; they show the difficulty of any attempt to clear the organisms from the bottom of some crypts. In one case the crypt, after running about half the depth of the tonsil, suddenly turned upon itself at an acute angle, and ran down to the very base of the tonsil (capsule), where it expanded into a small cavity full of bacilli.

The view that the carriers of diphtheria usually have enlarged tonsils is so strongly implanted in my mind that on one occasion when there was clinical proof that a diphtheria carrier was in the children's ward at Addenbrooke's I told the house-surgeon that by looking at the children's throats I would tell him the offender. The ward is not a large one. I found one child with very markedly enlarged tonsils (and adenoids), and this child yielded a positive swab. The possibility of persistence of infection in the fossae and sinuses of the nose after removal of tonsils and adenoids cannot be ignored, but the investigations so far carried out suggest that once the hygiene of the nose and throat has been improved by operative interference on the lines indicated there is a natural tendency to cure.

Other infections of the tonsillar crypts may give considerable trouble and waste much time. As an example may be quoted the case of a lady over 30 years of age, the wife of a doctor, who suffered every winter from recurrent tonsillitis. Usually three attacks occurred each winter and laid her up for a week at a time. The tonsils were only slightly enlarged, but as the attacks were follicular tonsillitis there could be no doubt that the tonsils were the centre of disease, and only by enucleation could permanent health to the throat be restored. Therefore, with every preliminary precaution, I enucleated the tonsils completely a year ago. The patient has never had an attack of tonsillitis since.

Anatomical.

It is unfortunate that the term adenoids has been applied to hypertrophy of the pharyngeal tonsil. It gave the idea of a multiple rather than of a single structure; and there are still people who expect to remove

several individual structures at operation and who take several strokes with the curette to do it. I teach the men at Addenbrooke's Hospital that to fail to remove the pharyngeal tonsil in one piece and at the first attempt is as bad as failing with a faucial tonsil.

When removed, the pharyngeal tonsil (adenoids) is seen to be an oblong structure with the longer side vertical; it has a marked central cleft and one or two lesser lateral clefts. The clefts are in the long axis of the mass. The central cleft is deep, so deep sometimes as almost to divide the mass into halves. It is quite possible in rapid digital examination for adenoids that the finger may slip up this central cleft, the soft vascular mass slipping away on each side, so that a false sense of clearness of the nasopharynx is obtained. With the deliberate examination unopposed, which is possible under an anaesthetic, such an error is not likely to occur.

One of the essentials of the modern operation of enucleation of the tonsils with the reversed guillotine is to press the buried portion of the tonsil into the guillotine. If the thumb is pressed backwards and slightly inwards on the convex spherical surface immediately outside the anterior pillar of the fauces it is pressing on the anterior half of a hemispherical body which is the buried portion of the tonsil.

The macroscopic appearance of a tonsil is very variable. There is often a cleft running downwards and backwards; sometimes it almost divides the tonsil into two portions, and the postero-inferior portion being hidden from view unless looked for, it is quite possible in an imperfect light or a hurried anaesthesia to slip the edge of the guillotine into the interval between the two portions of tonsil and take away the antero-superior portion only. A tongue of tonsil, not visible as a separate structure, runs up into the soft palate nearly as far as the uvula. It is probable that it is infection of this part of the tonsil with imperfect drainage which leads to the condition known as quinsy. In the former imperfect cutting operation this palatal part of the tonsil was not touched, and in consequence the risk of quinsy was not eliminated.

Age Considerations.

As to the best age to operate for tonsils and adenoids certain rough guiding rules may be given. Unless there are very strong indications, it is advisable to wait until the child is 2 years old. The "strong" indications are summed up as discharge from the ears, or repeated ear-ache. Very seldom does the critical surgeon derive any satisfaction from the attempted removal of adenoids in a child under 2 years of age. At the same time it is extremely simple to give such a child a whiff of chloroform and explore the nasopharynx with the little finger of the right hand, and if there is any enlargement present, remove it with one sweep of a small curette. I have never done this in a child under 1 year, and rarely under 2 years old, but when I have to do it I prefer to use a curette for the removal and not the finger-nail.

No dogmatic answer can be returned to the question whether if the tonsils are definitely enlarged they should always be removed. I would go so far as to say, however, that once the tonsils have been the seat of tonsillitis they should be removed. If the tonsils are only slightly enlarged, but with no history of disease, and the child is under 4 years of age, I am content to remove the adenoids only, on the understanding that the parents realize what is being done. Alone it is a trifling operation, but combined with enucleation of tonsils it is quite severe. Parents must be warned in such cases that nose-breathing after operation is vital to success. It must not be forgotten that some children of 2 are much stronger than others of 4. In out-patient work one must be guided by the distance the children have to travel home and the climatic conditions at the time.

It cannot be too strongly impressed upon those responsible for these operations that the removal of the adenoids is the essential. They are the main obstructive growth and the origin by proximity of the ear complications. At the same time they are hidden away in the nasopharynx, whilst the tonsils cry out for recognition to anyone with eyes in his head. I tell the men at Addenbrooke's Hospital that their failure to remove tonsils I can condone, for I can see their failure for myself; but their failure to remove the adenoids completely and finally is an unforgiv-

able offence; for their removal is assumed after an operation; incomplete operations may not avert the ultimate danger of deafness.

Preparation of the Patient.

The two complications to be feared after an operation for tonsils and adenoids are haemorrhage and sepsis. Functional success will be obtained if the patient become a nose breather; to obtain this the co-operation of the parents or friends is required. The friends should have it drilled into their heads by the emphasis of repetition. At Addenbrooke's Hospital we tell each mother individually when the child is brought to the surgeon for the first time: "This operation is no good unless you teach your child to breathe with the mouth closed afterwards. Make him lie on his back for ten minutes three times a day and breathe with his mouth closed until he does it day and night without trouble." This is the formula which is reiterated in substance when the out-patient letter recommending operation goes before the sister in charge. After the operation the sister or a nurse goes into the room where the children are waiting, just prior to leaving hospital, and once more emphasizes the importance of nose breathing and the closed mouth. Anyone who does much ear, nose, and throat work will agree that this is not a trifling matter. Ofttimes the child remains a mouth breather after the operation; not that the obstruction remains, but that the cure has not been consolidated by after-treatment. With every additional year after 4 years old the natural closing of the mouth without education is less and less likely to be obtained. From 12 years old onwards this effort to get a functional cure is the most serious aspect of the operation. I have had children brought to me who have had the operation done years before, who have open mouths, narrowed nostrils, and deafness; and the mother usually tells the story that the adenoids were removed, but they have grown again. Often on examining the nasopharynx with a finger it is found quite clear. Usually the mother has never been told to give the child breathing exercises, and unless the need for them is impressed on her, and driven in by repetition, they will be neglected and soon forgotten. My experience is that the failure to emphasize the importance of after-treatment, and to control it by system, is an unsatisfactory feature in hospital treatment. My conviction from experience is that adenoids do not grow again if they are properly removed. The bad results are due to one or both of two causes—the first being imperfect removal, especially cutting them obliquely from above downwards, so that the upper half or third is left; the other, failure to emphasize the importance of nose breathing. Systematic breathing exercises several times a day have not only the advantage of regularity of practice, but they have a mental and suggestive element of much importance.

Haemorrhage and Sepsis.

Of the complications haemorrhage is to be put first, since it plays a great part in so lowering the vitality as to make the patient liable to sepsis; moreover, it has been by far the commoner complication. I have had several very bad cases, and whilst death has never resulted, the greatest anxiety has been felt more than once. There is more risk of severe haemorrhage after tonsillectomy with increasing years. I have never seen severe haemorrhage in a small child. The cases I have encountered have usually been in people over 15 years of age, with a history of recurrent tonsillitis, much congestion of the whole oropharynx, and permanent dilatation of vessels. If tonsillitis is present or there has recently been an attack of tonsillitis, the blood supply is almost certainly excessive. One of the first rules to lay down, therefore, is that no operation shall be performed until all recent acute congestion has disappeared. I insist on a month elapsing since the last attack. To lessen the congestion as much as possible it has seemed advisable to give a mild astringent gargle after meals and at bedtime, such as alum 5 grains to the ounce. Furthermore, since mercury is believed to have a beneficial depleting effect on the throat and nose, when employed as a purgative, a dose of calomel is given two nights before operation, followed by saline next morning. After the calomel I usually advise no more meat until after operation—for two reasons: first, that no portions shall be left round the teeth as infective foci, and, secondly, that the proteins shall not raise the

blood pressure immediately before operation. The night before operation and on the morning of operation a dose of calcium lactate is given. In a delicate anaemic child I usually advise iron for about two weeks beforehand. After operation the patient is not allowed to get up and walk out from the operation room. This may easily be followed by severe bleeding, especially in adults. They should be removed on a stretcher or in a chair.

My experience is that if the risks of haemorrhage be avoided, if the child be protected against shock, and if no operation is performed in the presence of active microbic invasion, there is no risk of sepsis. Surgeons do not take any risks with fingers or instruments in the present day, and if infection occurs it is probably due to the calling into infective activity of some hitherto saprophytic organism owing to lowered vitality. The avoidance of lowered vitality resolves itself practically into an insistence on the maintenance of body heat. Excessive fasting, cold operation room or recovery room, hurried departure with waiting at a station, and a tedious journey afterwards are the risks run by the out-patients of hospitals. If possible the child should not have starved for more than four waking hours. The temperature of the operating room should be 60° or 65°, and so should that of the recovery room, and no draughts should be allowed. This is difficult to enforce with the modern nurse brought up to a purely empirical outlook with regard to fresh air and open windows; it is the open window of the ward which, by abstracting heat from the restless child who has thrown his covering off, leads to the complications which are liable to follow on operation in in-patients.

In winter it is not justifiable to operate on children and afterwards to send them home any considerable distance. After operation I advise that children be kept in bed for a week. At the end of this time the grey, sloughy appearance on the fauces will have practically disappeared.

Anaesthetics.

I am against ether as an anaesthetic owing to the congestion and secretion set up. When I first began operating for tonsils and adenoids, about 1904, we used chloroform at Guy's; but on its introduction turned to ethyl chloride, and in hospital practice I have continued it ever since. It is much quicker than chloroform, an important consideration when you have twenty patients waiting for operation. It gives a long period of anaesthesia, and having been used now for over a dozen years without any mishap the old forebodings should be put aside. Dangers, however, attended the use of somnoform, the mixture which preceded the introduction of pure ethyl chloride. The objection to ethyl chloride has been that children object to the sudden concentrated vapour used in the closed apparatus. This is a drawback, especially with nervous children, and on this account, in private, I have always used chloroform. With the introduction of the open method of administering ethyl chloride this drawback disappears, but I doubt whether ethyl chloride will ever supersede chloroform in cases where time is of no importance and gradual induction and maintenance of confidence is to be desired. With the closed method of administration of ethyl chloride the gag must be put in before the anaesthetic is begun. I always use a Doyen's gag propped well open at the start; it is not made to lever open a jaw which is firmly closed. In a child of about 5 years old and onwards the teeth are not very firm in the jaw in front, and the rough handling of a gag may easily knock them out. If, with ethyl chloride, the child begins to cough, I stop the anaesthetic, and if the trouble begins again on restarting, resort to chloroform, but this is very rarely necessary.

The usual dose of ethyl chloride is 3 c.cm.; the usual stages are ordinary breathing or a short struggle, then a period when there is stoppage of breathing but with corneal reflex present and no change in colour, followed by a period of deep respirations. After about three of these the operation is proceeded with. The stages of ethyl chloride anaesthesia are, however, very unreliable, and this must be counted as a drawback to its use. A very deep anaesthesia has no dangers with it unless an inexperienced operator begins whilst every reflex is abolished. This is the danger with any deep anaesthesia, whether ethyl chloride or chloroform. It is best if in any doubt to put the finger

into the throat and gently touch the fauces. If there is no suggestion of a contraction it is best to wait. The very slightest movement of the pharyngeal muscles justifies proceeding with the operation. The only danger I have encountered, excluding haemorrhage, has been due to too deep anaesthesia, abolition of the coughing reflex, and blood collecting in the larynx, where it may easily clot and, if not dealt with promptly, lead to asphyxial signs. A vicious circle is established of dyspnoea and venous congestion. The condition is very easily dealt with. The child is turned over on to its face, a finger put down to the aperture of the larynx, and any blood clot hooked forward; usually it will flow out without assistance.

The child should be wrapped in a sheet with the arms secured. This permits the child to be controlled on recovery, and especially in the struggling state which may occur where imperfect anaesthesia or inexperienced surgery leads to partial return to consciousness before completion of the operation.

Operation.

Once the fundamentals are grasped and a little practice obtained, the operation of enucleation of tonsils is quite as simple as the older cutting operation. It is essential, however, to be able to see what you are doing. In the old cutting operation the horizontal grooved supports with the curved end, into which the blade was forced and between which the tonsils were extruded, acted as a protection to the anterior and posterior pillars of the fauces, preventing their being cut; so that to anyone with ordinary experience the operation could be done quite blindly and when the mouth was full of blood. This is not possible with the modern enucleation method. It is essential to see, because the posterior border of the guillotine—that is the margin of the circle which encloses the tonsil—is slipped behind the posterior border of the tonsil. The guillotine is reversed so that the handle is directed to the opposite side—that is, for removal of the right tonsil the handle is directed to the left side. Furthermore, this edge of the guillotine in the groove between the posterior border of the tonsil and the posterior pillar of the fauces is pressed very firmly outwards until the long axis of the guillotine lies obliquely across the mouth. The line of this axis is from the juncture of tonsil and the posterior pillar of the fauces to the opposite molar teeth. When firmly fixed in this position the whole guillotine is pulled a little forward, if the tonsil is sufficiently enlarged, to allow leverage on the tonsil. Thus the tonsil is fixed and rendered prominent.

The next manipulation is to press the buried portion of the tonsil through the circle of the guillotine by pressing on the spherical bulge just outside the anterior pillar of the fauces. When this is pressed backwards and slightly inwards the deep portion of the tonsil is pressed through the guillotine. I generally use the thumb for this purpose. With a large tonsil and a small-sized guillotine, a short massage-like pressure may be required to get the tonsil in, but it is best to use a guillotine as small as possible, and it is wonderful how large a tonsil can be massaged through a small guillotine. The advantage of the small guillotine is that the tonsil gets jammed into it. With the deep portion of the tonsil thus pressed into the guillotine and steadied by the slight forward pull of the posterior edge of the guillotine on the posterior border of the tonsil, the blade of the guillotine is driven home. It cuts through the mucous membrane at the juncture of tonsil and anterior pillar of the fauces, and then, taking the line of least resistance, passes between the tonsil capsule proper and the pharyngeal wall. The guillotine must be sharp enough to cut through a thin layer of mucous membrane and blunt enough to take the line of natural cleavage between tonsil and pharyngeal wall. When tonsillotomy was practised, it was known that a guillotine with a sharp edge shot quickly home led to troublesome haemorrhage, whereas a blunt guillotine by a half-crushing action reduced haemorrhage to a minimum. At the same time the guillotine must not be so blunt as to be unable to cut at all, for after cutting through the mucous membrane of the anterior pillar at its junction with the tonsil and slipping between tonsil and pharyngeal wall, it comes up against the mucous membrane at the junction of tonsil and posterior pillar of the fauces. In this thin layer of tissue to be cut through there are blood vessels of which it is desirable to obliterate the lumen by the trauma of a

crushing action. When this posterior line of attachment has been reached the pressure of the thumb of the hand holding the guillotine should not be enough to force it home, owing to the bluntness of the guillotine; it is at this juncture that the other thumb should cease to press on the anterior pillar of the fauces, and the hand thus freed be used to force home the guillotine. The tonsil will always come away with the guillotine, owing to this crushing of the tissues. Since it is necessary to get a good view, it is advisable to pass immediately from the one tonsil to the other before blood obscures the view. Failure to see means that the furrow between the tonsil and the posterior pillar of the fauces may not be hit off, and that the anterior pillar of the fauces may be damaged. I often take away a thin edge of mucous membrane on the anterior pillar of the fauces. It is easily done without touching the musculature. After the enucleation of tonsils a definite smooth-walled cavity corresponding to the buried portion of the tonsil is felt with the finger. On examination of the tonsil the surface of the buried portion will similarly be seen to be smooth with the thin grey capsule of the tonsil covering it. The completeness of this capsule is the demonstration of complete enucleation.

Sometimes, especially in adults, the tonsils have to be

removed when there is no faucial prominence at all; there may be an excavation. In cases such as this the operation presents no increased difficulties, since the posterior pillar of the fauces is a guiding mark to the posterior border of the tonsil. Visibility is all-important to maintain the position of a guillotine whilst the tonsil is pressed into the guillotine. I have removed a tonsil which on examination afterwards was cup-shaped, consisting of an excavated buried portion of tonsil only.

The removal of adenoids calls for no other remarks beyond what has been said with regard to removing them with one sweep of the curette. It is always well to feel and steady the curette against the posterior border of the nasal septum where it touches the roof of the nasopharynx. This can quite well be done without any damage to what is a relatively fragile structure. One quick sweeping movement with maintenance of pressure backward on to the pharyngeal wall is then all that is necessary. At the end of operation the child can be turned sideways or face downwards to allow of the escape of blood; but is kept wrapped up, to avoid struggling, until such time as consciousness returns.

REFERENCE.

¹ On Enucleation of Tonsils with the Guillotine, by S. S. Whillis, M.D., and C. F. Pybus, M.S., F.R.C.S., *BRITISH MEDICAL JOURNAL*, November 25th, 1911, p. 1402.

A METHOD OF ENUCLEATING TONSILS WHICH LESSENS BLEEDING.

BY

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THE "reverse guillotine" method of enucleating tonsils, first described in this country by Whillis, is, I suppose, that most commonly now employed, and I personally use it almost exclusively, except that I use my thumb, and not my forefinger, to press the tonsil through the guillotine ring; and after trying various guillotines I came to the conclusion that the Howarth guillotine, with sharp and blunt blades, was much the most convenient of the instruments made for this purpose. I have come to use the blunt blade only in the vast majority of cases, keeping the sharp blade in reserve for cases where the fibrous attachments of the tonsil are so tough that they do not readily give way to the blunt blade—a condition found only in a small minority of cases operated on.

To obviate bleeding, and also to lessen the liability of the patients either swallowing blood or sucking blood into the larynx, I have recently somewhat modified my methods. It is much more convenient to engage the tonsil in the guillotine with the patient on the back than on the side, but to prevent blood from accumulating in the pharynx, with risk of its passing into the larynx or oesophagus, I like to have the patient on the side with the face turned somewhat down before performing any cutting, so that any blood runs down out of the mouth.

I adopted, accordingly, the following procedure: The patient is anaesthetized on the back and the operation field well illuminated with a head lamp or frontal mirror. Standing on his left side facing him, I first engage the left tonsil in the ring of the guillotine, shut down the blade by the handle lever and give this closed handle to an assistant (usually a nurse) to hold, and then engage the right tonsil with the second guillotine and close the blade and hold the handle myself.

On this being completed, the patient is turned on to the left side and the face turned somewhat down. Up to this time there is practically no blood in the mouth, and as the mouth is now turned down, any blood from the subsequent

operative procedure will run out of the mouth over the edge of the operating table. This manoeuvre almost completely obviates the swallowing of blood during the rest of the operation.

I now remove the tonsils, and I do so not by cutting out or tearing out; but, using the closed instrument in the same way as a pressure forceps is employed to perform torsion on a small artery, I twist the tonsil until the pedicle of fibrous tissue, engaged between the guillotine blade and the ring, containing the principal blood vessels of the tonsil, gives way.

In this way the bleeding from the tonsils is reduced to a minimum. The tonsil is removed in its capsule, and with rare exceptions the removal is complete. If necessary, adenoids are now removed with the face still turned somewhat down, so that blood from these also runs out of the mouth. On completion of the operation the patient is turned completely over on to the chest and face, with the

head hanging down over the edge of the table, and on removal to bed or recovery couch, care is taken that the patient is not allowed to lie on the back until there is a considerable degree of recovery from the anaesthetic.

The inconvenience of handing the closed handle of the guillotine to an assistant to hold, and the risk of slipping involved, soon made it evident that it was desirable to employ, for the first guillotine at least, one with a locking

attachment to lock the blade, such as the ratchet of the Elphick "haemostatic guillotine."

The Elphick guillotine, however, has the handle attached to the blade at right angles, and as the obtuse angle position of the handle in the Howarth guillotine has a great advantage, and also as the serrated edge of the crushing blade of the Elphick has no advantage which I can see, I got Messrs. Down to make me a guillotine which is really a modification of Howarth's.

The principal modification is the ratchet attachment to lock the blade in the closed position, but I had the guillotine made also with interchangeable ring and blades for different sizes of tonsils, and with the blunt blade very blunt. A small modification, but an important one, is that the end of the lever pushing the blade home is turned over to hold the sliding blade down to its bed, as I found in some of my Howarth's guillotines that firm pressure on the handle sometimes forced the sliding blade to ride up

Modification of Howarth's guillotine.