ACCIDENTS DURING TONSILLECTOMY AND SEQUELAE OF THE OPERATION.*

BY ADOLPH O. PFINGST, M. D., LOUISVILLE, KY..

It is with some hesitancy that I present a paper on tonsil operation, knowing that in the last few years medical literature has been flooded with articles dealing with this subject. However, most of the writings have dealt with the indications for the removal of the tonsils and the methods of operating until now most of us are pretty well agreed as to the kind of tonsils which demand enucleation and differ only in details of technic.

To make former contributions of more value, a large number of cases will have to be recorded, the accidents incident to the operation and the sequelae noted, and the patients kept under observation for ultimate results. My incentive to present the complications and sequelae of tonsillectomy is a series of over 1,200 cases of bilateral tonsillectomy extending over the last three years, all of which have practically been operated upon with the same technic and have been watched since the operation. Over 500 of these cases are taken from my private practice, while between 700 and 800 were clinical cases, many from the Anti-tuberculosis Association, operated upon either by myself or by my assistant, Dr. Wm. C. White.

The technic employed in our cases was briefly as follows: Outside of a thorough cleansing of the bowels no preliminary treatment was employed. With the patient anesthetized until pupillary reflex is lost, the head-end of the operating table lowered so as to have it about ten inches lower than the foot-end and the body turned somewhat towards the operator by inserting a long sand-pillar under the left shoulder, the patient is convenient for the operator seated at the side of the table and reflecting his light from a large electric bulb on the opposite side. With a self-retaining mouth-gag (Murdock) opened as far as possible without interfering with respiration and the tongue held down with a small depressor in the hand of a trained assistant, the tonsil first to be removed is grasped with a pair of vulcellum forceps. Many different forceps have been introduced. The one I use was patterned by me after a Gruenwald cutting-forceps and has the advantage of short blades

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which can be opened readily without obstructing the view of the tonsils and which take a firm hold and do not tear the gland. Firm traction is made upon the tonsil, pulling it out of its bed and putting the mucous membrane on a tension. This membrane is readily nicked just under the anterior pillar, for which purpose we employ a Smith dissector sharpened on its concave edge, which readily cuts the mucous membrane around the tonsil and allows the gland in its capsule to slip forward into the faucial space beyond the pillars, like the gland in a para-phymosis. A No. 8 wire is slipped over the gland and the small attached portion of the tonsil cut through with the snare with very little traumatism. After removal of the first tonsil a good-sized gauze sponge on a curved hemostat is inserted into the space between the pillars and pressure is made while the anesthetic is again being administered to prepare the patient for the other tonsil. Patients are kept under the anesthetic until all bleeding has stopped. Our operations were all performed at the infirmary where the patients were kept from one to three days. With but few exceptions we used no after-treatment for the first two or three days, then cleansing sprays and application of twenty per cent argyrol solution. It is hardly necessary for me to state that none of our cases were operated on during or immediately after an acute inflammation of the tonsils. A small percentage of adult cases were operated upon under local anesthesia of cocain and adrenalin injections.

ACCIDENTS DURING THE OPERATION: In the first twenty-five or thirty cases it was not an uncommon occurrence to either button-hole one or both faucial pillars or to cut into them, leaving a ragged edge. It also happened that the uvula would be included in the snare and accidentally abscised. These should rather be looked upon as errors of technic and occur no more since this has been improved by experience. In our earlier cases in which other forceps were employed, the tonsils frequently tore, demanding several re-applications. Another accident which happened frequently in the earlier cases was the slipping of the snare causing it to cut the tonsil, leaving a portion of it behind and necessitating a second attempt.

Probably the greatest source of anxiety during the operation is found in the *bleeding*. While I am convinced that the bleeding on the whole is much less after removing a tonsil in its capsule than after abscision with a tonsillotome, yet we have had several cases in which the flow of blood was checked with difficulty. In most cases pressure with gauze, or ice held in gauze, applied over the bleeding-point by means of a curved hemostat will stop the ordinary

bleeding in from five to ten minutes. Failing in this, the bleeding-point is found by retracting the anterior pillar and grasped with a hemostat, the pressure of which will stop it unless a large vessel has been divided. In two cases, one a boy of 19, and the other a girl of 22, large vessels were divided and blood spurted across the mouth as soon as the tonsil was removed. These vessels were caught with a Jackson hemostat and ligated with No. 1 cat-gut. The aspiration of blood, of which so much has been written, was never observed in our cases, nor could I find a case in literature in which such an accident was reported.

Although I do not care to enter into a discussion of the merits of the various anesthetics in tonsil-surgery, I wish to state that about half of our cases in which a general anesthetic was employed were given chloroform and half were given ether preceded by atropia and that we experienced no difficulty in any of them. Statistics gathered by Packard¹ seem rather conclusive in showing that ether is the safer of the two drugs. Packard found twenty-nine deaths recorded as a result of the anesthetic given for tonsil operations of all kinds, of which twenty-six resulted from chloroform, two from ethyl-chloride, one from the A. C. E. mixture and none from ether.

It is of interest to note that in one case after removal of the tonsils with capsule intact what looked like a remnant of tonsillar tissue was seen inside of the posterior faucial pillar in the tonsillar fossa. This was easily removed and microscopically proved to be a small amount of tonsillar structure encapsulated in a thin membrane of connective tissue.

SEQUELAE OF THE OPERATION: On the day following the operation the majority of patients had from 1 to 1½ degree elevation of temperature and then had no further fever. With few exceptions they complained for three or four days of painful deglutition and some pain in phonation, and it took from ten to fourteen days for the fibrinous deposit covering the wound to clear off.

The only semblance of sepsis noted in our cases was in a child of 3 years who was operated upon for enlarged tonsils and adenoids and who at the time had considerable enlargement of the glands of the neck on the one side. These glands hypertrophied very rapidly after the operation and, although their size decreased somewhat later after the wound-surface had become clean, they are still large, four months after operation.

The most common sequelae we observed was secondary hemorrhage and I include in this, hemorrhage coming on after the primary bleeding had been checked and the patient returned to bed.

One of these came on eight hours after the operation (male, aged 22 years), one after 12 hours (female, 17 years old), one on the fifth day (male, aged 27 years), and one on the sixth day (girl, 10 years old). The last case was almost pulseless and unconscious before Dr. White reached her. This, as well as the other cases, were brought to a stop by means of pressure with the gauze sponge held firmly in the fossa. These sponges were inserted dry except in the latter case, in which the gauze was saturated with 1-1000 adrenalin.

In only one case of secondary hemorrhage pressure failed to still the bleeding and we had to resort to more radical measures. This bleeding occurred in a girl of 22 years, about twelve hours after the operation and came from a plexus of veins just under the anterior pillar high up in the supra-tonsillar fossa. Efforts at ligation failed, the veins tearing during the endeavor, and it became necessary to suture the pillars over a roll of gauze before the bleeding could be stopped. The application of these sutures—as recommended by Gilpatric,² is difficult on account of the small space behind the posterior pillar. A small, full-curved needle was used and the sutures introduced from behind forward.

This patient presented two other unusual features. On the day after the hemorrhage when the plug was removed it was noticed that a small hematoma the size of a marble had developed on the packed side, beginning just above the suture. In addition to this the patient developed a high degree of hysteria, claiming an impossibility to swallow. When she was allowed to return to her home in the country a week after the operation, the hematoma was still present, otherwise the wound had progressed as far as other cases at the same stage. However, she continued to complain of pain in the throat and would swallow nothing but liquids. She was hyper-sensitive and complained of pain on slight pressure over the neck, the face and the upper half of the spine. A month after the operation when she was sent to me by her family physician she could hardly open her mouth. She complained of continual pain in her throat and refused to swallow anything but liquids. The hyper-sensitive areas were still pronounced. By assuring the girl that I knew just what the trouble was and that one or two applications of medicine would cure her she opened her mouth wide enough for me to insert a cotton swab between her teeth and mop the throat with ichthyol solution. Examination showed an absence of all inflammation, the throat being normal, the hematoma having disappeared. The application was made for its psychic effect and at the

same time I told her that she would almost certainly be able to open her mouth on the next day. This she did on the following day but still complained of pain for the relief of which a second application was made. In two days she was relieved.

The most unusual sequelae coming under my observation was one of hysterical hemiplegia coming on a week after a tonsillectomy. A large over-developed healthy-looking girl of 18 years with the history of some neurosis on the maternal side and the personal history of an hysterical temperament and some choreal contractures of the face and neck for two months was subjected to a double tonsillectomy on April 2, 1910. The operation was advised partly on account of her general condition but especially on account of recurrent attacks of peri-tonsillar abscess-formation. The operation was done under a general anesthetic, the tonsils being removed without much difficulty in consideration of the fibrous adhesions to the capsule. For about a week the case took the usual course, the soreness gradually subsiding so that the patient could partake of some food. However, she gradually developed a nervous condition, complaining of a fullness in the throat, an inability to swallow solids and some pain in the back of the neck, in the region of the tonsils and over the lower jaw. The patient rolled her tongue about in her mouth in a peculiar nervous manner. She spoke very little and only when addressed and then with apparent difficulty. There was a slight rigidity of the head. In several days neurosis developed, the most marked of which was a paralysis of the right arm and leg, the patient being able to walk only by dragging the right leg after her. The entire extent of the spine was hyper-sensitive, otherwise no hysterical areas of hyperesthesia or anesthesia were noted. There seemed to be a disturbance of the sense of taste, the other senses being apparently undisturbed. The reflexes were normal. The general condition of the patient was one of hebetude. She was aware of her surroundings, but evidenced no interest in things which ordinarily were of interest to her, as her music, reading and sewing, yet she performed her daily household duties without objection. A peculiar symptom which she developed in the fourth week after the operation was a fear with which she seemed possessed that someone would steal her valuables. She would hide her jewelry and other valuables and lock her doors at night, which was not customary with her. The patient continued in this condition for about three months, when gradual improvement began. The last symptom to leave was the hemiplegia, which disappeared entirely four months after the operation. During this time the pa-

tient was kept out of doors as much as possible. She was encouraged in the belief that she would improve and was removed from all exciting influences. At present the girl is the picture of health and has no chorea or other nervous phenomena. She realizes the condition she was in and speaks of her foolish actions with some embarrassment. Although this patient gave some evidences of mental disturbance and the case might be looked upon as bordering on insanity, the symptoms and clinical course would rather indicate that we were dealing with a case of hysteria major.

Inquiry among other operators in Louisville and about twenty in Chicago, Philadelphia and New York shows that very few complications and sequelae of the operation have been observed. Most of the Louisville operators report only a few cases of primary and secondary hemorrhage which were controlled by ligation or suturing or clamping the faucial pillars. No severe sepsis was observed and no death directly resulting from tonsil surgery.

The dryness of throat which has been mentioned by some operators after tonsillectomy has never been observed in my cases, although many of the patients were questioned regarding this symptom.

The change in the voice which is feared by the lay-people and which is also mentioned by some operators in a vague way has also never been noted.

The most unique sequelae brought to my attention was a large hematoma in a case operated on by Dr. Lederman, of Louisville, which I had the pleasure of seeing in consultation. This occurred in a young man of 26 years, with a marked aortic stenosis, and followed the removal of one tonsil in its capsule by means of dissection and the snare performed under local anesthesia. Soon after the operation, blood began to extravasate under the mucous membrane and in a few hours a mass the size of a large hen's egg had formed, occupying almost the entire palatine arch. Dr. Lederman also had a case in a girl of 18 years of age, in which a suppurative otitis media followed in 24 hours on the side on which a tonsillectomy had been done, under local anesthesia, with the dull dissector and snare. The otitis ran a mild course. The other tonsil was removed later without complication.

Dr. Hall, of Louisville, observed a death following tonsillectomy from an intercurrent diphtheria infection in a boy of 8 years, occurring seven or eight days after the operation. This was a clinical case and had been withdrawn from observation by the parents. When seen by Dr. Hall ten days after the operation, the child was

found to be suffering from advanced laryngeal diphtheria, the tonsillar area being free from membrane. He died in forty-eight hours notwithstanding treatment.

The replies from operators elsewhere would also indicate that complications and sequelae of the operation are not common. Most of the operators experienced a small percentage of troublesome hemorrhage. The frequency with which this complication arises varies with different operators. Casselberry, of Chicago, in a careful study of 1,500 tonsil enucleations, had serious bleeding—immediate, delayed and secondary—in the proportion of one to every seventy-five tonsils removed. Unless we include the cases in which we had to employ prolonged pressure (15 to 30 minutes) or had to grasp the bleeding-point and allow the hemostat to remain on the vessel for three or four minutes, we were troubled with severe hemorrhage but eight times in the 2,400 faucial tonsils removed, a ratio of one to 300. Ballenger was still more fortunate, recording but two cases of severe hemorrhage in 9,000 cases. Robertson, of Chicago, speaks of frequently encountering late primary hemorrhage, but failed to state in what proportion of cases. Freer, of Chicago, whose cases evidently run into the thousands, has had but three experiences with hemorrhages which required the employment of the clamp. Dench, of New York, also speaks of having had but two cases of rather severe hemorrhage coming on after the operation.

The means employed to allay the bleeding after tonsil enucleation also differs with the operators. Some employ adrenalin or other styptic agents, as gallic and tannic acid, alumen, etc. McKernen, of New York, speaks of the successful use of thrombo-kinase powder in five cases of secondary hemorrhage. In other cases he employed the clamp and ligature. Some favor the ligation of bleeding vessels, others advocate suturing the faucial pillars over a roll of gauze, some employ clamps for the same purpose (Ray, of Louisville, Freer, of Chicago) and some employ the buried suture at the bleeding-point (Marquis, of Chicago).

Sepsis was not observed by any of the men with whom I corresponded nor had any of them experienced a fatality from the operation, although Dench mentions a death following tonsillectomy due to status lymphaticus occurring in his hospital service. Ballenger, in the last edition of his text-book³ reports two cases of severe sepsis and two of prolonged hemorrhage with collapse but no death in 9,000 cases.

A review of the literature shows that some operators have met with more serious sequelae following the complete tonsil operation.

L. W. Dean,⁴ of Iowa City, reports a fatal case from sepsis following tonsillectomy. It occurred in a lady 27 years old. On the day following the operation the temperature rose, the throat became painful and edematous and the lymphatic glands in the neck became enlarged and tender. Later the glands over the entire body enlarged, the patient became delirious and died on the sixth day in a convulsion.

Dean also reports a case⁵ in a child 5 years old which developed a gangrenous inflammation of the neck a week after tonsillectomy, necessitating free incision and irrigation. This patient recovered, though she was in the infirmary over five weeks.

Dean cites from the literature many alarming complications after tonsillotomies such as, middle-ear inflammation, infection of the glands of the neck, pharyngeal abscess, meningitis, hyperpyrexia resulting in death, etc., and mentions only a few following tonsillectomies.

Parish⁶ cites a case, not his own, of a male 28 years old, who, during a tonsil operation with punch, developed a marked emphysema of the neck lasting three days and terminating in recovery.

A case of permanent torticollis is cited by Pierce⁷ from another's practice occurring in an adult following the complete tonsil operation, which was attributed to faulty technic, the operator having accidentally removed some pharyngeal muscular tissue.

T. J. Harris⁸ lost a case after tonsillectomy, in his opinion due to status lymphaticus. The patient, a man of 30 had both tonsils removed under local anesthesia and soon after the completion of the operation the heart becoming very weak until death followed. The autopsy showed the presence of a large thymus weighing eighteen grams and a distended right ventricle.

Packard⁹ also reports a fatal case after tonsillectomy in a girl of 3 years, the child developing a high temperature and death following with obscure symptoms in six hours.

Pairy¹⁰ observed a case in which death resulted from a cerebellar abscess, secondary to a middle-ear abscess which developed after tonsillectomy.

While a more extensive review of the literature might add several more cases to the ones in this report, it seems that alarming complications and sequelae are very rare after the removal of tonsils in the capsule. On the other hand, literature contains many instances in which the incomplete tonsil operation was followed by alarming symptoms or by death. In view of this we can only draw the conclusion that we have in tonsillectomy a comparatively safe

operation and that in its performance the operator must be guided by the same rules governing surgical operations elsewhere. The operation must be performed surgically clean, and should be done at a hospital. The amount of traumatism should be reduced to a minimum and bleeding vessels ligated when not controlled by simple devices.

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Discussing the physiology of the tonsil the writer accepts the view that it is probably to be looked upon as a modified lymph-gland and that it exercises a protective function against invading organisms. That this protective power is especially active in childhood is shown by the frequency with which the gland becomes hypertrophied. It is reasonable to conclude that the tonsil does fulfill an important function so long as it retains its functioning properties—an important qualification. The problem as to when complete removal of the tonsil is called for can only be finally solved by more accurate diagnosis. It is certainly unscientific and unsurgical to remove only partially a totally diseased gland, but it is equally wrong to remove a gland which still retains, or is likely to recover its functional activities. It is not at present possible in all cases to distinguish between these two. The question as to whether tonsillotomy is ever to be preferred to tonsillectomy must be answered in the negative. The writer performs the operation with a sharp elevator and a snare.

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