THE LARYNGOSCOPE.

VOL. XIX. ST. LOUIS, MO., FEBRUARY, 1909. No. 2.

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
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MULTIPLE PAPILLOMA OF THE LARYNX IN CHILDREN.*

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The presence at the same time in my clinic at the Manhattan Eye, Ear, and Throat Hospital of three cases of multiple papilloma of the larynx in children varying in age from five to ten years, affords such unusual opportunities for observation of the vagaries of this trouble that I have ventured to submit their histories, with comments, as material worthy of your consideration.

Last year Coakley presented a paper upon the same subject which elicited considerable discussion; but there seemed to exist as many divergent opinions upon treatment as existed some years ago when Dr. Hunter MacKenzie advocated so strongly tracheotomy alone as a curative measure in all cases of papilloma of the larynx in children.

Case I. F. L., male, aged seven, was first admitted to the Manhattan Eye, Ear, and Throat Hospital in 1905. At that time the patient complained of hoarseness only. There was no family history bearing upon the case. I am indebted to Dr. Duncan McPherson for the history of the case when first observed, and under whose skillful treatment the patient still remains.

The growth at first appeared single, sessile, and of mulberry shape. It was removed with the Mackenzie forceps at varying intervals, and at times was completely eradicated. About four to eight weeks generally intervened between operations, and this continued until the child came under my observation in October, 1907. There had been difficult breathing occasionally, which would be immediately overcome by removing the growth. Dr. McPherson noted the diminished rapidity of recurrence in the

*Candidate's thesis, presented to the American Laryngological Association at its meeting held in Montreal, May 11-13, 1908.

last year, and frequently a period of one to two months would now intervene between recurrences. The general health of the patient improved, and from a poorly nourished, anemic child, he developed into a sturdy boy.

A fibrosis occurred in the anterior commissure, which might occasion some loss of voice, even after the growth disappeared. However, it was the opinion of Dr. Jonathan Wright, under whose surgical care the patient had been for a part of the three years' observation, that the fibrosis would also disappear when the operative interference ceased. Dr. Wright considered the method pursued in

Case I. F. L., male, aged seven years. Drawing made after beginning operations for removal of the growth. The white area surrounding the base of the neoplasm is the fibrosis resulting probably from the frequent removal.

this case to be the ideal one when conditions favor it. The instrumentation was easy of accomplishment; the growth was single and did not interfere particularly with respiration; and there was nothing prohibitive in keeping the larynx clear until that physiological change occurred which will prevent recurrence.

Case II. A. Le R., Italian girl, aged ten, was admitted to the clinic July 11, 1907. She was brought to the hospital particularly for the removal of tonsils and adenoids, although she had been hoarse for five months previously. Owing to her struggles, it was absolutely impossible to examine her larynx in the clinic. No fan-

ily history bearing upon the case was obtainable. There were five other children in the family, all of whom were healthy and without hoarseness. No warts were found upon the body. The patient had had none of the diseases of childhood, but had lost about fifteen pounds in the previous five months.

At the time of examination there was slight cyanosis, and that anxious "facies" denoting difficult respiration. The voice was a hoarse whisper. I advised immediate admission to the hospital, and tried adrenalin sprays and steam inhalations, by which she was temporarily relieved of her distress. On July 18th she was anesthetized for

Case II. A. Le R., female, aged ten years. The drawing presents the condition following the first operations for removal of the neoplasm.

the removal of the tonsils and adenoids, at which time I obtained a view of the larynx, and removed a small papilloma for examination. The larynx had apparently three rather large growths in it, two upon the cords anteriorly, and one in the subglottic region.

Dr. Wright, in reporting upon the specimen, said that the growth was a papilloma springing from a base of granulation tissue, probably tuberculous. Examination of the lungs, however, revealed no evidence of tuberculosis, nor the sputa any bacilli.

The patient was immediately put on cod liver oil and arsenic, and seemed to respond to the treatment by gaining four pounds in two weeks. On August 1st I performed tracheotomy, believing it to be

the best thing for the patient, for three reasons: First, her breathing was difficult and she became quite cyanotic at times; second, she was absolutely intractable for operative measures *per vias naturales*; third, the presence of a tracheal tube would permit the better use of the Jackson tubes for frequent removals of the growths, if necessary.

The trachea was opened high up under chloroform anesthesia, and the immediate results were good; but the next day, and for many subsequent days, severe hemorrhages would occur from the trachea and from the wound itself. The child would work at the tube until it was out of place, and owing to the many attempts to replace it a false passage was made along the side of the trachea. This condition continued for about ten days, until finally the inflammation subsided, and the tube became less irritating. Exuberant granulations sprang up around the tracheal wound, which were removed with scissors, and the bases were then cauterized with fused silver nitrate.

On October 15th, under chloroform anesthesia, a small quantity of papillomata was removed from the larynx through the Killian tubes. The light was unsatisfactory, and the speculum was not adaptable for use in a child's larynx. On November 2d, another attempt was made by my assistant, Dr. McPherson, to remove more of the growths with the Killian tubes. He was not successful with the tube, but quite a few were removed by Mackenzie's forceps with the aid of the laryngoscope.

Following this operation, the patient was quite sick and could retain no food for several days. There was no laryngeal oedema, however. On February 13, she was again operated upon, and this time I used the Jackson self-illuminating speculum, and also his forceps. I removed a number of papilloma, and found them in many places where I had not seen them previously when using the laryngoscopic mirror. I found the Jackson tube much more satisfactory, and no untoward effects followed. The patient had continued to gain in weight, and was breathing so well that she had been permitted to make frequent visits home of one or two days' duration.

On March 27th, Dr. McPherson operated upon the patient with the Jackson speculum and removed as many growths as had been previously taken out altogether. Since this time there has been more space in the larynx and the child can speak in much clearer tones than before. There are, however, quite a number of the growths still present, and they do not yield to arsenic and potas-

sium iodide internally, nor to alcohol, zinc chloride, adrenalin and silver nitrate locally. I am now injecting castor oil into her larynx daily.

Case III. J. M., of German parentage, male, aged five years; admitted to the Throat Clinic of the Manhattan Eye, Ear and Throat Hospital, October 26, 1907. The mother gave a history for the child of snoring and mouth breathing, and at the time of admission my attention was directed only to the presence of adenoids and tonsils. Nothing was said at this time to make me suspect laryngeal growths. Upon subsequent investigation I ob-

Case III. J. M., male, aged five years. The drawing shows the appearance of the larynx before any radical interference had taken place. Only a few papillomata had been removed when this drawing was made.

tained the following facts from the father: When the child was two years old he had sore throat with fever, and after three days' sickness had a sudden attack of dyspnoea and became slightly cyanotic. A physician was called in, who administered some medicine which relieved the condition for a time, but the hoarseness continued. After several months of hoarseness the father took the child to the Post-Graduate Hospital, where some growths were removed from the throat, resulting in no apparent relief, although the child remained in the hospital for one week. The father took the child home, where for about six months he remained with no discomfort other than hoarseness. However,

about one year ago the child began to breathe badly and would choke at night. The father said that frequently the boy would rise in bed, stretch out his hands, and apparently plead for air. He then took the child to Bellevue Hospital, where the doctor removed some growths from the larynx, and after two weeks a second removal occurred. These two operations overcame the choking condition, and he was brought to the Manhattan Eye, Ear and Throat Hospital seven months ago for the snoring and sore throat

Case III. As it appeared May 1, 1908, after frequent removals of all visible papillomata.

only. No family history had any bearing upon the case. There were three other children in the family with normal voices and in good health.

Upon admission the child was fairly well nourished and the breathing was not bad except upon excitement. I removed his tonsils and adenoids on October 29th, after admission to the hospital, and not until he protested rather vigorously against the anesthetic did I notice anything unusual in the voice. He took his anesthetic badly, but before removing his tonsils and adenoids I examined his larynx and found it almost completely blocked with papillomata. I removed some of these growths at this time, to give him better

breathing space, and after the operation he was placed under a tent. With the exception of bad breathing and delayed recovery from the anesthetic, nothing eventful resulted from the operation. The breathing and hoarseness became worse after the operation, and continued to increase until November 16th, when I performed a tracheotomy. This overcame the difficult respiration. The patient made a good recovery from the operation, and on January 25th I removed a large quantity of papillomata from the larynx with the Jackson speculum and forceps. Chloroform anesthesia was employed. Temporary relief was obtained only, for new growths had sprung up in different areas, completely filling the larynx and even encroaching upon the epiglottis. On February 18th, pursuing the same methods as before, I again removed at least a half drachm of these warts. On March 3rd, I again performed the same operation and removed more growths than ever previously. The larynx is now filled up again with a greater number and larger growths than ever—one is about the size of a raspberry. I have applied locally alcohol, zinc chloride and silver nitrate; and now I am injecting pure castor oil into the larynx once a day in hopes that the same results may obtain in the larynx as upon the skin.

The microscopical reports on all these growths have been simply papilloma. The patient has steadily gained in weight. In this case tracheotomy was imperative, as no amount of operative interference would have kept down the growths.

ETIOLOGY.

Apparently nothing is determinable as to the cause of these growths in children, for they may occur at birth or at any time during life. Morell Mackenzie performed a tracheotomy upon a child aged two years and four months, in which the larynx was found, upon autopsy, to be filled with papillomata. The history of a hoarse, suppressed cry at birth, and a continued loss of voice led him to conclude that it was unquestionably a case of congenital papilloma. All congenital tumors of the larynx have been found to be papillomatous (Morell Mackenzie, *Laryngeal Growths*, 1871).

The appearance of a papilloma at birth precludes in a measure the probability of voice strain as a cause. The history of a number of these cases shows that hereditary tendencies, lowered vitality and unsanitary conditions seem to play no important part in their formation. In some instances, however, hereditary syphilis is a possible cause, and frequently the growths will disappear under the administration of potassium iodide.

The same contagiousness that characterizes the skin wart may properly apply to the laryngeal variety, if we accept as evidence the presence of new formations in different parts of the larynx following operative measures, which areas were previously free from the growths. Papilloma of the larynx may be either pedunculated or sessile, single or multiple, and may present any size from that of a millet seed to that of a raspberry. Some authors assert that upon minute observation all of these tumors are pedunculated (Knight, *Disease of the Nose and Throat*).

Another point of resemblance between the skin wart and the laryngeal variety is the uncertainty or vagary of disappearance. Frequently a skin wart will disappear without any recognized cause, and the same may be said of the laryngeal variety. It is this inexplicable change which has led some observers to conclude that, irrespective of treatment, the growths will not disappear until that physiological change has occurred in the subject which will retard the activity of the cell organism (J. Payson Clark, *Papillomata of the Larynx in Children*, *Boston Medical and Surgical Journal*, September 28, 1905).

Morell Mackenzie calls attention to the presence of skin warts as originating probably from the irritation of dirt, as he had observed these growths in cooks, coachmen and artisans. As giving additional weight to this argument, I would add the observation of Jonathan Wright in regard to the greater frequency of warts upon country children's hands, particularly those who were permitted to keep them dirty—to which observation I can readily accede. Another point is that of location of the skin wart, which is usually at the knuckle or between the fingers, where the papillae of the skin would be most irritated by the dirt being rubbed in. Irritation of the mucous surfaces, however, would have to result more from friction against another mucous surface or from the rubbing in of the mucus itself. Local predisposition seems to be the only etiological factor, however, that can be definitely cited. Of course there are those cases of papilloma of the larynx in adults due to the inspiration of irritating vapors and particles of dust, but this condition is unlikely to occur with children.

LOCATION.

Thick growths appear more frequently upon the cords than upon the ventricular bands, and more frequently in the anterior than in the posterior part of the larynx. They rarely occur in the posterior commissure, except the so-called tuberculous papillomata.

However, in Case III they spring from all parts of the larynx, and even upon the under surface of the epiglottis and the aryepiglottic folds.

SYMPTOMS.

The symptoms are somewhat characteristic, though they might easily be simulated in retropharyngeal abscess—abscess at the base

Case IV. The larynx of an infant who died of asphyxia at the age of seven months. The case was probably one of congenital papilloma, and the history and appearance of the growth bear a striking similarity to Case III. The drawing is a reproduction from the *Archives of Paediatrics*, Nov., 1904, in which journal the case was reported by Theodore J. Etterich.

of the tongue—laryngeal diphtheria, or in laryngeal stenosis from any other cause. Croup simulates papilloma of the larynx very strongly, and the converse of this is also true, and no doubt many cases of papilloma have been diagnosticated as croup.

Hoarseness, or possible loss of voice, dyspnoea, cyanosis, and the peculiar facial expression of anxiety accompanying any disturbance of respiration are the significant symptoms present. In Case III no suspicion of papillomata existed when the child was examined for adenoids, and it was only when he objected to the anesthetic that my attention was called to the peculiarity of his voice, which led me to examine his larynx under anesthesia before removing the tonsils and adenoids. Papillomata may be present in a great many cases where the hoarseness has been attributed to adenoids, and the possibility of this error should induce us to make laryngeal examination in every case where hoarseness is present. The parent of Case III, who is a German, offered no suggestions as to the previous history of the case, and the many experiences related were all obtained after tracheotomy was performed.

FREQUENCY.

Although this neoplasm is regarded as existing more frequently than any other laryngeal growth, yet the statistics of large clinics show that it is of relatively rare occurrence in children. In the clinic of Dr. Chappell, with which I was associated for ten years, at the Manhattan Eye, Ear and Throat Hospital, there was but one case of papilloma of the larynx in a child. In another clinic in the same institution there were only two cases during the same period. Clarke reports only twelve cases in the Massachusetts General Hospital in the examination of twelve thousand six hundred and twenty-three children under fourteen years of age. (*Boston Medical and Surgical Journal*, September 28, 1905). In eleven hundred tumors of the larynx reported by V. Bruns, six hundred and two were papillomata, but of this number the author does not state how many existed in children.

In 300 tumors of the larynx reported by Fauvel, 206 were papillomata; of this number, only nine were in children under fifteen years old (*Traité pratique des maladies du larynx*).

In 200 tumors of the larynx reported by Massei, ninety-four were papillomata (*Sui Neoplasma laryngei, studii e casistica*, Napoli, 1885).

In 100 tumors of the larynx reported by Morell Mackenzie, sixty-seven were papillomata, and of this number only eight were in children.

In 310 cases of laryngeal tumor reported by Schwartze, 163 were papillomata, but of these the author does not state the number occurring in children (*Des Tumeurs du larynx*).

VARIETY.

To the eye of the examiner, many different kinds of papillomata are noted. The most frequent is pale, granular, apparently friable, and with but feeble attachment to the cord or ventricular band. This variety more nearly resembles the skin wart than any of the others.

A second kind has about the same shape and size as the first, but appears more vascular, and varies from a *polypoid* condition to a pinkish *mucus soaked* appearance, which would indicate a more rapidly growing and a better nourished neoplasm.

A third is where the growth appears sessile, or where there is a large base from which spring other projections of the same neoplasm. These assume more of the cauliflower appearance. Such a growth in an adult larynx would occasion doubt in making a diagnosis.

All these macroscopic varieties, however, appear to be of the same structure when examined microscopically. The only variation to this statement in my three cases is in the report of Case II., upon the examination of some of the papillomata removed at the first operation. Dr. Wright adds that the growth sprang from a basis of granulation tissue, probably tuberculous, and in the last report says: "This seems to be a simple papilloma, but near the periphery of the epithelial papillae there are numerous cells containing degenerated hyaline matter, and at one place a distinct and typical whorl or epithelial pearl may be seen." The consistency is variable, being that of a polyp in some instances, and in others being horny and friable, even necrotic when of a tuberculous or of a syphilitic nature.

PATHOLOGY.

"The growth may be occasioned either by an hypertrophy of the normal papillae, or may be entirely new formations in the part. The basis substance is formed of connective tissue. The free surface is covered by epithelium, which may vary in its thickness and in the number of its layers, according to the seat of the tumor. Blood vessels and even nerves enter into the interior of the papillae." (Paget, *Lectures on Surgical Pathology*, 3rd edition.)

TREATMENT.

Each case has to be treated according to the peculiarity of the symptoms present, and from the literature upon the subject one is forced to conclude that there are many cases apparently similar which will not yield to the same line of treatment.

I believe that treatment can well be considered under three heads: First, that of necessity; second, that of expediency; third, that of election.

First. Under the first head will come those cases brought under observation—slightly cyanotic and with marked dyspnoea; where the child is emaciated, narrow chested, and with the characteristic “facies,” denoting insufficient respiration. The child will show little disposition to cry, because the exertion lessens still more the inspired air. In such a case there is nothing justifiable but immediate tracheotomy. To attempt anesthetization with a view to using the laryngoscopical tubes would be unwarrantable, and without an anesthetic no child would stand the use of the Killian or the Jackson tubes. Likewise, under these circumstances, the time necessary to accustom the patient to laryngeal examination and manipulation is not permitted the operator, and the only expedient is tracheotomy. I do not believe that any further operative measure is justifiable at this time, for the patient's resistance is already lowered to the minimum, and prolonged anesthesia or laryngeal manipulation but adds another factor in diminishing this resistance.

Since the advent of the Killian and the Jackson tubes, particularly the self illuminating laryngeal speculum of Jackson, which enables the operator to remove all the laryngeal neoplasms directly and without endangering the laryngeal structure, thyreotomy with its subsequent possibilities is absolutely unjustifiable in children. Even though we consider as favorable the results in a number of cases where thyreotomy has been performed—there having been no recurrence during the period of observation—yet there are so many instances where it has failed utterly or where it has resulted in a complete loss of phonation that one is compelled to look upon it with disfavor in the case of children, especially now since entirely safe measures are possible through the use of the Jackson laryngoscopical tube for the continued removal of these growths until nature has brought about the change that will result in their disappearance.

Taken as a whole, successful thyreotomies are materially in excess of unsuccessful ones, according to the reports in literature, but we have a number of particularly unsuccessful cases reported where thyreotomy has failed. Abbe reports a case in which thyreotomy was performed four times, with continued recurrence of the growth, although the bases of the structures were cauterized. Tracheotomy had to be done finally, and the tube remained in for six years, when the growths disappeared; but the voice was lost—which condition

was most assuredly due to the frequent thyreotomies. (*Medical Record*, April 28, 1900.)

Walker Downie reports a case in which thyreotomy was performed six times in one year in a child two years old. Lindon reports another remarkable case in which thyreotomy was performed seventeen times in two years, resulting finally in laryngeal stenosis and necessitating the permanent use of a tracheal tube. (The Treatment of Laryngeal Growths in Children, by C. Hunter Mackenzie, *British Medical Journal*, September 28, 1901.)

Following are a number of recorded cases of unsuccessful thyreotomies, performed by various operators in different countries:

Cases.

- Massei 1 (*Internationales Centralblatt f. Laryngologie*, Jahrgang x, p. 362).
 Garel 2 (*Annales des maladies de l'oreille et du larynx*, Juni, 1891).
 Oertel 2 (*Sammlung Klinischer Vortraege*, No. 315, p. 2807).
 Railton 2 (*British Medical Journal*, February 19, 1898).
 Eliasburg 1 (*Journal of Laryngology*, v., p. 245).
 White 1 (*Journal of Laryngology*, vi., p. 486).
 Cowgill 1 (*Medical News*, October 4, 1890).
 Chappell 1 (*Journal of Laryngology*, ix., p. 555.)

Summers reports a case of a child two years old with dyspnoea and hoarseness in whom low tracheotomy was performed and then thyreotomy. Upon attempting to remove the tracheal tube the child would choke. O'Dwyers' tube was tried unsuccessfully. Then a second thyreotomy was performed to no purpose, and finally the tracheal tube was left in place for two years, with satisfactory results. He also mentions two other cases in which the tracheal tube was successfully used.

Professor B. V. Bruns, of Tübingen, (*Handbuch der praktischen Chirurgie*, 1902), collected statistics of 127 children with laryngeal papilloma; forty-eight were not operated upon, and of these thirty-two died—twenty-eight by suffocation; three were cured spontaneously; twenty-six were tracheotomized—seven dying after the operation; twenty-one were subjected to laryngotomy—eight of these were permanently cured; forty were treated by intralaryngeal methods, of whom thirteen were permanently cured.

Rosenberg's Statistics:—109 children were subjected to laryngotomy, the operation being performed 144 times; eleven children were operated upon twice; three children were operated upon three

times; one child was operated upon four times. In all fifty-two children were not over four years old; twenty died mostly from suffocation due to recurrence of the papillomata; recurrences took place in forty-three after repeated operations; forty (or thirty-six per cent) of these were cured; ten of these had more or less loss of voice; eighty-eight children were treated by intralaryngeal methods; thirteen were not over four years old; three died, one from suffocation due to recurrence. Forty (forty-five per cent) were cured, but sixteen of these were of too recent date to determine the final outcome.

Thyreotomy may occasion loss of voice and stenosis of the larynx. It may be unsuccessful in eradicating the growth and require frequent repetitions of the operation without ultimate success, and finally necessitate employment of other measures to effect a cure. It may also be classed under the head of dangerous to life, as shock, producing death, frequently follows operative interference in the larynx. In view of the fact that it only enables the operator to remove successfully all growths from the larynx at the time, with no definite assurance of their nonrecurrence, and as this may be almost as successfully accomplished with a Jackson tube, without endangering the laryngeal structures, I believe that thyreotomy is unjustifiable.

Second. Under the head of expedient treatment would come that of tracheotomy. When is it justifiable? Should it be performed in every case of laryngeal papilloma? If all observers and operators had had the pleasing experience of Hunter Mackenzie there would be no argument against tracheotomy in every instance, but for some reason there have been those who have not met with the same favorable experience, though these cases have occurred in the hands of men equally skilled and equally desirous of favorable results. A marked example of the ineffectiveness of tracheotomy is the case reported by Dundas Grant, in which a tube had been worn for twenty-two years with no disappearance of the growth. (*International Medical Annual*, 1904.) Sympton reports a case of recurring papilloma in a child aged seven, in which a tracheotomy tube was kept in place for one year and three months, with no improvement, when thyreotomy was performed, with a recovery. (*British Medical Journal*, November 9, 1901.)

The consensus of opinion justifies tracheotomy in those cases of multiple papillomata of the larynx where there is difficult respiration or impaired health apparently due to bad breathing. Also in

cases where there is no evidence that the patient will become tractable in the use of intralaryngeal methods, likewise in cases of rapid recurrence after removal. The presence of the tracheal tubes in cases of multiple papillomata is a source of great assurance to the operator, whether the removal be by the old laryngeal method or with the Jackson tube, for even slight operative measures in the larynx may result in unexpected oedema. The tube is a safeguard against suffocation, but its long continued use may also result either in stenosis of the trachea or a collapse of the rings due to long continued disuse. The stenosis may be overcome by dilatation, but the collapse is of a more serious nature. This unfortunate occurrence may be obviated in a measure by frequent removal of the tracheotomy tube or by substituting a soft rubber tube for the metal one. I have endeavored to use a very short tube—one that would just engage the tracheal wall—but every fit of coughing disengages the tube, which renders it impracticable. The wearing of the tube probably hastens that physiological change in the mucosa necessary to the disappearance of the warts by reducing the vocal activity, and thereby reducing the blood supply to the area. But in view of the instances cited, where tracheal tubes have been worn for a long period without eradicating the growth it is unreasonable to conclude that the mere presence of the tube without some collateral aid would result in the disappearance of the growth. Where the papilloma is single, and in no way endangers the respiration, I would deem it inadvisable to do a tracheotomy.

Third. Election. Treatment under this head would involve no surgical procedure other than that which might be accomplished through the *vias naturales*. In a limited number of cases papilloma may be removed from the larynx of children after the use of cocaine only with Mackenzie's forceps, the snare or the curettes of Krause, Heryng, Landgraf, and Schroetter. In Case I the child has been trained to hold a perfectly immovable larynx, and no difficulty is experienced in removing the growth with any of the instruments mentioned, though the position of the tumor renders the Mackenzie cutting forceps the most effective. I have attempted snaring the growth, but have always failed, owing to the loop slipping off. In order to use the Jackson self-illuminating speculum, it is necessary to anesthetize the patient, which in itself adds an element of danger; but if the patient will not permit of intralaryngeal examination it becomes imperative to anesthetize, in order to facilitate the employment of the Jackson tubes.

Chloroform anesthesia, rather than ether, is preferable in these cases, because it lessens the laryngeal secretions by being less irritating to the mucosa. After partial anesthesia by chloroform, it is well to apply a 10 per cent solution of cocaine to the interior of the larynx, and also a one-thousandth solution of adrenalin, which renders the larynx less sensitive to manipulation and obviates the necessity of deeper general anesthesia.

By the time the patient is under the anesthetic the cocaine has overcome the laryngeal reflexes, which has to be accomplished before the introduction of the speculum. The patient is then placed in the Rose position, with the head well over the table, and supported with the left hand of the assistant, who sits to the right of the patient with his knee under the head and his foot on a stool. With his right arm extended under the neck of the patient, he introduces his index finger, protected with a large iron thimble, between the jaws and opens them sufficiently to admit the speculum. The larynx, trachea, and mouth should be brought into as direct a line as possible. The operator kneels upon a low stool at the head of the patient and introduces the speculum between the tongue and hard palate and presses upward and forward until the epiglottis is seen, when he engages this upon the tip of the speculum, elevating the tip and depressing the handle, until the laryngeal structures come into view. Gentle manipulation is necessary to present the structures in anything like their normal appearance, as too much pressure will pull the ventricular bands together and occlude the view of the structures beneath.

In my two cases it has not been difficult, after a little experience, to see the growth plainly in the larynx. I have used the Jackson forceps with complete satisfaction in removing the warts. It is by no means as easy of accomplishment as it appears to the onlooker, and the instrument frequently interferes with the illumination of the growth. It is quite possible to mistake the tips of the arytenoids for a papilloma when the parts are covered with blood, and I deem it one of the essentials of the operation to keep the parts well sponged and as bleached as possible. Adrenalin acts fairly well as an astringent at first, but I have found a weak solution of zinc chloride, or a solution of tannic and gallic acid controls the hemorrhage for a longer period. I do not consider it wise to keep the patient anesthetized too long, and would advise frequent removals rather than prolong the anesthesia. There never has been any oedema following these operations in my cases.

After the operation the patient is kept under a tent for twenty-four hours, and the air is moistened by the steam from a croup kettle. Ordinarily I use a mixture of *Ol. Pinus pumilionis*, one drachm; menthol, 10 grains; and milk of magnesia, 2 ounces. Of this mixture, one teaspoonful to a pint of water is sufficient. This mixture gives off a steam laden with a nonirritating medication which is very acceptable to the patient.

LOCAL TREATMENT.

Nearly every conceivable astringent has been applied locally to these growths. Quite a few observers have seen beneficial results from alcohol applied in full strength. Delavan has particularly recommended this in the papilloma of adults. I have applied it consistently in two of my cases, but with no apparent improvement. *Thuja occidentalis* has been used by quite a number, most frequently in adults. Brown, of Chicago, used *Thuja* in an adult with apparently good results. (*Journal of the American Medical Association*, August 3, 1901.) Zinc chloride, silver nitrate, adrenalin, lactic acid, and many other astringents have been applied locally for the removal of these growths, with but little apparent result.

INTERNALLY.

Arsenic has had more advocates than any other internal drug, and no doubt arsenic hastens that physiological change necessary to the disappearance of the warts. I have had Cases II and III on Fowler's solution since their admission to the hospital, and they have both gained in weight; but I am skeptical as to the effect upon the larynx. I have also had these cases on potassium iodide for a limited time, but with no apparent effect. Bostock is a very strong advocate of potassium iodide and arsenic internally, alternating between the two (*Monatsschrift f. Ohrenheilkunde*, 1905, Part II.)

I believe that any internal medication which will build up the general system will aid in hastening the departure of these growths, and likewise the local application of any astringent will retard the growth of the wart by diminishing the blood supply.

As castor oil applied frequently to a skin wart will often result in its disappearance, I thought it might act as well in the larynx. To this end I have injected into the larynx daily a few drops of castor oil. Time for positive conclusions in regard to its efficiency has not yet elapsed. Castor oil is certainly not irritating and can result in nothing unfavorable.

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