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Original Articles.

LOW LATERAL PHARYNGOTOMY.

FOR APPROACH TO THE LOWER PORTION OF THE PHARYNX,
UPPER PORTION OF THE ESOPHAGUS AND POS-
TERIOR SURFACE OF THE LARYNX, WITH
AN ILLUSTRATIVE CASE.*

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The operation of low lateral pharyngotomy for the purpose of reaching the lower part of the pharynx, the upper part of the esophagus and the posterior aspect of the larynx, is not a novel procedure except in so far as may relate to the larynx itself.

AN ILLUSTRATIVE CASE.

In the instance of the case in question, the patient, about 45 years of age, had suffered for many months with a tumor located apparently at the lower part of the pharynx, so low, in fact, that it could be seen only with the aid of a laryngoscope and could be felt at its upper aspect with the index finger introduced through the mouth only with much difficulty. The distance from the upper incisor teeth to the tumor was five and a half inches. The growth appeared to fill the entire pharynx at that situation, although the finger could be swept around the upper part very easily. However, at a distance of six inches from the incisor teeth the end of the finger, when thus swept, came in contact at the right border of the pharynx with an apparent attachment of the tumor to that aspect of the pharyngeal wall. The morbid growth was smooth and soft to the touch, evidently fixed in position, and had been regarded of a fibro-cystic structure. No external appearances suggested the existence of the growth or of its nature, and only a point of tenderness at the right side just behind the thyroid cartilage could be elicited on deep pressure. The patient could breathe readily except when in the recumbent position and during sound slumber, then the presence of obstruction, characterized by obstructive stertor and difficult breathing, were prominent. The patient could swallow all kinds of food, without any other evidence of interference than that manifested by turning the head aside a bit and involuntarily extending it, movements not entirely foreign to those noticed with deglutition in fowls.

Inasmuch as local treatment had in no manner been followed by benefit and the increasing size of the growth suggested the probability of early and dire complications of the functions of respiration and deglutition,

harsher measures of practice were suggested to the patient. With this object in view I was requested by Prof. F. H. Bosworth to join with him in determining upon a final means of relief. Accordingly, it was determined that only direct removal would suffice, and low lateral pharyngotomy at the right, for obvious reasons, was selected as the best means of approach to the growth. It was deemed wise to direct the lower portion of the incision so as to correspond to the site of the supposed attachment of the morbid growth to the lateral wall of the pharynx, thus enabling one to clearly define the important characteristics of the tumor and the best means of removing it, i. e., by enucleation, the hot loop, or by ligature or division of the pedicle.

With the head and shoulders well elevated to facilitate respiration, the patient was anesthetized with chloroform by Dr. Bennett. The approach of profound anesthesia was promptly attended with such a degree of respiratory obstruction as to require the employment of a trachea tube, which, in this instance, was introduced into the larynx in order to limit as much as possible the capacity of the space above the tube, thus minimizing the amount of blood that might enter the larynx in spite of packing should much bleeding attend the removal of the growth. As might be expected, the introduction of the trachea tube rendered quiescent the operation field and permitted placing the patient in all respects to suit the requirements of the occasion. I was assisted in the operation by my colleague, Dr. George D. Stewart.

DETAILS OF THE OPERATION.

After the introduction of the trachea tube the head was turned strongly to the opposite side and an incision made from a point about an inch below the body of the jaw, in a line corresponding to the posterior border of the thyroid cartilage, through the integument superficial fasciæ and platysma, to a point a little below the cricoid cartilage. The borders of the incision were drawn apart and held by means of traction loops, and the left greater cornu of the hyoid bone was firmly pressed to the right, thus bringing into prominence the right greater cornu, which was then seized with a tenaculum and drawn firmly upward and held, thereby increasing the open space below it and immobilizing the cornu, thus placing on the stretch and making prominent the part of the inferior constrictor at the floor of the incision, the thyro-hyoid muscle at the outer border and also the portion of the thyro-hyoid membrane immediately below the greater cornu, as well as the contiguous borders of adjacent muscles. It seems proper to note at this time that the external and internal branches of the superior laryngeal nerve are the only nerve structures of special significance that are reasonably exposed

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Surgery and Anatomy, and approved for publication by the Executive Committee: Drs. H. O. Walker, A. J. Ochsner and DeForest Willard.

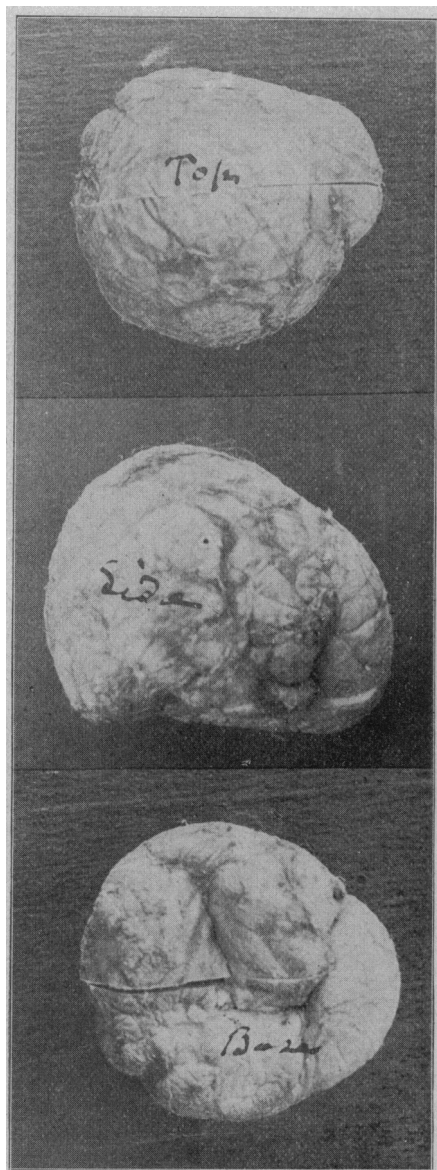
to danger from proper operative advance through this incision. The external branch is intimately associated with the part of the inferior constrictor muscle most concerned in the operation, lying upon, sometimes piercing, its lower part, perhaps passing quite transversely across, then again nearly vertically downward upon it. However, inasmuch as this nerve can be easily seen in the great majority of instances, it can be readily avoided. The internal branch passes beneath the thyro-hyoid muscle with the superior laryngeal artery, between the

greater cornu, avoiding the internal branch of the laryngeal nerve and the attendant artery, into the pharynx.

Through this opening the index finger was carefully introduced and the tumor lying in front was closely examined. It extended from side to side, encroaching more pronouncedly upon the right, was quite immovable and appeared to be located immediately posteriorly to the larynx and firmly attached to it. It was at once evident that it could not be entirely removed by cold or hot snaring, and therefore removal by enucleation was next considered. The incision into the pharynx was extended downward to opposite the point of supposed attachment of the growth to the wall of the pharynx, already mentioned, thus exposing the right side of the tumor with the mucous membrane reflected above it. Through this opening the index finger was introduced between the tumor and the reflected membrane, and with patient though somewhat rigorous caution the tumor was completely enucleated, leaving intact the entire membranous envelope, a fact quickly proven by introducing into the sac fluid from which none escaped, except at the point of its entrance. The enucleation showed that the growth apparently began at the right side of the posterior surface of the cricoid cartilage and increasing gradually in size had remained covered with the expanding overlying mucous membrane of its inception, becoming attached as it increased to the posterior surfaces of the arytenoid cartilages and the intervening structures. The right half of the growth was so firmly held in position by the right ala of the thyroid cartilage that it was necessary to divide with scissors the ala at a point just internal to the junction of its cornu before the growth could be raised from its bed.

Only trifling hemorrhage ensued during the operation. The opening into the pharynx was closed with two rows of fine interrupted chromicized catgut sutures, substantially similar to the manner of intestinal sewing. The superimposed structures were closed successively by buried catgut and superficial silkworm-gut sutures. A textile fabric drainage agent was introduced into the sac left after removal of the tumor, and the remaining portion of the external wound was lightly packed with gauze. The borders of the divided cartilage were closely united with a chromicized catgut suture. The direct pharyngeal portion of the wound healed promptly. The sac was treated by drainage and gentle washing with a small syringe. At the end of the third day a limited portion of the fluid injected into the sac entered the pharynx through a small opening at the lower part, caused, no doubt, by sloughing, since the foul odor of the breath suggested this process. Had the opening been at the upper part of the sac, it is believed that alimentary substances would have entered the sac, and from there passed through the external wound. On the fifth day fluid injected into the sac likewise entered the larynx, causing evidences of strangling. No doubt limited sloughing of the anterior wall of the sac happened about this time. However, care in washing prevented unpleasant results from this cause. The sac rapidly became obliterated and the external wound substantially closed at the end of nineteen days, when the patient returned to his home.

During the first three days after the operation the patient was nourished by the bowel, only water in small amounts being administered by the mouth; after this time fluid alimentation was given by the mouth till the end of the week, when a mixed diet was freely taken.



Growth removed from posterior aspect of larynx by low subhyoid lateral pharyngotomy, April 25, 1902; patient discharged May 14, 1902. Weight, 425 gr.; diameters, $1\frac{1}{4} \times 1\frac{1}{4} \times 1\frac{1}{2}$ inches. Photograph taken after preparation in formalin.

greater cornu and the thyroid cartilage, and pierces the thyro-hyoid membrane, going to its distribution. Often the superior thyroid vein, and sometimes the middle, lies in the way. In this instance a careful examination of the floor of the operation field disclosed the external laryngeal nerve lying quite vertically along the inferior constrictor, with the superior thyroid vein lying transversely somewhat higher up. The former was raised, pulled aside and held, the latter tied between two ligatures and pushed aside. A half-inch incision was then made through the thyrohyoid membrane, just below the

A sharp attack of follicular tonsillitis during the first week was the only incident of an otherwise uneventful recovery.

The tumor on removal weighed 425 grains and was $1\frac{7}{8} \times 1\frac{3}{4} \times 1\frac{1}{2}$ inches in its antero-posterior, vertical and transverse diameters respectively. It appeared to have been entirely removed. Muscular fibers were found in the structure, giving rise to the surmise that it must have originated in muscular tissue, probably of the right side of the larynx, invading in a degree the muscles and perhaps the nervous supply of the right arytenoid cartilage, since following the removal for a time the right vocal cord and its arytenoid cartilage were motionless.

CASES REPORTED IN THE LITERATURE.

Examination of the literature on this subject by Dr. H. A. Haubold gives the following result: The first authentic case of low lateral pharyngotomy was done by Cocks of England in 1856, for removal of a false-tooth plate. The next one was done in 1875 by Wheeler of Dublin, for the removal of a needle from the pharynx. This operation involved only the making of a small hole in the pharynx. Justi of Germany, in 1882, made a low lateral pharyngotomy for removal of a plum pit from the pharynx, but found it necessary to supplement it by a subhyoid incision to remove the offending agent. In 1884 Wheeler removed successfully a spindle-celled sarcoma the size of a small egg from the pyriform sinus of the pharynx by means of a low lateral pharyngotomy. Wheeler's case is therefore the first in which a neoplasm has been removed from the pharynx in this way. In 1886 Wheeler also excised a diverticulum of the pharynx by an incision for low lateral pharyngotomy and the patient recovered. This makes a total of five previous cases, all of which recovered.

The author's case appears, according to the above, to be the first case of removal of tumor from the larynx by the means of low lateral pharyngotomy.

DISCUSSION.

DR. DUDLEY P. ALLEN, Cleveland—I have operated on one case in the same manner as Dr. Bryant. There was a pedunculated tumor on the left side of the pharynx, which could be distinctly brought into view by opening the mouth and depressing the tongue as far as possible. I reached it in the same way as Dr. Bryant and removed it in a very satisfactory manner and afterward closed the mucous membrane of the pharynx with a running chromicized catgut suture, using drainage for the external wound. The patient did thoroughly well for a number of days, but at the end of that time developed a pneumonia and died. This was probably to be attributed to the fact that during the administration of the anesthetic the tumor seriously impeded respiration and very likely was the indirect cause of the inhalation of material into the respiratory passages. The moment the pharynx was opened and the tumor was seized and drawn outward the embarrassment to respiration ceased, and no blood whatever escaped into the pharynx. I was very much pleased with the access which the method of operating gave to the lower portion of the pharynx and the posterior surface of the larynx.

DR. JOSEPH RANSOHOFF, Cincinnati—I would like to present an x-ray picture of a foreign body in the upper part of the esophagus. Dr. Keene had one case and this is the second, taken from a child about twenty months old. The operation was not done until two weeks after the jackstone had found lodgment. It had perforated the wall in two places. Dr. Bryant's case is very interesting. The lower part of the pharynx is more difficult to deal with than is the esophagus. I would like to ask one question: There is an operation which is not new, known as the subhyoidan pharyngotomy. I have done it on the cadaver only, but I should think it would be

admirably adapted for such a case as Dr. Bryant's. I would like to know if it could have been done in this case, as, if so, manipulation in this dangerous region would have been avoided.

DR. R. H. M. DAWBARN, New York—I have had a case somewhat similar to that of Dr. Bryant, which in several respects was very interesting, but I made an anatomic error during the operation itself. The patient had swallowed a partial set of artificial teeth while laughing. I tried to remove it through the mouth but failed and then did a low pharyngotomy. During the operation I thought I felt the plate, but on proceeding further I found I was mistaken. I had taken the free posterior edge of the thyroid cartilage for the plate, an error which it is very easy to make. Then I used a large male sound down the pharynx, and this showed the plate to be lodged high in the esophagus, whence it was removed through the pharyngeal incision. As to the after-treatment, I believe all text-books have advocated not endeavoring to sew up the wound in esophagus or pharynx, but simply to pack. In this case, however, I carried out what I thought was a good surgical principle, i. e., to put the operated part at rest. I sewed the pharynx with a double row of the finest chromicized catgut and at the end of a week I sewed up the external wound, which had been packed with gauze until then. The patient did not even swallow water for a fortnight after the operation, thus avoiding all tension on the sutures in the gullet. It is only a question of care for us to give food and drink to our patients for any length of time without using the stomach. I have artificially fed several patients for months, partly by the colon and partly by the skin. I used chiefly peptonized milk by the colon (sigmoid). Also, four times in twenty hours the patient was fed through the skin by inunction with very hot oil. I have ascertained that a larger amount of animal oil will be absorbed than of vegetable oil. It is best to precede the hot oil inunctions with bathing and vigorous rubbing with a coarse towel. Much more oil can be absorbed through a congested skin than through a pale, anemic skin. After an hour's vigorous massage with hot oil, from four to six ounces will be absorbed. On the whole, I prefer hot, melted goose grease to other oils; though melted fresh butter will do almost as well; and this is approximately true of several kinds of hot sweet oil (vegetable oils).

DR. EMMET RIXFORD, San Francisco—I had occasion to use a similar incision recently for the removal of an epithelioma of the upper portion of the esophagus. The tumor was just out of reach of the finger at the level of the cricoid cartilage and the constriction so great that the patient was in a condition of starvation. Dr. Bryant spoke of the free access the incision gave to the larynx and in my case I found it possible to dissect the tumor off the posterior wall of the larynx exposing and freeing both recurrent laryngeal nerves. In making the incision I found great assistance in a bougie passed down to the stricture. In attempting to attach the upper end of the severed esophagus a serious complication set in of hiccoughs which tugged strongly on the esophagus. In order to reproduce the portion of esophagus removed from behind the larynx I dissected up a flap of mucous membrane from the posterior wall of the pharynx and turned it down, attaching it to the upper end of the esophagus, thereby establishing a continuity of epithelium. The incision which I called a lateral esophagotomy, but which was in reality a low lateral pharyngotomy, much as described by Dr. Bryant, gave excellent access to this region. There was some difficulty experienced in preventing saliva and blood from entering the larynx, but judicious distribution of gauze tampons sufficed. Paralysis of the left vocal cord ensued, but disappeared after some three weeks. The wound healed readily, though, of course, with suppuration. The patient is now able to swallow solid food though liquids cause coughing. A bougie about the size of one's finger is passed daily to prevent cicatricial stenosis. The operation was done too recently to warrant any statement as to recurrence.

DR. E. L. SHURLY, Detroit—I have recently removed a somewhat larger tumor from a similar situation by means of

the snare. There are twenty-five cases or more on record of tumors of this sort and size which have been removed by pharyngotomy or by the mouth. The nature of the growth in my case was like that of an accessory thyroid. I had great difficulty in adjusting the snare, because the tumor had a very broad base, but finally removed it by means of an unusually large strong snare. Most of these tumors can be removed in this way, thus avoiding the difficulties and dangers of an external operation, as well as avoiding a tracheotomy and leaving a bad scar in the neck. I do not know whether it would have been possible to have operated on Dr. Bryant's case with a snare, but it should be done whenever possible. I was interested very much in the case, and the explanation of the method of operation. I wish to make a plea for the avoidance of pharyngotomy when possible.

DR. FRANK J. LUTZ, St. Louis—Besides the anatomic difficulties encountered in doing a subhyoid pharyngotomy the question of anesthesia is one of great importance. Some years ago I called attention to this and stated that the operation could readily be done under local anesthesia. The vital indications in my case were dyspnea and dysphagia. The patient was an old man who was dying for want of nutrition. The tumor was so large that I was afraid to use general anesthesia. Under local infiltration I was enabled to do the dissection without any mishap. I applied a 4 per cent. solution of cocaine on the mucous membrane covering the growth and on the pharyngeal surface and under its influence the tumor was very readily enucleated. By the use of local anesthesia you secure the intelligent co-operation of your patient, which is very important. The literature of subhyoid pharyngotomy is much greater than the author has stated.

DR. GEORGE GOODHUE, Dayton, Ohio—Some six weeks ago I was called to see a man who had performed pharyngotomy upon himself by the anterior route. He hugged the inferior maxillary so closely that he had left below the cut not only the trachea and larynx but the epiglottis. There was tremendous gaping. He had not cut any vessels, except those which had ceased to bleed, but they commenced again on manipulation and had to be ligated. The parts were sewed with catgut, layer by layer, using an interrupted suture. This case demonstrates a large field for operative procedure and leads us to wonder if after all the anterior route would not be preferable to the lateral.

DR. R. F. WEIR, New York—As to the practical treatment afterward in closing up esophageal wounds, I think Dr. Dabarn is correct in his theory about this. It is a part of the body which can not be kept still. Mucus and saliva will accumulate and must be swallowed. You may close the leakage, but it will probably leak. Hence, in addition to the closure of the pharyngeal or esophageal wound, one should pack thence outward to the skin with something like iodoform gauze in order to prevent leakage. It is sometimes of advantage to use for this a sticky gauze and for this Whitehead's solution is of service. This consists of iodoform dissolved in ether mixed up with the compound tincture of benzoin, which gives to gauze dipped into it the desired adhesiveness.

DR. BRYANT, in closing—At the outset permit me to thank you for the courteous attention exhibited in connection with the consideration of this unusual case. As to the selection of the route of entrance to the pharynx, I had thought that I stated this part of the question as clearly as possible. Whether to seek the removal through an incision made in front or at the side was not clear to me at first, but later, when finding that the growth encroached more on the right than on the left side of the pharynx, it was appreciated that I might be able to define its limits, determine its attachments, and, perhaps remove it through a lateral opening better than from any other aspect of the neck; also, it occurred to me that I might be able to remove it from beneath its mucous membrane covering without impairing the structural integrity of the latter, which could not of course be accomplished by any other line of access. Only a sufficiently large incision was made into the larynx at the upper part of the common incision to enable me to investigate with the index finger the extent of

the growth and its probable attachments, which facts were practically ascertained by this means. Extension downwards of this incision exposed to approach the tumor, which was enucleated with the finger, leaving its mucous covering intact. The opening into the pharynx was then closed with two rows of sutures in the manner already stated. The sac was rinsed out with peroxid of hydrogen, found by this means to be intact, was then dressed, and the upper portion of the wound finally closed as already described. From this time the real point of interest seems to me to be whether or not the sac would slough, in part or wholly, or contract into place, leaving only a protuberance which would slowly disappear. It did not occur to me, except in a passing manner, that injury to the carotid vessels might happen, especially since the incision was far removed from them. Only superficial vessels and nerves were involved in the first incision; the profounder ones already enumerated were avoided in the succeeding deeper ones. So far as the sewing is concerned I remember long ago performing an esophagotomy for removal of a campaign button and contrary to the advice of an older surgeon than myself, sewed up with a single row of catgut the opening through the mucous membrane and its immediate superimposed tissue the entire length, leaving unclosed though lightly packed with gauze, the larger part of the superficial wound. In this instance only partial union of the deep tissue ensued, the remainder healing slowly by granulation. However, something was gained by this step in sewing without attending danger, and therefore deep sewing should be considered a proper measure of practice. The drawing upward of the greater cornu of the hyoid bone with a tenaculum or traction loop, serves not only to increase the space beneath it for operative purposes, but also averts the movements of the parts—thereby affording increased opportunity and much comfort in making incisions here for various purposes, and especially in ligating the lingual artery.

I respectfully submit that it does not lie in the power of any man to so apply a hot or cold snare to a growth of this peculiar attachment as to enable him to remove it as promptly and effectively without subsequent annoyance as was done in this case.

THE SYMPTOMATOLOGY OF CALCULOUS RENAL AND URETERAL DISEASE.*

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PHILADELPHIA.

The symptoms in calculous nephritis and ureteritis are seldom commensurate with the gravity of the case, or the size of the calculus. Small calculi are the most dangerous as they threaten the functional life of the kidney, before giving rise to symptoms that suggest their presence. A calculus resting in the calyx or pelvis of the kidney is simply a foreign body. So long as it remains aseptic it can only produce mechanical irritation or obstruction. Such a quiescent aseptic calculus can increase to large proportions before it is suspected.

A number of large calculi that have been found produced only a dull ache in the lumbar region, a slight amount of albumin, and in some a microscopic trace of pus. In some of these cases the condition had lasted for years and had been frequently diagnosed as chronic Bright's disease. The semi-quiescent calculi produce more marked symptoms. They are often adherent to the pelvic mucosa and cause hemorrhages after violent movements. If the blood is sufficient to form clots, they may produce obstructive symptoms and colic. In freely movable calculi the symptoms and size bear a closer relationship. The larger the calculus the less severe

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Surgery and Anatomy, and approved for publication by the Executive Committee: Drs. H. O. Walker, A. J. Ochsner and DeForest Willard.