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A CASE OF LARYNGEAL STENOSIS IN THE ADULT, SUCCESSFULLY TREATED BY INTUBATION; CONTINUOUS WEARING OF TUBE FOR FOUR YEARS.*

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The patient, a female, married, aged thirty-two, presented herself to me in the early part of March, 1903, to be relieved from wearing a tracheotomy tube which had been inserted some five months previously on account of urgent laryngeal dyspnea. She gave the following history as bearing on the case, dating from the above time:

Family history—negative, habits good. Previous history — measles, mumps and scarlatina in early childhood; diphtheria when eight years old; it was rather a severe case and there is said to have been some trouble with throat at the time; exact nature not known; typhoid fever five years ago, which was complicated by erysipelas (facial); no rheumatism, no renal, cardiac or pulmonary symptoms. The patient is said to have always had more or less trouble with her throat during childhood. At eight years of age (not associated with her diphtheria, she thinks) she had a great deal of difficulty in breathing, and some applications were made to her throat which gave relief. Otherwise well till present; had one miscarriage.

Present illness.—Began about October 1st last,

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five months ago, as a result of a severe cold, when she had spasmodic attacks of dyspnea and cough with hoarseness, usually coming on at night and lasting variable periods, but usually some hours. These increased in severity until finally she went to Roosevelt Hospital, where tracheotomy was performed. On October 15th, 1902, (two weeks after onset of symptoms), two attempts were made to remove tube, but it had to be reinserted after three hours and one-half hour respectively. After five weeks she went home with the tracheotomy tube in place and has worn it constantly till the present time, March 1, 1903, from which date the following history begins.

She was very desirous of dispensing with the tracheotomy tube, as its constant irritation, causing incessant coughing and excessive secretion, had caused rapid loss of flesh and had reduced her general physical condition to a very low ebb. Examination of her pharynx at this time revealed quite a decided loss of tissue from old ulceration on the right free border of the soft palate extending up toward the uvula. This was a very important point, bearing on the cause of her laryngeal stenosis, as the ulceration was strongly suspicious of being of specific origin, but careful questioning could not elicit any direct specific history. She was placed, however, on anti-specific treatment at once, hoping it might have an effect upon the laryngeal condition, but she did not bear the iodides well and the treatment was discontinued for a while, but was resumed at various times during the subsequent progress of the case, to be discontinued for the same reason. It is difficult to say just how much the iodide of potassium aided in any improvement of her laryngeal condition.

Examination of her larynx showed it to be practically entirely closed, all the normal landmarks were obliterated; the superior portion, including the arytenoids, being incorporated in a more or less uniform bilateral swelling of a somewhat dense character, leaving a mere slit in the center, through which a fine probe could be passed so as to touch the metal

tracheotomy tube below; there was no apparent loss of tissue and practically no motion ot the parts. There was a small goitre present, but not sufficient to produce any external pressure.

On March 28th, 1903, under chloroform anesthesia, with the assistance of Dr. John Rogers, of New York, I passed a medium-sized adult hard rubber intubation tube, using considerable force, until the tracheotomy tube was reached, then the tracheotomy tube was withdrawn and the intubation tube continued below the tracheotomy opening. Before intubating, dilatation from below upward was made into the larynx with steel sounds through the tracheal opening.

The intubation tube was retained with comparative comfort for four weeks, when it was expelled and had to be replaced at the end of seven hours owing to rapidly increasing suffocation. The tube was retained this time till May, 1903, when it was coughed out, to be replaced May 24th (one week) on account of severe dyspnea.

June 21st, 1903. Tube was expelled and patient breathed well until June 24th, when it was necessary to replace it again owing to severe attack of difficult breathing. During this interval an opportunity was afforded for examination of the larynx.

There was some motion of arytenoids, especially of the left. The intercordial space was very narrow, the vocal cords, or what appeared to be vocal cords, were irregular in shape with a flabby, fleshy appearance; there was no motion whatever either in phonation or respiration; the right cord was more irregular in outline than the left, as if more pressure had been exerted on it; the color of larynx generally was very red. At the anterior commissure or just below it on the tracheal wall there was a small whitish slough which was forced up in the larynx on expiration, giving a sensation to the patient as if something were loose or flapping and causing her considerable annoyance in coughing and breathing. Various examinations showed but little change in the appearance of the larynx, except that the intercordial space seemed to become a little wider. It

was very evident that the intubation tube had exerted considerable pressure absorption.

The patient was very apprehensive and nervous about being without the tube, which I think might have been a factor in bringing on the suffocative attacks at this time.

The tracheal fistula had been kept open since the beginning, but it was now decided to close it, which was done under chloroform on July 1st, 1903, by Dr. Forbes Hawkes at the Presbyterian Hospital, the edges being excised and brought together by sutures; this is the first instance of which I know of a patient going under a general anesthetic, breathing entirely through an intubation tube; the operation was performed apparently as well as if she had been breathing through a normal larynx.

The operation resulted in a permanent closure of the tracheal wound.

The intubation tube was worn from June 24th, 1903, till May 23rd, 1905, when it was coughed out, but was replaced in a few hours, as the patient did not wish to take any chances in being without it. During this long period the patient was perfectly comfortable as far as her breathing was concerned, and did her ordinary work, and traveled considerable distances throughout the country. Occasionally during attacks of coughing the tube would become partially expelled, but she had learned the art of pushing the tube back in place with her finger and exerting pressure, until the attacks would cease. She could eat and drink with comparative comfort and her general condition became much improved, it being in marked contrast to the period in which she was wearing the tracheotomy tube. She often expressed herself that it would have been impossible for her to have lived under the severe physical strain of the tracheal cannula. She was often asked to have the intubation tube removed, but refused, stating that she was perfectly satisfied with her condition. However, on April 23rd, 1907, as the tube was becoming somewhat foul from secretion, and becoming convinced of the necessity of trying to do without it, she consented to its removal, which was

done, and up to the present time, May, 1908, there has been no occasion for its reintroduction.

The condition of the tube was as follows: Some odor, owing to adherent secretion on its superior exposed portion, some small areas of very superficial erosions on external surface, principally on the posterior surface just above the swell, indicating the points of greatest pressure. Internally the tube was coated with fine calcareous deposits evenly disseminated over its entire surface.

Immediate examination of the larynx showed a pretty fair glottic space, larger than at the time of last removal. The mucous membrane was very red in color, but no ulcerations; the motion of the larynx was good, excepting the left side which did not move as well as the right, the immobility seeming to be limited to dense tissue about the left arytenoid; both cordal areas seemed to move well, there was considerable general superficial swelling of the mucous membrane, breathing good, voice aphonic. The patient was somewhat apprehensive as to her ability to breathe without the tube; this wore away as soon as she regained her confidence,. The breathing has continued to improve and is normal in character. She has also gained decidedly in flesh and strength, and considers herself as well as ever. Her voice, though not normal, is variable as to strength and quality; at times being excellent, but becoming hoarse when taking cold, and in damp weather. Examination of larynx at the present time, May, 1908, one year and over since the final removal of the tube, shows the following:

Color, normal, with tendency to paleness.

Motion, somewhat restricted, due mostly to induration about the left crico-arytenoid region, the right side moving with much less restriction.

Right vocal cord is fairly normal in contour, color and motion.

Left vocal cord seems to have been more or less absorbed.

Right arytenoid, slightly enlarged, movable.

Left arytenoid, considerably indurated; the glottic space, though irregular in shape, is most ample in

size for breathing purposes and bids fair to remain so unless encroached upon by future inflammations.

The anterior wall of the trachea is quite red in color and shows signs of irregularity in contour at the seat of the original tracheotomy wound.

The goitre seems to have diminished in size during the year.

The dimensions of the intubation tube used were:

Length, from the highest point of the head,	3 inches.
Anterior posterior diameter of head..	¾ inch.
Transverse diameter of head.....	⅞ "
Anterior posterior diameter of lumen.	½ "
Transverse diameter of lumen.....5/16	"
Outer circumference at neck.....1⅝	"
Outer circumference at median swell 1 6/8	"
Outer circumference at lower extremity 1 5/16	"

The exact time of the intubating period from the date of the first introduction was four years and twenty-five days, and with the exception of a few days the tube remained in continuously.

The object in presenting this history, other than to record a successful outcome in a case which at first seemed to indicate the wearing of a tracheal cannula or an intubation tube for the remainder of the patient's life, is to emphasize the following points:

1. The tolerance of the larynx to long continued pressure.

2. The superiority of continuous pressure in causing absorption over the older methods of the temporary introduction of dilating instruments.

3. The comparative comfort with which an intubation tube may be indefinitely worn.

4. The improved general condition of the patient while wearing the intubation tube in contrast to the

debilitating influence and local annoyance of the tracheotomy cannula.

5. The superiority of the hard rubber over the metal tube in forming less amount of calcareous deposit, thus lessening the danger of ulceration and formation of exuberant granulation tissue.

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