ENLARGED HEMILARYNGECTOMY

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In 1954, F. C. Ormerod wrote that patients with cancer of the larynx now present themselves earlier, so that this disease is diagnosed in less advanced stages than previously. Hence there is more need for partial operations and a higher percentage of these. Besides the decidedly advantageous circumstance that the diagnosis is made earlier, another factor sometimes functions, i.e. partial operations are more frequent than they used to be. As in otosclerosis, patients often demand a certain operation which they themselves consider to be the most favourable. Similarly, in carcinoma of the larynx the patients of today know that partial operations of the larynx are possible. They demand, in a very decided manner, a partial larynx operation. Their requests do not refer to the method, which would be much more difficult for them to select than in otosclerosis, but to the question whether they will retain the normal mechanism of voice after operation or not. In some cases in which in principle the total extirpation of the larynx would be the best solution of the case we are influenced in our decision by the question which would be better: a partial operation or the complete refusal of the patient to submit to any kind of surgery. Sometimes we reach the conclusion that it is better to perform a rather more hazardous type of operation than to do nothing. Of course in these cases we must also consider the question of partial operation *or* irradiation, or partial operation *and* irradiation.

Below I shall describe a type of operation which the decided attitude of a patient suggested to me.

Instead of repeating and discussing the site and features of the morbid focus according to one of the generalized classifications such as Krishaber's (1879), StClair Thomson's (1921, 1930, 1937), Wahls' (1947), or Semon's (1886, 1907), I shall give a sketch for purposes of orientation, illustrating what kind of localization is considered. This sketch closely coincides with the site of the morbid focus which Pietrantoni and his co-workers describe as (*a*) inferior vestibular cancer, and (*b*) superior vestibular cancer.

We should bear in mind that in neoplasms in such a situation there exists a serious possibility of invasion by the morbid process through the thyroid cartilage. This problem has been considered by MacKenty (1926), Leroux-Robert (1937), Fraser (1924), Broyles (1943), Jackson (1939), and Ogura (1955), among others. We should then remember that invasion of the spatium præ-epiglotticum is very frequent, as has been pointed out by

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Leroux-Robert (1937), Caliceti (1955), Clerf (1955), and Bisi (1955). Finally we must take into consideration the danger of infiltration along the true vocal cord, which has been discussed by Snitman (1945) and Hassin (1947). Immediate infiltration beyond the borders of the larynx, and especially infiltration of the pre-laryngeal muscles, must also be taken into account.

Lastly there is the problem of the lymph nodes in these cases. It is our practice (except in chordectomy, when we do not perform a special lymph node operation) to perform an appropriate one-stage lymph node resection in cases in which more extensive surgery is indicated. In hemilaryngectomies, for many years (since 1930) we have performed homolateral lymph node resection. In cases of total laryngectomy the bilateral lymph node operation is performed. The technique of lymph node removal is in principle the same as that taught by my professor of surgery, M. Rutkowski (1939), i.e. all the connective tissue together with the lymph nodes is removed in two flaps, so that there remains an integral anatomical preparation of the muscles, vessels, and nerves of the neck. It is only when on one side the relation of the pathological changes to the jugular vein or the muscles is such that a clean anatomical preparation cannot be obtained that we perform Crile's operation on this side, while the other is prepared as already described.

The type of operation which will now be briefly discussed may be approximately described as a combination of Soerensen's hemilaryngectomy (1930) with Alonso's horizontal laryngectomy (1950, 1951). The principles of Soerensen's hemilaryngectomy may be summarized as follows: lymph node resection on the side of the morbid focus, the skeletalization of the larynx on the side of the focus, the splitting of the thyroid cartilage, the crico-thyroid ligament and the cricoid cartilage in the midline. The laryngeal fissure is now extensively enlarged by hooks, the mucosa of the posterior wall of the larynx cut, and the lamina of the cricoid cartilage incised until it cracks along the line of incision. Now passing upwards, the half of the larynx with cancerous changes is freed from its surroundings. The hyothyroid membrane is dissected out above the superior margin of the thyroid cartilage. There remain *in situ* the other half of the cricoid cartilage together with the arytenoid cartilage, half of the thyroid cartilage, and the epiglottis. Some contemporary authors (*c.* 1930), such as MacKenty (1926), Okada (1955), Ferreri (1955), or Maure (1955), did not approve of this operation; others such as Kahler gave broader indications for this procedure than Soerensen. Struyken Brockler and Quix emphasized the importance of conserving the region of the aditus laryngis on the diseased side as necessary for a good functional result. Alonso's horizontal laryngectomy, as well as its modifications by Le Roux-Robert (1950), Maspétiol (1950), and others needs no further mention, as it has frequently been the subject of discussion.

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Coming to the question of operation when the pathological changes are such as in Fig. 1, it should be stressed that in these cases the changes are situated in the region of the vocal cord, with partial or even total immobility of the cord and with invasion of the vestibular region of the larynx. An approach is made by (*a*) a "single door incision" (*Türflügellappen*), (*b*) monolateral lymph node excision, (*c*) tracheotomy, (*d*) meticulous preparation of the muscles and perichondrium externum from the thyroid cartilage, (*e*) division of the ligamentum conicum and the thyroid cartilage in the midline. Sometimes the incision through the

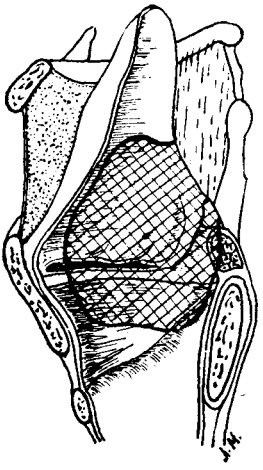


FIG. 1.

thyroid cartilage deviates more or less distinctly towards the healthy side. Further upwards the incision runs through the hyothyroid membrane as far as the hyoid bone, and finally turns towards the side affected, dividing the membrane from the hyoid bone. (Fig. 2.)

The inferior horizontal branch of the incision initially runs through the inferior part of the ligamentum conicum, and then attacks the signet of the cricoid cartilage (with Liston's scissors), so that the upper part of the signet together with the arytenoid cartilage forms part of the preparation about to be excised. (Fig. 3.)

After the laryngeal fissure has been somewhat enlarged by means of hooks, an incision in the midline of the posterior wall of the larynx is made in the manner of the Soerensen incision, but the inferior part of the cricoid cartilage is saved. Then by means of scissors the affected half of the larynx is freed together with almost all the epiglottis, which together with the affected half of the glottal region forms a one-piece preparation.

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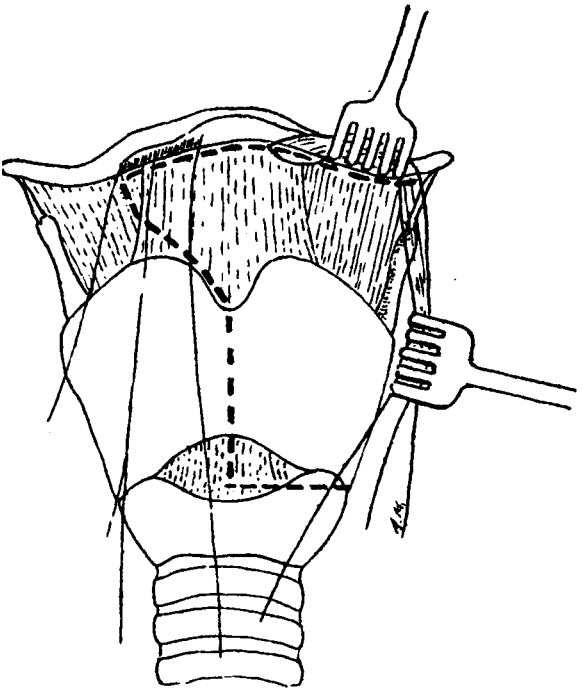


FIG. 2.

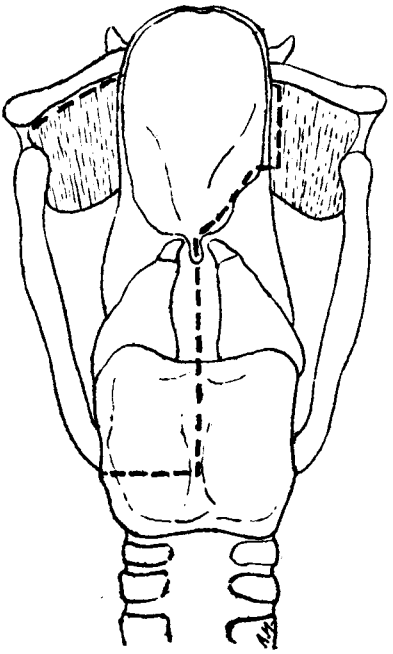


FIG. 3.

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A few sutures, according to the situation, draw closer or fix the margins of the divided parts of the mucosa.

Fig. 4 is a sketch of what remains from the larynx. (*f*) A tampon is placed over the tracheal tube and fixed to this. After some days this tampon is removed through the mouth (by means of a thread passed through the nose during operation). (*g*) After the preparation has been removed and the oozing blood meticulously arrested, the previously

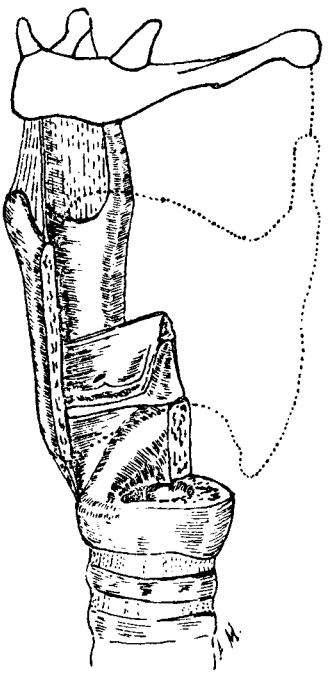


FIG. 4.

mentioned flap, composed of fascia, muscles and perichondrium, is stitched in midline to the anterior border of the remaining part of the larynx, so that what is left of the lumen of the larynx is primarily reconstructed and at the same time fenced off from the wound in the neck. The skin is then stitched back into position. A drain is inserted in the lateral inferior corner of the neck wound. (*h*) During the next 3 days the patient is fed parentally, and then a thin feeding-tube is inserted through the nose. During the post-operative period the posterior part of the dividing muscle wall adheres over the whole area of the wounded pharyngeal wall at the site of the extirpated half of the larynx. The anterior part of this muscle wall forms the lateral mid-wall of the hemilarynx.

When performing this operation for the first time, we took into

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account that even if our hopes of the great adaptive powers of the innervated muscles were fulfilled, we might have to remove the remaining part of the larynx after some time; there was no other solution since, as Negus



FIG. 5.

Illustrating one of the cases (W.W., case no. 1811/62, age 53) shown in Fig. 1.



FIG. 6.

The patient S.A., case no 1703/19, age 50. Photograph showing the patient ten days after operation during respiration.

has pointed out, the partially resected larynx is the cause of frequent choking.

Meanwhile, the first patient operated on in this manner has given us a

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pleasant surprise. The healing and adaptation of the remaining part of the larynx were very quick and satisfactory. The feeding tube was removed after 6 days, and the tracheotomy tube after 9 days.

In our second case, the situation of the morbid process forced us to encroach on the healthy side in the region of the commissure of the vocal cords, and the incision through the thyroid cartilage was shifted to the same side. In this case, also, the post-operative healing was very quick, but the period of easy choking was longer. The lumen of the larynx and the work of the remaining vocal cord enables the patient to speak in a natural manner and with a fairly good voice. The lumen of the larynx is at present



FIG. 7.
The same, during phonation.

not large enough to allow him to breathe easily, and therefore he is wearing a small tracheal cannula as an aid to respiration.

We have recently operated on a third patient, with the same results as in the second. All three patients were subsequently subjected to irradiation. In the second case we hope to remove the small cannula within the next few weeks.

In this report we cannot speak of any permanent cure, because all three patients were operated on within the last year. All we can speak of now is the great power of functional adaptation of the remnants of the larynx together with the muscles which were used for the reconstruction of this organ.

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Enlarged Hemilaryngectomy

Summary

A method of hemilaryngectomy with the epiglottis is described. The operation is preceded by lymph-node dissection on the affected side. The medial wall of the hemilarynx is reconstructed by means of the external laryngeal muscles from the opposite side. Some weeks after operation the patient is subjected to irradiation. Within the last year, three cases were operated on by this method. One of them has been decannulated, the other two are wearing a small tracheal cannula. All three patients have a natural mechanism of voice production. The period of easy choking lasted from 3 to 6 weeks. Four sketches and three photographs accompany the article.

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