Section of Surgery

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DISCUSSION ON SURGICAL TREATMENT OF CARCINOMA OF THE PHARYNX

Sir Stanford Cade: This contribution deals solely with epithelial new growths, namely, squamous-cell carcinoma. Only lesions of the laryngopharynx will be discussed; lesions of the oropharynx and of the nasopharynx are excluded as they present quite separate problems. It is convenient to subdivide the laryngopharynx into two main parts, the epipharynx above and the hypopharynx below, the line of division being at the level of the upper border of the cricoid cartilage. As the natural history of malignant tumours of the pharynx varies with their site of origin, it is customary further to subdivide this anatomical site in four groups: (1) Tumours of the aryepiglottic fold extending to the epiglottis and arytenoid cartilages. (2) Tumours of the lateral wall of the laryngopharynx. (3) Tumours of the sinus pyriformis. (4) Tumours of the hypopharynx either on the anterior wall—post-cricoid—or posteriorly at a somewhat lower level. This subdivision is of importance, as it affects the course of the disease. The symptomatology of the lesions also differs: thus, pyriform fossa lesions are notoriously silent for a long period, the post-cricoid lesions give rise to dysphagia early, and the aryepiglottidean tumours give rise to abnormalities in the sensation of the throat. Further, the incidence of lymph-node involvement and its time of occurrence differ with the primary site (Table I).

TABLE I.—LYMPH-NODE INVOLVEMENT—PERCENTAGE

	+	−
Epilaryngeal	50	50
Lateral pharyngeal	63	37
Pyriform fossa	73	27
Post-cricoid	50	50

The sex incidence shows a marked preponderance in men, except in post-cricoid carcinoma, which is peculiarly a disease of women.

Diagnosis.—Early diagnosis is essential. Diagnosis should be not only of the nature of the disease, but of its exact site and, above all, its extent. It is here that diagnostic radiography is sometimes more helpful than endoscopy. A lateral view of the neck with air inflation is of greater value than the use of opaque media. Tomography also helps to delineate the extent of the disease. It goes without saying that a general examination of the patient, radiography of the chest, and blood examination should be done in all cases. Histological examination of the tumour is, of course, imperative. Biopsy is only dangerous if the piece of tissue removed does not give the pathologist a representative part of the tumour; whenever I am told: "biopsy was negative" I cannot help wishing that the patient had at that stage changed her surgeon and so perhaps ensured an earlier diagnosis. Biopsy is important not only to establish a diagnosis of cancer, but to determine its degree of malignancy, differentiation, and radiosensitivity.

We must consider such problems as the degree of operability, the likelihood of achieving prolonged control of the disease, the disabilities following operations and those after radiotherapy. The material on which I, personally, base my opinions, the sum total of my experience, covers a period of twenty-two years.

My close association with radiotherapy has brought much clinical material, and I can look back on a series of just over 400 cases of carcinoma of the pharynx which I saw and treated with my colleagues.

During those twenty-two years (Table II) conventional X-ray therapy, as far as the pharynx is concerned, has been proved to be only of limited use. Radium therapy at my own hospital has proved

TABLE II.—CARCINOMA OF PHARYNX 1930–1952

	Total	M	F
Epilaryngeal	77	70	7
Lateral pharyngeal	47	42	5
Pyriform fossa	167	155	12
Post-cricoid	112	30	82
Total	403	297	106

more effective, and has a place in the management of the case. As a palliative, it is of great value. Yet the pharynx is not an anatomical site where radiation can with confidence be advised as the most reliable treatment, if surgery can well deal with the lesion. It is exactly forty years since Wilfrid Trotter described his lateral transthyroid pharyngotomy. In 1937—that is twenty-four years after Trotter first described it—Pilcher analysed 100 cases (including many of Trotter's own cases) treated by this method at University College Hospital; he found 7 alive out of the 100, as the result of surgical treatment alone, the longest survival being ten years, the shortest eighteen months at the time of writing.

Here are two quotations from Trotter which illustrate why he went no further than a lateral transthyroid pharyngotomy: one shows the material limitations of his times, and the second shows an attitude of mind—both of interest:

"For the surgeon, the pharynx combines three of the most formidable obstacles to the exercise of his art; it is inaccessible in a high degree, it is a seat of delicate and concentrated function, and it contains septic material to which the surrounding tissues are in no way immune."

It will be conceded that to-day sepsis can be controlled to a degree unknown to Trotter's generation; that most of us consider the pharynx as easy of access and that its function, swallowing, can be provided for by surgical reconstruction.

The second quotation illustrates his thoughts:

"I should not feel able to record as a true success the cure of a pharyngeal carcinoma won at the expense of laryngectomy."

Speaking for myself I do not consider a laryngectomy too high a price for the patient to pay for a chance of escaping death from cancer of the pharynx. Surgery is of a limited usefulness in the treatment of cancer as a whole—it is estimated that, all told, about 10 to 15% of the cancer population can be treated effectively by surgery. It is accepted that the earlier the case, the smaller the lesion, the more accessible the site, the better the results of surgery. In the case of the pharynx, it is inevitable to have to discard as unsuitable for surgical excision the majority of cases for one reason or another—be it lymph-node involvement, extent of the lesion, age of patient, unsuitability on general grounds—only a few can be confidently submitted to surgery. But as in other sites, so in the pharynx, the excision must be wide. Minor surgery is unlikely to control cancer of the pharynx; conservative resections here, as elsewhere, seldom conserve the patient and often conserve the disease. If a diagnosis of cancer of the pharynx is established, if it is considered operable and suitable for operation, a laryngo-pharyngectomy is the operation of choice. The tissue removed extends from the base of the tongue, includes the epiglottis, the hyoid bone, the thyroid and cricoid cartilages, three rings of the trachea and the entire laryngopharynx. It leaves the patient with a permanent tracheotomy and a gap extensive and difficult to fill up. Many attempts at the closure of this gap and at the restoration of normal swallowing have been made. I will deal with the principles of repair only. Mr. Reidy will deal with the reconstructive surgery. There are, in fact, three methods available. (1) Partial closure with the original skin flap, leaving a pharyngostome. (2) Delayed closure by tube pedicles from the acromio-pectoral or cervico-pectoral areas; and (3) immediate reconstruction by means of a skin graft applied to a plastic tube. No. 3 is the ideal to aim at. Pharyngostomes and the inevitable leakage of saliva and difficulties with feeding should be avoided if possible. Delayed closure by tube pedicles often takes eight to twelve months, and demands many operations—sometimes half a dozen—and cancer patients do not tolerate this as well as the young and non-cancerous patients. The skin graft on plastic tube, when successful, permits normal swallowing within a few weeks. The incidence of stricture is, however, common and repeated dilatations, or even gastrostomy, become inevitable. The skin-grafted plastic tube is a great advance—yet it leaves much to be desired, and there is room for further attempts either by direct flap graft or by using frozen material such as the aorta or, preferably, the trachea.

Though most of my patients eventually died of their disease, there is yet enough encouragement in the occasional success and long survival to warrant the continuance of the effort.

Mr. Ronald W. Raven: The importance of cancer of the pharynx is evinced by the severe degree of suffering it causes the patient before it finally takes his life. For years cancer of the pharynx has presented us with a great challenge. We can never forget the endeavours of others in this difficult field—Wilfred Trotter, who did so much pioneer work, Lionel Colledge, and Harold Wookey.

The treatment of the various types of growth which occur in the nasopharynx still largely remains a radiotherapeutic problem. Radical surgery is valuable in carcinoma of the oropharynx; for example, I have one patient who had an advanced lesion in this situation which was considered unsuitable for radiotherapy, who is well and at work nearly four years after operation. In this paper I shall deal with the hypopharynx and recount some of my personal experiences with a series of 24 patients suffering from proved squamous-cell carcinoma treated by surgery. I use the term hypopharynx in its widest sense to include the part of the pharynx which extends from the glosso-epiglottic region to the pharyngo-œsophageal junction.

Clinical Condition of the Patients

The majority were suffering from extensive disease, and 50% had metastases in the regional lymph nodes. Some had been pronounced untreatable and were in great distress caused by stridor or dysphagia whilst awaiting their end; one had had a palliative gastrostomy and another a palliative tracheotomy. Others had received radiotherapy, but the disease was steadily advancing and there was nothing else to offer them but radical surgical treatment. It is against this bleak background that the results obtained by surgery should be judged. The sex and age incidence are shown in Table I.

Table I.—Sex and Age Incidence

Males	Females	Years							
11	13	37–39	40–45	46–50	51–55	56–60	61–65	66–70	71–75
Number of patients		2	0	2	1	6	7	5	1

Aspects of the Pathology

The requirements of the operation are based upon a knowledge of the behaviour and extent of the disease.

Origin.—As Trotter described it, the disease usually commences in the following areas: the epiglottis, glosso-epiglottic fold, aryepiglottic fold, pyriform fossa, posterior wall, and the post-cricoid region. The last situation is usually affected in females in this country, whilst males usually develop the disease in the higher parts of the hypopharynx. In some patients carcinoma is of multicentric origin. I cannot state the exact site of origin in many of my patients as the disease was so extensive; anterior penetration of the larynx was common, in others the thyroid gland was involved, and the growth extended from the cervical œsophagus to the junction of the oro- and hypo-pharynx.

Spread.—The growth has a high degree of malignancy; metastases occur in the regional lymph nodes early, and the disease spreads as shown in Table II.

Table II.—Spread of the Disease

Direct extension	Vertically in the wall to oropharynx and cervical œsophagus Anteriorly into larynx and trachea Laterally into thyroid gland and internal jugular vein Posteriorly into prevertebral muscles and cervical vertebræ
Lymphatic metastases ..	Deep cervical and recurrent laryngeal groups Prelaryngeal and pretracheal nodes may be affected
Hæmatogenous metastases ..	Lungs, liver

The lymphatics from the hypopharynx mainly drain through the supraglottic pedicle primarily into the deep cervical lymph nodes around the internal jugular vein extending from deep to the posterior belly of the digastric to the omohyoid. These nodes communicate with others in the neck including those under the anterior border of the trapezius. Initially metastases form in this group of nodes. When the larynx or cervical œsophagus is infiltrated metastases may also occur in the prelaryngeal, pretracheal and recurrent laryngeal groups of lymph nodes. A carcinoma localized in one half of the hypopharynx may affect the lymph nodes in the opposite side of the neck and bilateral nodes may be involved from the more extensive primary growths. The eradication of the diseased lymph nodes is a vital part of the surgical treatment.

Operability.—Certain facts can be elucidated to guide us, assuming that there are no general contra-indications present. A careful assessment of the general and local conditions is made. A history of many months usually means advanced disease, but sometimes this is found in patients with a short history. Signs of inoperability include fixity of the hypopharynx, diffuse lateral infiltration in the neck, and enlarged, fixed cervical lymph nodes. Pharyngoscopy shows the situation and upward extent of the growth and biopsy will reveal its nature; if the upper border reaches the base of the tongue operation may still be possible. Laryngoscopy shows marked œdema and any anterior extension into the larynx, but this does not exclude operation. Radiological examination with plain X-rays, a barium swallow and tomograms gives additional information regarding the local extent of the disease; if posterior infiltration through the pharyngeal wall into the prevertebral tissues is discovered operation is contra-indicated. In the lower group of neoplasms the extent to which the œsophagus is involved must be known to decide if it can be divided at a safe level below the growth. This is usually determined on exploring the neck, when the final assessment of the extent of the disease is made and a decision is reached about performing a radical operation. In my series of patients, one proved inoperable on exploration of the neck owing to invasion of the prevertebral tissues by the carcinoma; a palliative tracheotomy and gastrostomy were instituted to relieve the severe dyspnœa and dysphagia which were present.

Patients with dyspnœa should not undergo preliminary direct pharyngoscopy and laryngoscopy as spraying the pharynx and larynx with a solution of cocaine may cause a severe exacerbation requiring urgent tracheotomy which should be avoided if at all possible. In these patients I defer this examination until the patient is in the operating theatre for the major operation when a biopsy is

also done and a histological examination is made with the frozen section technique. In these patients I have also deferred the removal of septic teeth until after the major operation was performed. When there is respiratory difficulty I institute a tracheotomy under local anæsthesia as the initial step in the radical operation which is then continued under endotracheal anæsthesia. If severe dysphagia has caused dehydration and wasting a temporary gastrostomy is necessary to build up the general condition for three weeks before the major operation is done.

The Radical Two-stage Operation

Excisional Stage

Anæsthetic.—Intravenous Pentothal Sodium is usually given for the induction when severe dyspnœa is absent and an endotracheal tube with an inflatable cuff is gently passed into the trachea so that the growth is not injured. Endotracheal nitrous oxide and oxygen are then administered and the cuff of the tube is inflated with air; care is taken that it is not inserted so far in the trachea as to obstruct a bronchus. A large growth with marked œdema may prevent this and the first steps are carried out under Pentothal or local anæsthesia and the trachea is divided as soon as possible for the administration of a general anæsthetic.

Monoblock dissection.—A quadrilateral flap of skin is raised from the neck based on the sterno-mastoid which is not being removed, and this part of the operation includes the removal of the hypo-pharynx, larynx, and the thyroid gland when it is infiltrated. Bilateral excision of the cervical lymph nodes is essential when they are found enlarged. The whole procedure constitutes a monoblock operation.

The regional lymph nodes.—These are examined and dealt with first. Affected lymph nodes may be found at operation which are not palpable clinically. When the primary growth is in the lateral wall of the hypopharynx, the lymph nodes may be involved only on that side of the neck, but the other side must be explored also. If the growth occupies both sides of the hypopharynx bilateral metastases are likely, and I have found the nodes are usually bigger and more numerous on one side, and this necessitates a complete block dissection. On the other side of the neck when the nodes are smaller and mobile they are removed completely but I leave this internal jugular vein and sternomastoid muscle.

The hypopharynx.—The upper and lower limits of the resection depend on the site and extent of the growth; the incisions should usually be 2·5 cm. away from its edge. Thus with the higher neoplasms the hyoid bone is removed and the lower section passes through the pharyngo-œsophageal junction. When the neoplasm is situated lower in the hypopharynx the hyoid bone remains and the cervical œsophagus is divided at the thoracic inlet. When it is doubtful if the incision has cleared the growth immediate histological examination with the frozen section technique of the divided pharynx and œsophagus is valuable. The trachea is usually divided between the second and third rings for the higher neoplasms, and between the third and fourth for the lower ones. When total thyroidectomy is necessary the parathyroids may be included; one of my patients developed mild tetany which was easily controlled by the usual treatment.

Reconstructional Stage

The quadrilateral skin flap is used for the new hypopharynx and is anastomosed to the divided oro- or hypo-pharynx above and the cervical œsophagus below; its lateral opening is closed later. The raw areas in the neck are covered with split-thickness skin grafts from the thigh. A polythene tube is inserted through the œsophageal opening into the stomach for feeding purposes. An interval of five to six weeks is usually allowed for healing and to enable the new skin tube to acquire a new blood supply from the prevertebral region before the final stage is carried out.

At the second operation the lateral cervical fistula is closed and the new skin hypopharynx is covered by full-thickness skin using rotation or hinged flaps from the neck or acromio-pectoral tubed pedicle grafts. A Ryle's tube is passed through the nose into the stomach for feeding purposes and a period of two to three weeks is usually allowed for healing before the patient is allowed to swallow.

I have carried out a laryngo-œsophago-pharyngectomy or laryngopharyngectomy in two stages for the majority of the patients in this series. They are radical operations and I have found the full-thickness skin tube with skin cover very satisfactory (Figs. 1 and 2; 3 and 4).

Post-operative Fistula

Sometimes an area of skin necrosis occurs after the operation with the formation of a fistula. This is usually in the suprahyoid region or posteriorly to the tracheostomy into the new pharynx. For instance the high variety occurred in 1 patient where the resection was made above the hyoid bone. I closed it by reflecting downwards a quadrilateral flap of the mucous membrane over the posterior aspect of the tongue and sutured its lower border to the freshened edge of the inner skin lining of the new hypopharynx. This was covered with full-thickness skin from an acromio-pectoral tubed pedicle graft. When the lower fistula is small it gradually contracts and closes spontaneously; larger ones may require a plastic operation to cure them or alternatively a Portex tube is inserted in the hypo-pharynx and into the œsophagus beyond the fistula and time is allowed for it to heal; in the meantime the patient can swallow.

FIG. 1. — Patient aged 67 after laryngo-œsophago-pharyngectomy for an extensive carcinoma of the hypopharynx which had necessitated a gastrostomy. She is well forty-five months later and swallows everything.

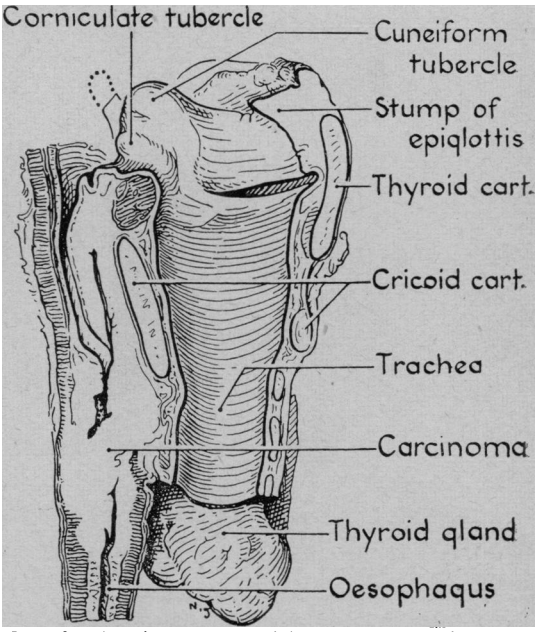

FIG. 2.—Specimen removed from the patient in Fig. 1. The carcinoma extends from the cervical œsophagus to the arytenoids.

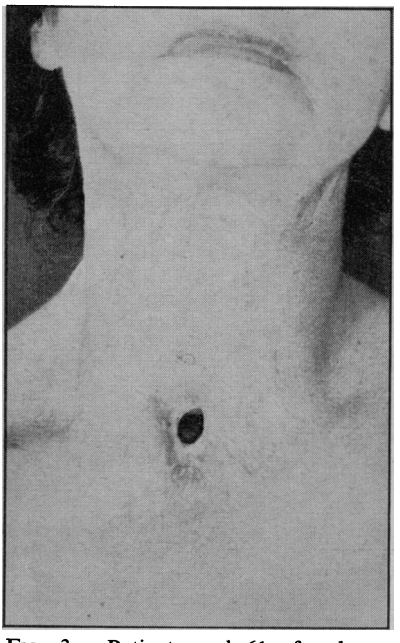

FIG. 3. — Patient aged 61 after laryngo-œsophago-pharyngectomy for a carcinoma of the hypopharynx. She is well twenty-three months later and swallows everything.

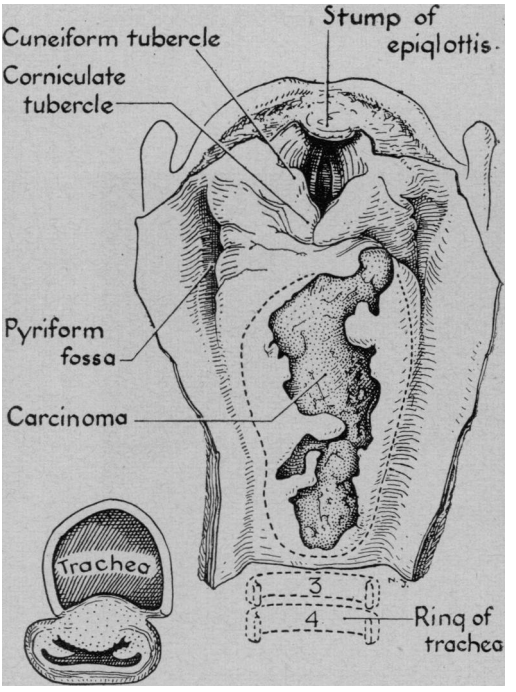

FIG. 4.—Specimen removed from the patient in Fig. 3. The carcinoma extends from the cervical œsophagus to just below the arytenoids, the marked œdema of the latter is evident. The inset shows the growth invading the œsophago-tracheal septum and bulging into the trachea.

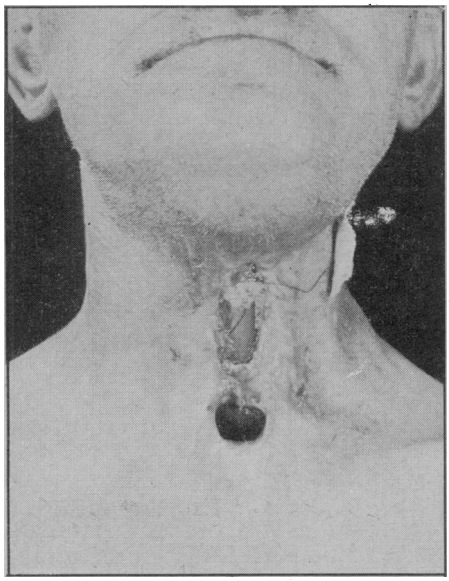

FIG. 5.—Patient aged 64 who had an extensive carcinoma of the hypopharynx with a metastasis in a cervical lymph node treated with high voltage X-radiation. The disease was extending and a laryngopharyngectomy was performed with the formation of a median pharyngeal fistula. A Portex tube has been inserted and the irradiation changes in the skin are shown.

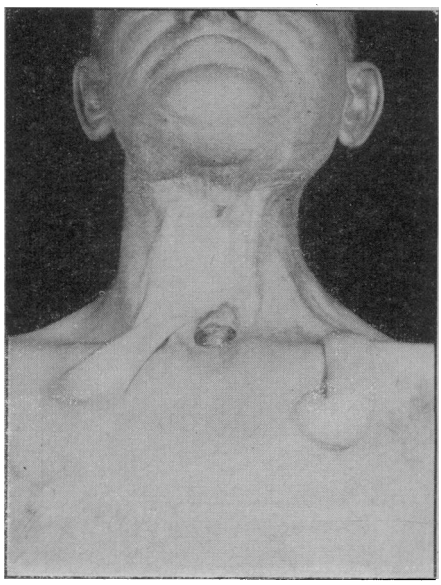

FIG. 6.—Same patient as in Fig. 5 showing acromio-pectoral tubed pedicle skin grafts brought up to the neck in stages; the left one is kept in reserve. The fistula has been closed by an inner hinged full-thickness skin graft from the neck and covered by the right acromio-pectoral graft.

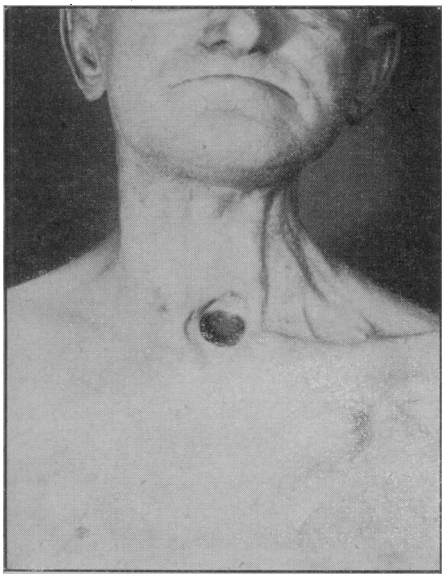

FIG. 7.—Same patient as in Fig. 6 showing the final result. The patient is well twenty-six months later and swallows everything.

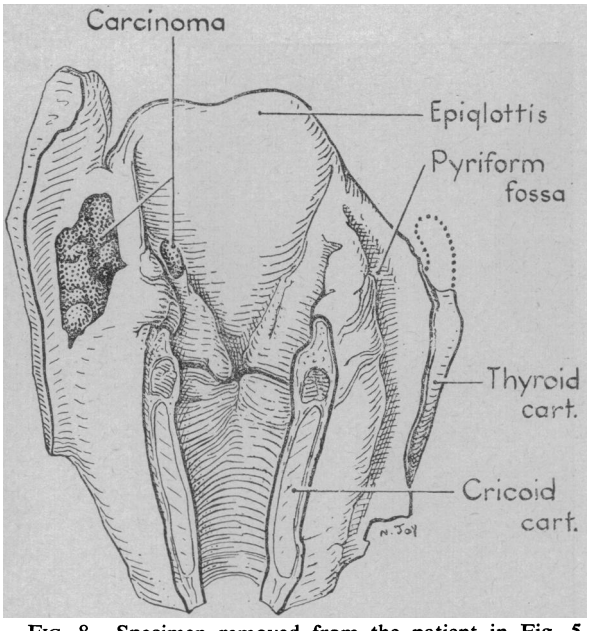

FIG. 8.—Specimen removed from the patient in Fig. 5 showing an irregular carcinoma in the left pyriform fossa 3·8 × 1·3 cm. which reaches the left aryepiglottic fold medially and a nodule of growth projects on the posterior surface of the epiglottis at the level of the centre of the ulcer. At the posterior margin of this nodule is a small perforation communicating with the ulcer in the pyriform fossa.

One-stage Operations with Primary Closure of the Pharynx

These procedures are sometimes possible but are less radical and should only be done for an early growth especially in the lateral wall of the pharynx. For instance, in one patient I excised the hypopharynx and larynx and performed an end-to-end anastomosis between the upper segment of the divided hypopharynx and the pharyngo-œsophageal junction and he swallowed perfectly five weeks later. This operation was possible because the patient had a severe fixed cervical kyphosis and the divided ends could be brought into apposition without tension. For another patient with an early carcinoma in the left pyriform fossa I performed a partial pharyngectomy with conservation of the larynx and reconstructed the pharynx. Bilateral excision of the cervical lymph nodes is always necessary when they are enlarged.

Staged Radical Operations After Unsuccessful Radiotherapy

When a radical operation is necessary after radiotherapy, for an uncontrolled or recurrent carcinoma, a number of difficult technical problems are present due to degenerative changes in the skin of the neck. I have used two techniques when dealing with these patients with satisfactory results.

(1) *Conservation of a strip of the posterior pharyngeal wall.*—This is possible when the carcinoma is situated away from the posterior wall and then its lateral borders are sutured to the skin of the neck thereby creating a median pharyngeal fistula. A Portex tube is inserted in the hypopharynx and beyond the fistula into the œsophagus so that the patient can swallow. An interval is allowed for the skin of the neck to improve sufficiently so that a plastic operation can be done to close it; several months may be required and during this time bilateral acromio-pectoral tubed pedicle grafts are prepared. To close the fistula it is sometimes possible to reflect a quadrilateral skin flap, hinged on one edge of the fistula, turn it over and suture it to the opposite edge to provide an inner skin lining. This is covered by the full-thickness skin of one acromio-pectoral graft (Figs. 5, 6, 7 and 8). Alternatively, both acromio-pectoral grafts are used for the inner skin lining and outer skin cover.

(2) *Use of a narrow quadrilateral skin flap.*—When the position and extent of the carcinoma necessitate removal of the whole hypopharynx the quadrilateral skin flap is cut sufficiently narrow so that it will probably retain its blood supply and survive. At the same time it must be wide enough to cover the prevertebral tissues and form a posterior wall for the skin pharynx. Its upper border is sutured to the posterior wall of the divided hypopharynx, the lower border to the posterior wall of the divided œsophagus and the free edge to the skin of the opposite side of the neck. The anterior wall of the divided hypopharynx is sutured to the skin of the submaxillary region and the patient is left temporarily with a posterior skin gutter. Acromio-pectoral tubed pedicle grafts are then prepared for the construction in stages of the anterior wall of the skin pharynx and to provide it with full-thickness skin cover.

When the vitality of the skin of the neck is greatly impaired, acromio-pectoral tubed pedicle grafts must be prepared beforehand and be ready for use when the excision of the hypopharynx is performed so that a posterior wall for the skin pharynx can be provided and the prevertebral tissues covered.

End-results with Surgical Treatment

The periods of survival after these operations in 23 patients are set out in Table III. One additional patient was found to be inoperable on exploration of the neck and a palliative tracheotomy and gastrostomy were instituted. There was no operation mortality.

Table III.—End-results with All Types of Operation

	Period in months after operation									
10 patients alive..	3	5	6	7	9	23	23	26	26	45
10 patients died of cancer ..	4	4	8	12	12	12	20	23	23	33
3 patients died of other cause ..	2	11	30							

The results of surgery should not be judged only by survival periods, each patient is an individual problem to solve with serious symptoms requiring immediate relief. In many patients the disease in the hypopharynx is extensive with infiltration of the larynx and possibly the thyroid gland, and metastases in the regional lymph nodes are often present rendering the condition unsuitable for irradiation treatment. In addition a number have severe dyspnœa or stridor requiring a tracheotomy. No treatment other than surgery was possible for the majority of my patients; they were relieved completely of their distressing symptoms and given the possibility of more permanent benefit. After operation the patients are happy, grateful, live useful lives, dress normally, and some return to work. They swallow everything easily and no patient in my series has developed a fibrous stricture at the junction of skin pharynx with the œsophagus or elsewhere. Their ability to speak is variable but this is not so good as after laryngectomy. The longest survival period at present is forty-five months; this patient was aged 67 with an extensive carcinoma causing severe dysphagia for which a palliative gastrostomy was performed elsewhere and she remains well and swallows everything perfectly—the gastrostomy was allowed to close. As a result of my experience I can recommend these operations knowing they have considerable palliative value and it is hoped that time will prove that some patients may be permanently cured.

ACKNOWLEDGMENTS

I thank Dr. L. A. Morris and Dr. A. Chester for helpful co-operation in the anæsthesia of the patients; my registrars, house-surgeons and the nursing staff for their help; and Portland Plastics, Ltd., who supplied me with Portex tubes.

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Mr. J. P. Reidy: In this discussion I am concerned only with the process of repair, and by this I mean the reconstruction of the cervical œsophagus to allow of normal swallowing and the passage of food from mouth to stomach.

The reconstruction of an œsophagus involves at least two layers of tissue—a lining and a cover. At present, skin is used to provide lining and cover, and, of the two, the more difficult task is the provision of a lining which will not contract or produce a stricture.

In brief: (1) The lining may be made of flap skin which has its own blood supply and does not contract, and once completed with proper cover such an œsophagus gives no trouble. The reconstruction, however, requires several stages in the preparation and transfer of the skin flaps.

(2) The lining may be made of a sheet of Thiersch graft inserted on a tube and covered with flap skin. This allows of primary excision and reconstruction in one operation. The use of a Thiersch graft carries with it the risk of contraction along its whole length, or constriction at its junction with the upper end of thoracic œsophagus.

In these cases of pharyngolaryngectomy, the provision of a cervical œsophagus is an essential, otherwise the patient is left with a large pharyngostomy above, and two openings in the lower neck, the œsophagus and the tracheostomy. Saliva dribbles from above and causes excoriation of the neck skin. Furthermore, saliva flowing into the trachea at best afflicts the patient with continuous attacks of explosive coughing, and at worst with bronchopneumonia and death. The use of dressings on the neck to mop up the salivary flow is not only difficult but ineffective. Having regard to this uncomfortable post-operative state, to the age of the patient and to the prognosis, the surgeon must make the choice between, on the one hand, a rapid reconstruction in one stage by a Thiersch graft on a tube with its possible shortcomings, and on the other, a reconstruction with flap skin for lining, requiring more than one operation, but producing a relatively trouble-free result.

The operation of pharyngolaryngectomy is a formidable procedure, but there appears to be no satisfactory alternative to this mutilating surgery. A low operative mortality is essential together with rapid steps in reconstruction to make the whole procedure worth while.

In 1913, Wilfred Trotter described pharyngotomies with excisions, and with reconstruction using local skin flaps. His endeavour was always to preserve the larynx and pharynx (Fig. 1A).

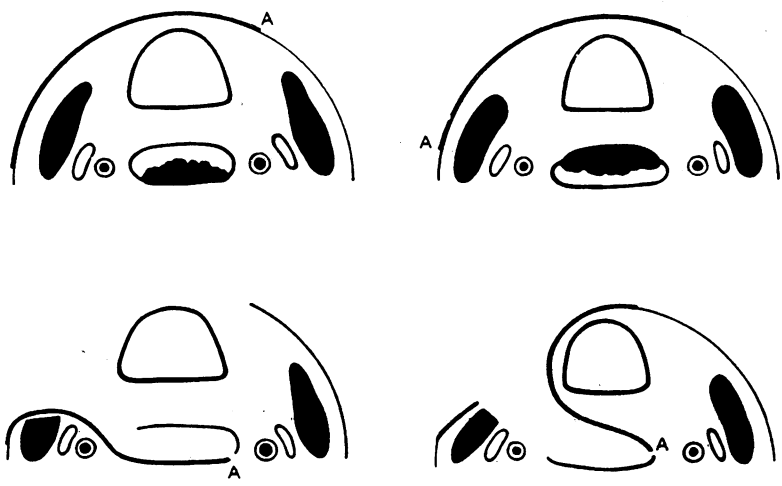

FIG. 1A.—Trotter's flap. (1) For posterior growth of pharynx. (2) For anterior growth of pharynx.

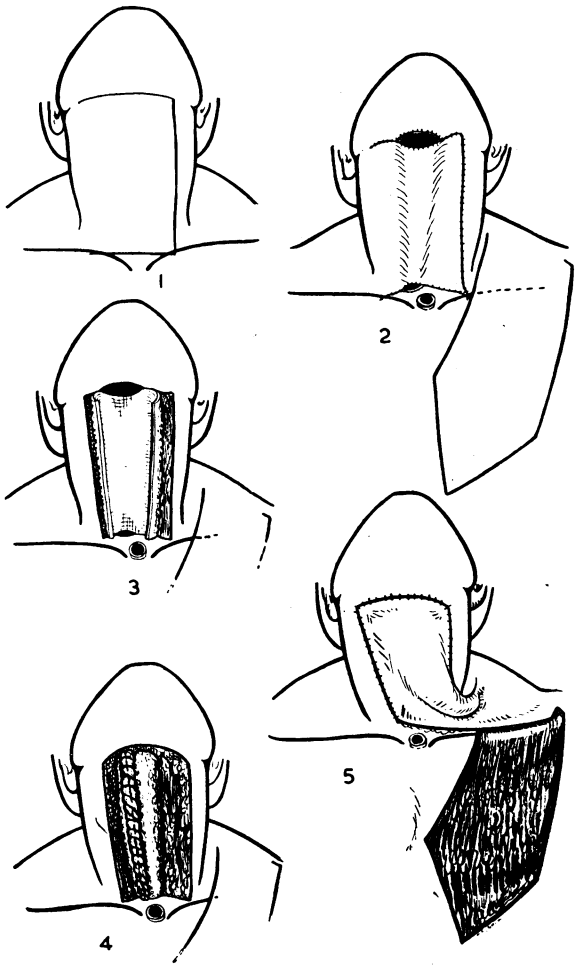

FIG. 1B.—Total pharyngolaryngectomy. (1) Broad transverse flap on neck, outlined. (2) After primary excision. Neck flap replaced. Three stomata. (3 and 4) Transverse neck flap inturned and sutured to enclose pharyngostome and œsophagus, providing flap lining. (5) Acromiothoracic flap applied for cover.

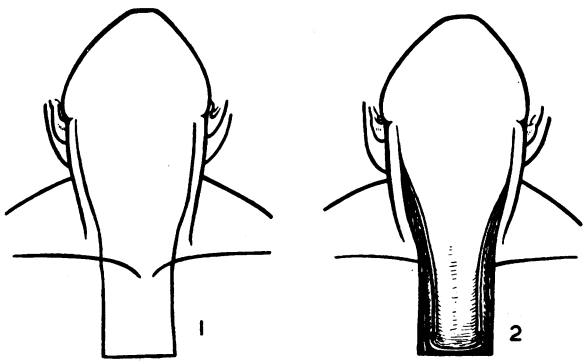

FIG. 1C.—Total pharyngolaryngectomy. Long U-flap for (1) exposure and (2) reconstruction. (Mr. E. E. Lewis, Cardiff.)

THE CONSTRUCTION OF FLAPS (FIG. 1B, 1C)

(1) Where the neck skin has been irradiated, the blood supply will be diminished. Any form of flap, particularly long and transverse, will be liable to slough. If this occurs there will be breakdown of lining whether of flap or of Thiersch graft.

(2) Reconstruction of the œsophagus with *flaps for lining* is likely to give a more certain and trouble-free result. The drawback is that more than one operation is required with an interval of weeks between.

(3) Ideally, flap skin for lining is desirable, preferably inserted at the primary excision. It is, however, *not justifiable* to delay primary excision in order to prepare appropriate skin flaps.

It may be possible to devise a skin flap for immediate use as lining, at primary excision, without the need for previous preparation, and so complete the operation in one stage.

(4) When the primary excision is performed, and the trachea and œsophageal stumps are sutured to skin on the lower part of the neck, care must be taken to place a skin bridge between the two. Close approximation of œsophagus and trachea makes suturing of lining flap very difficult (Fig. 1D).

FREE GRAFTS

In 1950, V. E. Negus advocated pharyngolaryngectomy for hypopharyngeal carcinoma and immediate repair using a Thiersch graft wrapped around a polythene tube. This tube and graft were inserted into oropharynx above and œsophagus below to reform the cervical œsophagus, and the skin flaps of the neck were applied as cover. Negus left in his tube for six months, but has reported some difficulties arising out of this.

In 1951, Mr. Negus gave me the benefit of his advice and I followed certain lines, after a close study of the literature and the methods employed by previous surgeons. My incisions were Z-shaped to allow wide exposure from broad-based flaps (2A). These flaps could be adjusted on each other in closing up, so as to gain length vertically—particularly useful when œsophagus and trachea are divided at level of 6 or 7 ring of trachea. The lateral flaps and single transverse flap do not allow of much adjustment vertically. The polythene tube was modified in shape finally to produce a long 10-in. funnel,

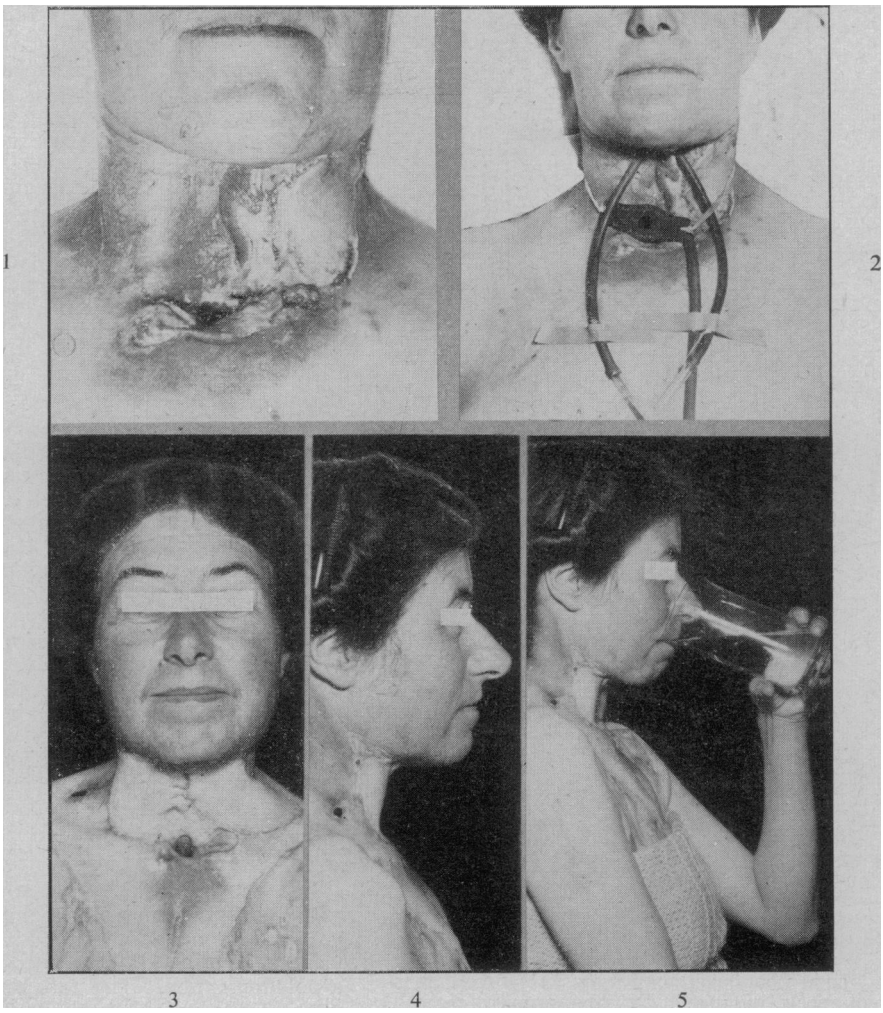

FIG. 1D.—Total pharyngolaryngectomy (Sir Stanford Cade) for carcinoma of the larynx. Reconstruction œsophagus. T P flaps. (1) After total pharyngolaryngectomy. Transverse neck flap (previously irradiated) has partly sloughed. (2) Before repair. Tracheostomy tube in place. Stomach tube in œsophagus. Tubes in pharyngostome to suck away saliva. (3, 4 and 5) After flap repair of cervical œsophagus.

2½ in. oval at upper end, tapering to 1 in. diameter at half-way, and narrowing further to ½ in. diameter distally. This long end acted as a whip well within the œsophagus, and produced no "sharp edge" necrosis of œsophagus as with the earlier type tube. The smallest diameter allowed passage of a Ryle's tube, but it has not been necessary to use the whole length of 10 in. The posterior aspect of œsophagus is divided vertically to make a large lumen, and the tube and graft are inserted within the œsophagus below and within the oropharynx above to lie behind the tongue (Fig. 2A, B, C, D).

The graft is stitched with plain catgut to the margin of œsophagus and to mucous membrane of oropharynx. Three wire or stout nylon sutures are run transversely through neck going through skin, sternomastoid muscles and through polythene tube with its graft. The sutures are tied or fixed on the skin surface and prevent the polythene tube from sliding down.

In one case of mine the tube slipped and produced necrosis of graft at level of manubrium.

A pressure dressing is applied to the neck in order to compress the skin flaps on to the underlying graft. A good thick neck dressing also immobilizes the head and neck. The dressing is maintained for three weeks, though changed every week.

In my short series of cases, the polythene tube has been removed through the mouth during the third week, in order to avoid risk of pressure necrosis by tube on graft.

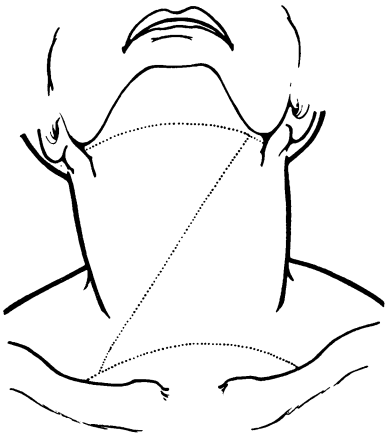

FIG. 2A.

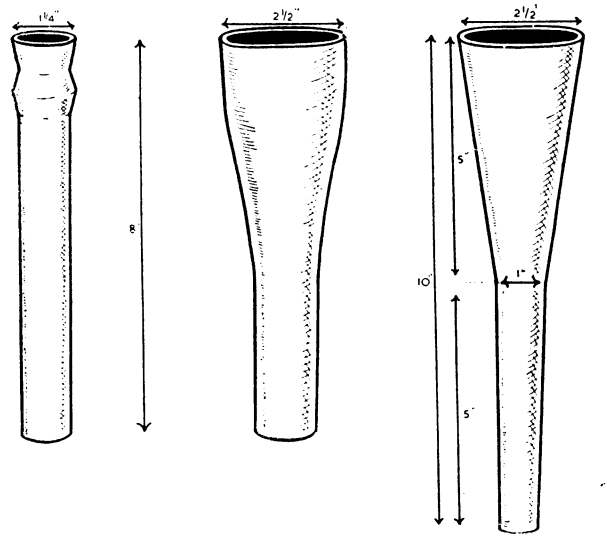

FIG. 2B.

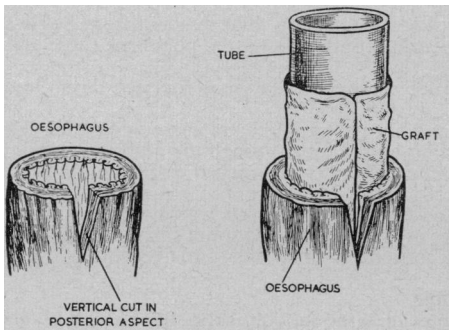

FIG. 2C.

FIG. 2.—Reconstruction of cervical œsophagus by Thiersch graft on a Portex tube. A, Z-incision for exposure. B, Types of polythene tubes. C, Insertion of tube and graft into œsophageal stump. D, Total pharyngolaryngectomy (Sir Stanford Cade) for carcinoma of pyriform fossa. Post-operative appearance.

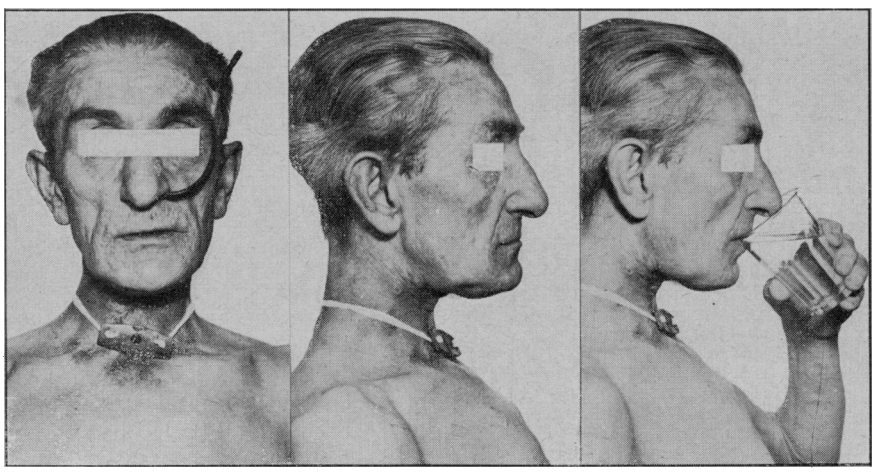

FIG. 2D.

The patient is fed through a Ryle's tube or ordinary stomach tube running through one nostril, and inside the polythene tube to the stomach. A high protein fluid diet is given through the tube (*see* Table I). When the polythene tube is removed, fluid and soft solids are given by mouth normally, gradually increasing to ordinary solids. The patients normally gain weight, and may gain up to 2 st.

TABLE I.—HIGH PROTEIN, HIGH CALORIE FLUID DIET IN PHARYNGOLARYNGECTOMY

Stage I		Stage II
Milk .. .. .. 3 pints	2,700 calories	Patient taking food by mouth. Diet altered
Casilan .. .. .. 6 oz.		Milk .. .. 2¼ pints
Sucrose .. .. .. 2¼ oz.		Casilan .. .. 5½ oz.
Glucose .. .. .. 4 oz.		Glucose .. .. 2½ oz.
*Liq. calcii hydrox. sacch. 25 oz.		Vitamins .. .. .. Continued
	Radiostoleum	
	Calciferol	
	Becosym	
	Nicotinamide	
	Ascorbic acid	
	Ephynal	
	Pancreatin	
	Thyroid extract	
	Neo-ferrum	
	Sodium citrate	

*Calc. hydrox. discontinued after one week.

THIERSCH GRAFT LINING

(1) Reflection of neck skin is preferable in two flaps on broad bases rather than in one transverse flap. Z flaps allow of some rearrangement to pay the transverse excess into the vertical.

(2) Previous irradiation enhances risk of sloughing of the flaps. It also appears to increase the risk of fibrosis and contraction of the skin graft.

(3) The graft should be cut in one piece about 8 in. by 4 in., of medium thickness and from hairless skin, e.g. the inner aspect of a thigh. The graft is applied, raw surface outwards, to the polythene tube, and stuck on with Mastisol.

(4) Firm pressure dressing around the neck is essential for success—for at least fourteen days—and neck movements must be prevented.

(5) The polythene tube is removed during the 3rd week, and normal feeding by mouth commenced. Keeping the polythene tube longer carries with it the risk of ulceration by the tube through the graft, and through the covering neck skin. Constriction may occur only at the junction of graft with normal œsophagus, but this may give no symptoms, although it may be apparent radiologically.

(6) Contraction of the whole "grafted œsophagus" may occur rapidly within six weeks of operation or more slowly. In either case, it is unlikely that passage of bougies at intervals will do more than provide temporary relief. In the long run, it is quicker to excise the whole grafted œsophagus and to reconstruct with flaps. Meanwhile, a gastrostomy is essential.

(7) The tracheostomy tube is discarded as soon as possible.

(8) Where a tracheotomy has been performed some time prior to primary excision, the method of Thiersch graft on a tube should not be undertaken. There is grave risk of infection breakdown, bronchopneumonia and death.

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Mr. Gavin Livingstone: In cancer of the upper pharynx irradiation of the primary lesion is probably the best treatment, but in the mid-pharynx and hypopharynx results of irradiation are so disappointing that I think surgery is at present the method of choice. There has been a change of outlook on pharyngeal surgery in the last few years because of the straightforward convalescence of the patient following laryngectomy compared with the pre-penicillin era, and I feel the fate of the larynx should not interfere with the planning of the operation.

In all cases of post-cricoid carcinoma and in most pyriform fossa lesions the larynx will have to be removed. In these cases if glands are present a block dissection should take place at the same time as a pharyngolaryngectomy where the complete segment of the pharynx should always be removed. Another indication for removing the larynx is where the recurrent laryngeal nerves are involved or may be injured, leaving the patient with a bilateral abductor paralysis which will necessitate a permanent tracheotomy and possibly a laryngectomy later.

Mr. R. Raven has been advocating a two-stage reconstruction in these pharyngolaryngectomies. On this question I feel that the better approach is to plan the operation so that there is a primary reconstruction, complete if possible, but at any rate of the food channel, as the patient is then saved that rather unpleasant three weeks following the primary operation until the secondary closure is carried out. At present I think the Thiersch graft on a polythene tube seems to be the best method. Two advantages of this are that any length of the pharynx removed can be bridged, and that the method can be used after the neck has been irradiated where any reconstruction using local skin flaps will probably break down owing to the sloughing of the flaps. I do not think it justifiable to delay the primary operation for six to eight weeks while pedicle skin grafts are prepared.

In point of fact the Thiersch graft reconstruction is falling into disfavour due to the number of cases which develop strictures. I think the reason for this is that there has been no standardization of the method. For example, the tubes used may vary in size, length or shape with the individual surgeon, and again, there is great variation in the time tubes are allowed to remain in situ. In my experience, strictures do not always develop, and, when they do, they are usually at the lower end at the œsophageal graft junction. I always remove the hyoid bone with the larynx, and because of this a stricture is unusual at the upper end. Great attention must be paid to detail. It is small details and variations in technique which decide the success or failure of this method of reconstruction.

In one case where a stricture did develop two months after operation, I inserted a small polythene tube about an inch in length, the size of a No. 10 intratracheal catheter, and had the upper end flanged so that it would not slip through the stricture. The patient is wearing this tube permanently, and although I have removed it for inspection on two or three occasions, there has been no suggestion of ulceration or discomfort, and as the reconstructed pharynx is entirely insensitive, the patient is able to adjust the tube should it become dislodged or temporarily blocked.

An œsophageal-tracheal fistula may occur from too long or too big a polythene tube, or one which is not removed soon enough. I remove mine in fourteen days.

A patient in whom one of these fistulas occurred vomited while he was being fed through a feeding tube, and the stomach contents regurgitated up the œsophagus and went into the trachea. In spite of aspiration infection occurred and the patient died six weeks later from a lung abscess, though the fistula had nearly healed. In future I would use a cuffed feeding tube so that the cuff can be inflated around the tube in the œsophagus to prevent any regurgitation of food. This would be a safeguard against the recurrence of such a tragedy.

Conclusion.—If this mutilating operation is to hold a permanent place in the treatment of pharyngeal cancer, a one-stage operation can add greatly to the patient's comfort during convalescence, and can shorten his stay in hospital. At present until the plastic surgeons, who should be intimately associated with this operation, can devise a one-stage reconstruction I think that the Thiersch graft is the method of choice. But a technique must be perfected which will minimize the chances of strictures.

Mr. V. E. Negus said that the discussion had centred on growths arising at or near the mouth of the œsophagus in the post-cricoid region. He proposed, therefore, to speak mainly of this type.

There were many cases of growths on the outside of the larynx which could be dealt with effectively by Trotter's method of transthyroid lateral pharyngotomy.

With regard to post-cricoid growths it was very much better to make the decision that if anything were to be done it must be by radical surgery. He was averse to loss of time and added discomfort to the patient by attempts to treat these growths with irradiation which, in his experience, had no prospects of cure. The operation resolved itself into removal of the larynx with part of the pharynx and upper end of the œsophagus, followed by immediate primary repair by means of a plastic tube covered by a skin graft. At the operation it was necessary to carry out block dissection; the fascia, glands, sternomastoid and internal jugular vein being left attached to the pharynx and larynx. The hyoid bone and usually four rings of the trachea were taken away, and also half of the thyroid, a portion being left, if possible, in order to avoid subsequent deficiency of thyroid and parathyroid hormones.

Professor R. S. Pilcher said that Trotter's insistence on preserving the larynx might be untenable to-day, but equally untenable was the rejection of his conservative operation of lateral pharyngotomy. Brevity of treatment was an important part of palliation, which should be assessed by the duration of relief and not by survival alone. Where the outlook was bad because of glandular metastases conservative treatment of the pharynx with the prospect of early recovery of function might be the most useful form of surgery.

Long-term results.—Out of 100 consecutive and unselected cases admitted to University College Hospital in 1927 to 1936, 7 survived five years or more without pharyngeal recurrence after conservative operations on the pharynx. He was not aware that this rate of salvage from all comers had been bettered.

[*April* 17 and 18, 1953]

MEETING AT THE QUEEN ELIZABETH HOSPITAL, BIRMINGHAM

Programme

[*April* 17, 1953]

Operations and Demonstrations

Demonstrations:

Specimens to Demonstrate the Nature of Ulcerative Colitis.—Mr. B. N. BROOKE.

Pathological Demonstrations.—Dr. J. G. JACKSON.

Cases Demonstrating the Use of the Epithelial Inlay Technique in Excision and Repair, with Special Reference to Tumours of the Jaws.—Mr. O. T. MANSFIELD and Mr. R. O. WALKER.

Demonstration of X-rays.—Dr. O. SMITH.

Operations:

(1) Thyroidectomy. (2) Retro-pubic Prostatectomy.—Mr. R. K. DEBENHAM.

Ulcerative Colitis—Excision of Rectum and Revision of Ileostomy for Prolapse.—Mr. B. N. BROOKE.

Partial Gastrectomy.—Mr. R. P. SCOTT MASON.

Mitral Valvotomy.—Mr. A. L. D'ABREU.

The following Papers were read:

A Method of Using Intravenous Procaine in the Treatment of Fractured Ribs.—Mr. GILROY BEVAN.

The Nature of Ulcerative Colitis: Its Definition and Cause.—Mr. B. N. BROOKE.

Blood and Fluid Loss at Operation.—Mr. A. J. H. RAINS.

Lawson Tait.—Emeritus Professor SEYMOUR BARLING.

The Present Management of Paralytic Ileus.—Mr. J. A. C. EDWARDS.

The Anatomy and Nerve Supply of the Crura of the Diaphragm with Special Reference to the Repair of Hiatus Hernia.—Mr. J. LEIGH COLLIS.

Acidosis after Uretero-colic Anastomosis: a Study of Its Control.—Mr. N. C. ROGERS (introduced by Mr. H. DONOVAN).

Relief of Pain of Pancreatic Origin.—Mr. D. M. MORRISSEY.

Duodenal Obstruction in the Newborn.—Mr. A. GOUREVITCH.

[*April* 18, 1953]

Operations:

(1) Partial Cystectomy. (2) Millin Prostatectomy. (3) Nephrectomy. (4) Orchidectomy. (5) Demonstration: Ascending Pyelograms.—Mr. H. DONOVAN.

Partial Thyroidectomy.—Mr. A. GOUREVITCH.

Œsophagectomy. (Fluid Loss Studies Were Made During This Operation).—Mr. A. L. D'ABREU.

(1) Heller's Operation. (2) Left Pneumonectomy. (3) Second-stage Right Thoracoplasty. (4) Bronchoscopy.—Mr. J. LEIGH COLLIS.