

# LARYNGECTOMY IN THE TREATMENT OF INTRINSIC CANCER OF THE LARYNX

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Untreated cancer is a fatal condition and it is therefore essential that the disease be recognized as early as possible. It is also necessary that the correct treatment should be applied and that all the means at our disposal should be used to the best advantage.

It would be wrong for the surgeon to believe that he can remove all cancer with his knife without recognizing the enormous value of modern radiotherapy, but it would be equally wrong for the radiotherapist to believe that he can cure all cancer with his therapy. Cancer of the larynx is no exception to these beliefs. Malignant disease of the larynx is mostly squamous carcinoma.

## Incidence

The disease is far more common in males. In the series of 50 cases treated surgically in the ENT wards at Grootte Schuur Hospital (January 1961 - April 1965) there was only 1 woman patient. It is also far more common in Whites than in the Coloured or Bantu. The disease occurs

TABLE I. AGE AND RACIAL INCIDENCE OF LARYNGECTOMY

Age (yrs.)	White	Coloured	Bantu	Total
70-80	2	0	1	3
60-70	14	3	0	17
50-60	5	2	0	7
40-50	2	0	2	4
30-40	1	1	2	4

most frequently in the 6th and 7th decades of life—especially the 7th. The youngest patient subjected to laryngectomy at Grootte Schuur Hospital was a Coloured male aged 34. Although Thompson and Negus mention that the disease does occur in very young individuals we have not seen any patient in this age group.

## Pathology

Macroscopically carcinoma of the larynx presents as either an ulcerative or a fungating lesion and histologically it ranges from the well-differentiated squamous carcinoma on the one hand to the highly undifferentiated, rapidly growing lesion on the other. Because of the poor lymphatic drainage of the true cords, regional lymph node involvement occurs as a rather late phenomenon, whereas a lesion from any other anatomical site will spread to the lymph nodes at a comparatively early stage—often producing bilateral lymph node involvement. It has been stated that only 4% of the true cord cancers will present with nodes whereas in the case of supraglottic or subglottic carcinoma this complication presents in 40% and 14% of cases respectively.

The disease may spread by local infiltration by lymphatics or via the blood stream to produce distal metastases.

## AETIOLOGY

Although it is not yet clear what causes cancer of the larynx, there are certain predisposing factors which cannot be overlooked when considering this aspect of the disease.

### 1. Smoking

It is uncertain whether smoking causes cancer of the larynx but, with only an isolated exception, all our cases of true cord carcinoma have smoked fairly heavily for a long time.

### 2. Alcohol Consumption

We have observed that most of the cases suffering from supraglottic carcinoma have, at various times, been fairly heavy drinkers.

### 3. Voice Abuse

This factor has been postulated as a possible cause but it would be incorrect to make such a statement with any degree of certainty. We do know that the disease does occur in teachers, preachers and singers.

### 4. Premalignant Conditions

Leucoplakia, hyperkeratosis and multiple papillomatosis are believed to be premalignant conditions. One of our patients,



the only female in the series, had suffered from multiple papillomatosis of the larynx and trachea for many years and was eventually subjected to laryngectomy for malignant degeneration. Unfortunately she had been given radiotherapy previously in an attempt to cure her papillomatosis. In addition there is the case of a local barman who presented himself at the outpatient department complaining of hoarseness. He had small white plaques on both cords and on the supraglottis. A biopsy specimen was taken and the histology of the plaque removed from the left cord showed malignant change. Repeated biopsies have been negative and we believe that this is the only case we have on record of an endoscopic removal of a cordal carcinoma. This patient attends our clinic regularly for checking, and was not subjected to radiotherapy.

#### 5. Syphilis

We have had several patients with a carcinoma of the larynx and a positive Wassermann reaction.

#### DIAGNOSIS

The diagnosis is made on:

1. History
2. Examination (as per laryngoscopy)
3. Confirmation by biopsy

The diagnosis may present considerable difficulty. We recall the case of a man who presented himself with hoarseness to a laryngologist elsewhere. On examination he had a papillary lesion of the inter-arytenoid region extending to the left arytenoid mound. The surgeon suspected cancer but could not obtain a positive biopsy. The patient was referred to Groote Schuur Hospital where again biopsies were repeatedly negative. We referred him to the radiotherapy department where it was agreed to treat the lesion as a carcinoma and X-ray therapy was recommended. After completion of his treatment, a repeat biopsy was done and for the first time a report of squamous carcinoma was obtained. He was subjected to laryngectomy and is still doing well.

#### CLASSIFICATION

Having established a diagnosis it is necessary to decide on the correct treatment, which is either radiotherapy or surgery or a combination of the two. In the interest of the patient it is essential that all competition between the radiotherapist and the surgeon should be avoided. Instead they should work in harmony with one another so that the best results may be achieved. To make this possible some means of classifying the disease according to the response to treatment should be accepted. Accordingly we divide carcinoma into 2 main groups:

- (a) *Intrinsic carcinoma or primary carcinoma*—discussed below
- (b) *Extrinsic carcinoma or secondary carcinoma of the larynx*—not referred to in this article

TABLE II. CLASSIFICATION OF LARYNGEAL CANCER

Lesion	White	Coloured	Bantu	Total
Intrinsic	24	6	5	35
Extrinsic	8	5	0	13
Unclassified	1	1	0	2

TABLE III. CLASSIFICATION OF INTRINSIC LESIONS

Lesion	White	Coloured	Bantu	Total
Supraglottic	5	2	2	9
Glottic	17	4	3	24
Subglottic	2	0	0	2

Intrinsic carcinoma is further divided into:

- (i) *Glottic carcinoma*, which arises from the true cords, anterior or posterior commissure. This is the commonest form and carries the best prognosis.

(ii) *Subglottic carcinoma*, which arises from the subglottic space, is the rarest form of laryngeal cancer and carries a worse prognosis.

(iii) *Supraglottic carcinoma*, which arises from the base of the epiglottis, ventricles and ventricular bands. This is the most serious laryngeal cancer and carries the worst prognosis.

In addition to this anatomical classification, laryngeal carcinoma is further subdivided according to whether it is an early or late lesion.

*Stage I.* Includes the very early lesion and is limited to the tissue of origin with no infiltration, no fixation and no lymph node involvement.

*Stage II.* Here there is local infiltration but no fixation and no lymph node involvement.

*Stage III.* There is local infiltration, fixation and/or homolateral lymph node involvement.

*Stage IV.* This is the very advanced cancer. There is local infiltration, fixation of the larynx, bilateral lymph node involvement and/or distal metastases.

#### TREATMENT

Carcinoma of the larynx is undoubtedly the most serious disease affecting this organ. Until 1900 radical surgery, i.e. laryngectomy, was the only form of treatment. The first laryngectomy done successfully on a human subject was performed by Billroth in 1876 following experimental work on animals.

During this century has come the birth and development of radiotherapy with the more modern methods of treatment with telecobalt and super-voltage therapy replacing the older methods of treatment with X-rays, interstitial radium and teleradium. There are those who feel that if 250 KV X-ray therapy were the only form of therapy available, surgery would be the order of the day.

Radiotherapy and surgery have become very closely drawn together in the treatment of carcinoma of the larynx. Each serves a very useful purpose, if correctly applied, in the treatment of this dreaded disease.

#### The Choice of Treatment

This rests with either radiotherapy, surgery or a combination of the two. Early carcinoma will respond well to either radiotherapy or surgery. It is extremely difficult to give comparative figures as they are so variable, but it would appear that in early carcinoma treated by laryngofissure the 5-year cure rate is in the region of 70-75%. With radiotherapy, i.e. telecobalt or super-voltage therapy, the 5-year cure rate may be over 80% with stage I carcinoma. When stage II carcinoma is included this figure drops to approximately 60%. The advantages of radiotherapy over surgery in the treatment of early cancer of the larynx are overwhelming because the voice is retained and the patient is given an additional chance of being cured.

Several factors are vital in determining an accurate diagnosis and before treatment is advised.

The endoscopist must be skilled in the art of examining the larynx. It is essential that he must be able to assess accurately the exact situation of the lesion, the movements of the larynx, and the biopsies submitted for histology must be taken carefully in order to give the pathologist every opportunity of determining accurately the penetration of the lesion. Several biopsies should be taken of the lesion and around the lesion and these labelled carefully. A negative biopsy is useful information. Careful notes should be made immediately after the examination in



order to obviate any possible error. There is no place for the occasional endoscopist who takes a hurried look and biopsy before referring the patient for treatment. With skilled modern anaesthetic techniques the surgeon should be allowed plenty of time to carry out his examination and biopsies thoroughly. If necessary a pre-operative tracheostomy should be done to ensure the safety of the patient.

No treatment should be advised before all data on the patient are available to both the surgeon and radiotherapist, who should then confer and decide on the correct treatment. It is generally accepted that correctly administered telecobalt or super-voltage therapy are more effective than 250 KV X-ray therapy, but it should also be noted that poorly administered modern techniques may be far less useful than well-planned 250 KV X-ray therapy.

In accordance with the views expressed above we have referred our early cases, i.e. stage I and II, to the radiotherapy department for treatment. In cases of more advanced carcinoma of the larynx (stage III) we have advised laryngectomy—i.e. where there is (i) laryngeal fixation, (ii) lymph node involvement, (iii) perichondritis, or (iv) in cases where radiotherapy has failed.

Although we refer our early cases for radiotherapy, conservative surgery is a recognized method of treatment for early lesions.

1. Laryngofissure is done for an early carcinoma of the cord.

2. The extended laryngofissure for a lesion which has extended beyond the bounds of simple removal of the cord, i.e. where the lesion has progressed to the vocal process and into the anterior commissure.

These procedures may also have a place in the surgical treatment of cases of failed radiotherapy in early lesions. We have no experience of the results of the extended laryngofissure operation and the horizontal partial laryngectomy, and very little experience with laryngofissure. We are hesitant to test their use in the treatment of some forms of early carcinoma, and believe that if there is any doubt about the efficacy of a conservative procedure it is wiser to do the more radical operation in the interest of the patient. We accept that carcinoma is a ruthless disease and must be treated radically. Accordingly, when surgery is indicated, radical surgery is advised in the form of laryngectomy which is usually combined with a homolateral block dissection of the glands. This operation is done in all cases considered unsuitable for conservative surgery and where conservative surgery has previously failed.

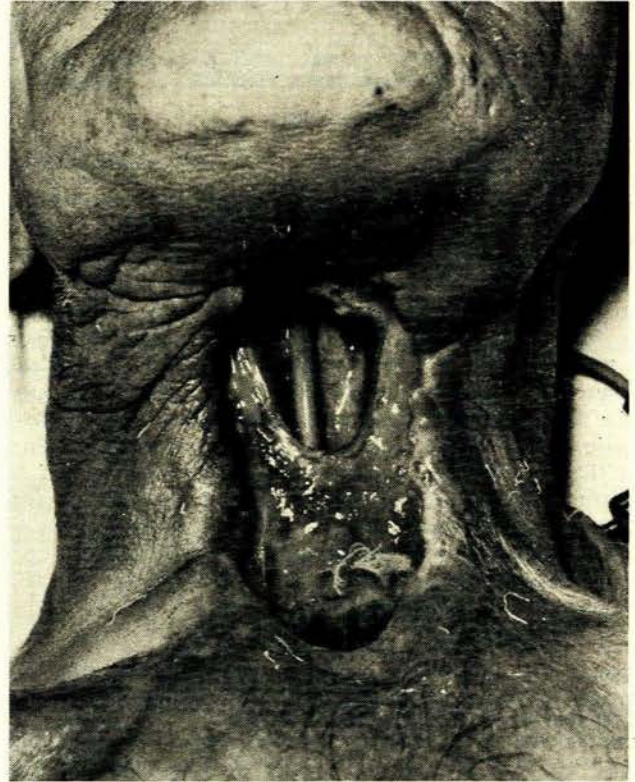
In cases of advanced unilateral involvement of the larynx with or without homolateral lymph node spread, laryngectomy and block dissection of glands is recommended. We are insistent on including a block dissection in the operation as on occasion it has been found that although no nodes were clinically palpable there was indeed microscopic infiltration of regional lymph glands in the block dissections. Where there is bilateral involvement of the larynx, laryngectomy with a block dissection of glands on the side of maximal involvement is carried out.

In cases of stage IV carcinoma of the larynx the prognosis is poor with either radiotherapy or surgery. In these

cases we prefer radiotherapy because on rare occasions there may be a dramatic response to the treatment and radiotherapy may occasionally cause marked regression in the local tumour, rendering it surgically removable.

#### *Surgery after Radiotherapy*

It is always most depressing to be faced with a post-radiotherapy laryngectomy. The operation is more difficult as there is much scarring, landmarks are difficult to identify, bleeding is often excessive and healing is delayed with



*Fig. 1.* Tissue necrosis after laryngectomy in a patient previously treated with X-ray therapy.

resultant breaking of suture lines, tissue necrosis and fistula formation which often requires closure at a later stage with plastic surgery.

Many patients who have been subjected to laryngectomy after radiotherapy, have spent several months in hospital awaiting closure of their fistulae. This is not always the case as 1 patient was subjected to surgery, after radiotherapy had caused gross necrosis of his larynx and at laryngectomy a gangrenous larynx was removed. Radiotherapy had destroyed the primary tumour as well as the larynx. We expected a very stormy postoperative course because of the infection and necrosis but the patient surprised us all by not developing any complications and was eating normally by the 14th day.

It is said that the postoperative hazards are grossly reduced with telecobalt and super-voltage therapy, but many cases of delayed healing after this therapy have been seen.



## LARYNGECTOMY

*Preparation of the Patient*

When the diagnosis has been established the patient is subjected to a series of investigations including X-ray of the chest, tomograms of the larynx, and the Wassermann reaction test. If considered a suitable subject for surgery the patient is advised of the suggested treatment. The relatives are informed of the diagnosis, and if the patient wishes to know the diagnosis he is told of the nature of the disease and the magnitude of the surgery required to cure him of his illness.

We always call on the assistance of a previous laryngectomee and speech therapist to encourage and discuss the treatment with the patient and to demonstrate the art of speech after laryngectomy. A physiotherapist is asked to instruct the patient in breathing and coughing exercises and a social worker will attend to any possible domestic problems.

We insist on a full medical examination and should like to know the results of a throat swab, haemoglobin, blood count, blood urea and liver-function tests. Six pints of blood are cross-matched in readiness for the operation and antibiotic therapy is usually commenced  $\pm$  24-48 hours pre-operatively.

*Premedication*

On the night before surgery the patient is given a strong sedative to ensure adequate sleep and an hour pre-operatively an injection of Omnopon and Atropine is given on the instructions of the anaesthetist.

*Anaesthesia for Laryngectomy*

Unless the patient has already had a tracheostomy performed, anaesthesia is usually induced with thiopentone and suxamethonium followed by spraying the tracheo-bronchial tree with lignocaine and the passage of a cuffed armoured endotracheal tube. Anaesthesia is maintained with nitrous oxide and oxygen, possibly with the addition of small concentrations of ether or halothane. Ventilation is preferably controlled by using curare. A mechanical ventilator is of considerable use here, as the operation is usually a fairly prolonged one and the ventilator frees the anaesthetist's hands enabling him to attend efficiently to monitoring and blood transfusion. Spontaneous respiration has not been found to be satisfactory. It is however important that no time be lost in changing from endotracheal tube to tracheostomy tube while the patient is curarized.

A nasogastric tube and an oesophageal lead for attachment to a thermometer are passed after induction. Many of these patients cool significantly during a prolonged operation involving considerable blood loss and facilities for keeping them warm during this period should be available. Ideally they should be on a warm-water blanket. Blood administered should be warmed to body temperature. Double lengths of corrugated tubing are of value in enabling the anaesthetist to keep his apparatus at a convenient distance from the operating field. It is important that the relaxant be reversed and the patient breathing spontaneously before the cuffed tracheostomy tube is replaced by the laryngectomy tube.

*The Operation*

Immediately after induction the patient is positioned, the skin is prepared and towelled.

The skin incision extends from the angle of the mandible (on the healthy side) in a large U to below the level of the cricoid cartilage and up to the tip of the mastoid process (on the side of the block). The long arm of the incision is then divided in the middle by an incision which runs at right-angles downwards and forwards over the middle of the clavicle. Three flaps are raised and stitched to the towels. Flap 1 is dissected to above the hyoid bone; flap 2 is dissected to the anterior border of the trapezius muscle and flap 3 is turned back over the clavicle. The block dissection is then commenced by dividing the lower end of the sternomastoid muscle and the inferior belly of the omohyoid. The carotid sheath is opened and the internal jugular vein ligated and cut below the level of the middle thyroid vein. Contents of the posterior triangle are then carefully dissected and swept upwards, care being taken not to damage the brachial plexus and phrenic nerve and, on the left side, the thoracic duct. The strap muscles must be divided as low as possible, the thyroid isthmus and inferior thyroid veins and artery ligated and cut. The carotid sheath is carefully dissected and swept upwards, care being taken not to damage the carotid trunk, vagus nerve and sympathetic trunk.

At its upper end, the sternomastoid is again divided and the internal jugular vein ligated and cut. The accessory nerve should be identified and cut. The facial veins and artery are taken and the contents of the digastric triangle swept downwards, care being taken of the mandibular branch of the facial nerve which crosses the surface of the submandibular gland in the fascia. The lingual nerve is identified and freed and the hypoglossal nerve preserved. The block is now swept medially and the superior thyroid artery ligated and cut.

The hyoid bone is carefully dissected and the larynx mobilized by freeing its extrinsic muscular attachments. The superior laryngeal vessels and nerves are identified, ligated and cut. At this stage the trachea is entered. A sterile cuffed tracheostomy tube is introduced and linked up with the anaesthetic machine.

Now the pharynx is entered above the epiglottis and the pharyngeal mucosa carefully cut around the laryngeal inlet, allowing at least  $\frac{1}{2}$  in. of healthy mucosa around the tumour. The larynx is lifted forward and separated from the hypopharynx and oesophagus by careful blunt dissection. At the level of the tracheostomy tube the trachea is cut across and the specimen removed. The pharynx is closed with several layers of chromic suture (00) and the trachea is sutured to the skin. Rubber drains are inserted (usually 3) and the skin wound closed with interrupted sutures. The dressing requires much care in its application. It should be firm but not too tight. A modified Moure-Lombard laryngectomy tube is introduced into the trachea and a crepe bandage applied. When the bandage has been applied the patient should be fully awake and breathing normally. The operation usually lasts about 4 hours.

## POSTOPERATIVE MANAGEMENT

*Care of the Patient*

For the first hour or two the patient is nursed in a



supine position. When the blood pressure is stable, the patient is given 1 pillow per hour until he is sitting upright.

Humidification is essential—this is supplied by passing humidified oxygen from a Drager Humidifier to a plastic cage which is strapped to the patient's neck. Continuous humidification is advised for 3-4 days and it is then gradually decreased until the patient no longer requires added vapour. A useful guide to assessing the need for humidification is in the nature of the secretions. If the secretions are viscid and tend to crust, then humidification is necessary. When crusting does occur we have found that by instilling a few drops of 4% bicarbonate solution one is able to loosen the crusts and they can then be coughed up.

Careful and frequent suction of the laryngectomy tube is essential and in the immediate postoperative period it may be required as often as once every 10-15 minutes. Vigorous and frequent physiotherapy is essential. The patient is allowed a brief period out of bed on the first postoperative day. This period is gradually increased until full movement out of bed is allowed. Shoulder and arm exercises are necessary, especially on the side of the block dissection. If this is not vigorously carried out it may result in a stiff, drooping shoulder and marked limitation of shoulder movement.

#### *Feeding the Laryngectomee*

For the first 12-24 hours the patient is given intravenous 5% dextrose in water. Nasogastric tube feeds are then commenced with dextrose water which is increased in amount and changed to  $\frac{1}{2}$ -strength milk over the next 12 hours and full-strength milk after a few more feeds. The feeds are then changed to a 2,000 calorie 3 litre diet in 24 hours. We have found this very satisfactory and it is easily prepared in the ward or hospital kitchen. By increasing the calorie content, diarrhoea may result which can be very troublesome. This diet is continued until the nasogastric tube is removed in the uncomplicated case on the 14th day. When the feeding tube is removed, normal diet is prescribed and speech therapy commenced.

Drains are usually shortened after 3 days and gradually removed over the next day or two. We believe that the drains should be removed when they stop draining and this, in the case of laryngectomy and block dissection, normally takes several days. Stitches are usually removed on the 8th-10th day.

#### *Management of the Laryngectomy*

The Moure-Lombard tube is left unchanged until the 8th-10th day in the uncomplicated case, when it is replaced by a suitable Colledge tube.

#### *Postoperative Depression*

It has been noticed that many patients become markedly depressed on the 2nd or 3rd postoperative day. When this has occurred we have called on a previous laryngectomee to pay a visit and to encourage the patient.

#### *Discharge of the Patient from Hospital*

The uncomplicated case usually remains in hospital for a period of approximately 3 weeks. After speech therapy is commenced the patient is kept in hospital until he grasps

the art of post-laryngectomy speech. We consider it advisable to discharge him then to practise the art at home. In the case of Bantu patients who cannot speak English or Afrikaans, our speech therapist works through an interpreter and has achieved astonishing results.

#### *Postoperative Visits*

On discharge the patient is instructed to visit the hospital after 2 weeks for his first check as an outpatient. Thereafter the patient is seen at 3-monthly intervals or longer—depending on the circumstances. No patient is discharged from the hospital until we are satisfied that the patient's relatives are fully acquainted with the management of the laryngectomy tube.

#### *Employment after Laryngectomy*

We attempt to assist the patient who has already reached pensionable age by obtaining a disability grant but in the younger age-group we encourage employment. One of our patients returned to his job as a guard on the railways 6 weeks after leaving hospital. He had completely mastered the art of speech and was determined to return to his work. It must be added that the railway authorities were extremely cooperative and helpful in rehabilitating this man. In the case of the unskilled labourer one is faced with a very awkward problem. Such a patient is unable to compete in the labour market and is usually obliged to supplement his meagre income with a disability grant.

#### *Detubation of the Laryngectomee*

The Colledge tube is usually left in position for a few months. Many patients prefer to keep the tube in permanently. When detubation is attempted the patient is admitted to hospital and the tube removed. He is kept under strict observation to determine any narrowing of the stoma. If after a few days there is no stenosis the patient is discharged. Should stenosis develop a tube is reinserted and kept in position.

#### DIFFERENTIAL DIAGNOSIS

It is not intended to go into a detailed discussion of the causes of hoarseness but it is suitable to refer to some of the conditions that have been encountered in adults in the outpatient department.

##### 1. *Functional Dysphonia*

This is a condition which can hardly be compared with laryngeal cancer but must be excluded. The cords fail to meet during phonation but the cough is normal.

##### 2. *Paralysis of the Vocal Cords*

It must be remembered that the recurrent laryngeal nerve supplies all intrinsic muscles of the larynx except the crico-thyroid which is supplied by the external laryngeal nerve. Sensory supply above the cords is via the internal laryngeal nerve but sensation below the cords is supplied by the recurrent nerve. A lesion affecting any of the motor nerve supply will disturb normal voice production to a greater or lesser extent and one must be aware of this when examining the larynx in a case of hoarseness.

##### 3. *Chronic Laryngitis*

This is a long-standing inflammatory condition of the larynx possibly associated with recurrent bouts of acute



laryngitis, excessive smoking, alcoholism, or voice abuse, while chronic bronchitis, chronic sinusitis and infected tonsils and adenoids may be additional factors. The cords are thickened, reddened, hypertrophic, and possibly oedematous.

#### 4. *False Cord Dysphonia*

This is a most interesting but unusual condition in which the false cords close over the true cords during phonation. It may be functional but often it is related to previous organic disease, e.g. an attack of acute laryngitis. The hoarseness is variable and there is an alteration in the tone, which usually deteriorates towards the evening. Very careful examination is necessary to make this diagnosis.

#### 5. *Contact Ulcers*

These are benign ulcers which occur as a result of voice abuse over the vocal processes of the arytenoid cartilages. On occasions granulation tissue will form on one side with a corresponding depression on the other vocal process, giving a 'cup and saucer' effect.

#### 6. *Pachydermia Laryngis*

This is a form of chronic hypertrophic laryngitis affecting the posterior half of the larynx. Sometimes it may produce a 'cup and saucer' effect by the presence of a hypertrophic nodule on one vocal process and a corresponding depression on the other.

#### 7. *Vocal Nodules* (Singer's nodes)

These are small nodules at the junction of the anterior and middle third of the cords. This is the result of organization in a small haematoma which is caused by vocal strain or abuse.

#### 8. *Polypoid Degeneration*

Polypoid degeneration of the cords follows on excessive smoking and voice abuse. The cords are swollen and watery and resemble nasal polyps. Sometimes a polyp becomes pedunculated and may hang below the cords.

#### 9. *Papillomata of the Cords*

(i) *Juvenile papillomatosis*—multiple papillomata—may arise from any site within the larynx and trachea. These usually regress at puberty but sometimes persist and may become malignant.

(ii) *The single papilloma* is usually found in adults and a common site is the anterior commissure.

#### 10. *Hyperkeratosis*

This consists of piled up keratin and may be difficult to distinguish from carcinoma and the solution is only found on a histological section.

#### 11. *Leucoplakia*

This consists of a white epithelial membrane on the cords and elsewhere in the larynx.

#### 12. *Tuberculosis of the Larynx*

This usually affects the posterior half of the larynx, producing ulceration. It is a painful condition and is commonly found in association with active pulmonary tubercle. Laryngeal tuberculosis and carcinoma may coexist.

#### 13. *Syphilis*

This may resemble any other disease of the larynx. As a rule it affects the anterior half of the larynx. A gumma of the larynx may cause extensive distortion and may closely resemble an infiltrating carcinoma.

#### 14. *Intubation Granuloma*

Granulomata form on the vocal processes of the arytenoid cartilages. Hoarseness usually dates from an operation under general anaesthesia where intubation was carried out.

### COMPLICATIONS OF LARYNGECTOMY

#### 1. *Wound Sepsis*

This presents a major problem, especially if a pre-operative tracheostomy is performed. We insist on a pre-operative throat or nasal swab to determine if possible the most suitable antibiotic. If sepsis does occur a swab is immediately taken for culture. If pre-operative tracheostomy was necessary, a swab is taken from this site to determine the antibiotic of choice.

#### 2. *Haemorrhage*

Blood loss during the operation has been variable and is usually replaced immediately. Severe postoperative bleeds with cases of intrinsic carcinoma are not recalled but in 2 cases of pyriform fossa carcinoma there have been brisk fatal haemorrhages approximately 1 week after surgery. These have not been explained as at autopsy the bleeding site could not be ascertained. All major ligatures were intact.

#### 3. *Haematoma Formation*

This has been encountered in a few cases. It usually occurs on the side of the block dissection and is treated by evacuation.

#### 4. *Escape of Chyle*

One case is recalled where there was a free escape of chylous fluid (not in this series). This was in the case of a block dissection on the left side where the thoracic duct was torn.

#### 5. *Pulmonary Complications*

These are fortunately not common. They usually result from blood aspiration during surgery and are treated with vigorous physiotherapy and antibiotics.

#### 6. *Injuries to Hypoglossal or Lingual Nerves*

These may result in unpleasant sequelae but are of no real consequence.

#### 7. *Deep Vein Thrombosis*

A few cases with this complication developing in the immediate postoperative period have been seen. There have been no fatal results. We do not allow intravenous drips to be put up on a leg if it can be avoided and we encourage exercise and early mobility in an attempt to prevent the complication from developing.

#### 8. *Pharyngeal Stenosis*

This may develop as a late complication in laryngectomy. It is however uncommon in our experience. Dilatation is necessary if it does occur.



### 9. Crusting in the Trachea

This is fairly common and usually results from inadequate humidification. It is treated by removal of the crusts, adequate humidification and instillation of drops of 4% bicarbonate down the trachea to loosen the crusts.

### 10. Tissue Necrosis

Necrosis may follow wound sepsis or pre-operative radiotherapy. As a result of tissue necrosis, sinuses and fistulae may form which may require closure with plastic surgery.

### 11. Local Recurrence

This is treated radically with deep X-ray therapy.

#### ASSESSMENT OF RESULTS

During the period January 1961-April 1965, 50 patients were subjected to laryngectomy at Groote Schuur Hospital. Thirty-five operations were done for intrinsic carcinoma

TABLE IV. CASES SUBJECTED TO LARYNGECTOMY 1961—APRIL 1965

Year	White	Coloured	Bantu	Total
1961	3	1	0	4
1962	7	2	2	11
1963	7	2	2	11
1964	13	2	0	15
1965	3	5	1	9
Total	33	12	5	50
Percent	66	24	10	100

TABLE V. LARYNGECTOMY IN CASES OF INTRINSIC CANCER OF THE LARYNX

Year	Total no. of cases	Alive	Dead	Unknown
1961	3	2	0	1
1962	9	5	3	1
1963	10	7	1	2
1964	10	10	0	0
1965	3	2	0	1
Total	35	26	4	5

and 13 operations for extrinsic laryngeal cancer. There were 2 cases which could not be classified. The 35 cases of intrinsic carcinoma included 9 supraglottic, 24 glottic and 2 subglottic lesions.

We do not believe that one can draw any conclusions from these cases, as the survival period is too limited to

be of any real value. Twenty-six patients are known to be alive, 4 have died and 5 patients could not be traced. It is of interest to note that in 35 laryngectomies, 12 cases had pre-operative radiotherapy and 12 cases experienced delayed healing as judged by fistulae formation. Eight of the patients with delayed healing had received pre-operative radiotherapy.

Figures can be very misleading but it may be interesting to refer to some of the results quoted by Work and Boyle on cancer of the larynx published in the *Laryngoscope* of July 1961: they treated 13 cases of carcinoma with X-ray therapy alone with a 76% 5-year survival; 18 cases of supraglottic carcinoma were treated in a similar manner with an 11% 5-year cure rate. In 14 cases of cordal carcinoma treated with X-ray therapy followed by surgery, the 5-year cure rate was approximately 64%, and with 5 cases of supraglottic carcinoma it was approximately 40%. In 41 cases of cordal carcinoma treated by surgery there was a 70% 5-year survival rate, while 25 cases of supraglottic carcinoma treated surgically gave approximately 56% 5-year cure rate.

They feel that the policy of 'watchful waiting' for cervical lymph node metastases to occur following laryngectomy has been discouraging even if block dissection is performed later. If block dissection is done in continuity with laryngectomy in these patients the survival rate could be improved.

#### SUMMARY

The place that laryngectomy should take in the treatment of intrinsic carcinoma of the larynx is discussed. Thirty-five cases treated in this manner are recorded and the management described.

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