Antibiotic therapy carries no special consideration, though intramuscular injections should not be given to haemophiliacs on general principles. It was possible to give the appropriate antibiotics by mouth or intravenously, with the exception of Colistin which is dangerous by the intravenous route and cannot be given orally. To illustrate the great difficulty of eliminating infections in the presence of haematoma formation, it was not possible to sterilize his wound despite the use of antibiotics to which the infecting organisms remained sensitive until his death.

SUMMARY

A case of pseudotumour of the thigh in Christmas disease is described. The leg was amputated, but infection of the haematoma led to bleeding and shortened the half-life of administered concentrate. Secondary suture was followed by further bleeding, and sepsis around the femoral artery led eventually to its rupture and death from exsanguination. The medical and surgical management are briefly discussed.

We would like to thank Drs. R. Biggs and J. P. Soulier for their continued advice and assistance; Mr. J. R. Jordaan, South African Ambassador to France, for arranging for supplies of the concentrate to reach the airport on time; Lederle Laboratories who kindly donated a large supply of epsilon amino caproic acid; and Dr. J. G. Burger, Medical Superintendent of Groote Schuur Hospital, for willing advice and for permission to publish.

REFERENCES

2. Banyu Pharmaceuticals: Personal communication.
13. Macfarlane, R. G., Mallam, P. C., Witts, L. J., Bidwell, E., Biggs —offers an excellent bilateral lymph node involvement. It has been stated that only 4% of the true cord carcinomas 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 one 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 his 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>
<thead>
<tr>
<th>TABLE II. CLASSIFICATION OF LARYNGEAL CANCER</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Intrinsic</td>
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<tr>
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<table>
<thead>
<tr>
<th>TABLE III. CLASSIFICATION OF INTRINSIC LESIONS</th>
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<tr>
<td></td>
</tr>
<tr>
<td>Supraglottic</td>
</tr>
<tr>
<td>Glottic</td>
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<tr>
<td>Subglottic</td>
</tr>
</tbody>
</table>

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 radiothera­
pist, who should then confer and decide on the correct
treatment. It is generally accepted that correctly adminis­
tered 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 radio­
therapy department for treatment. In cases of more ad­
vanced 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, con­
servative 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 laryn­
gectomy, 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 homo­
lateral 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 recom­
manded. 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 prog­
nosis 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 iden­
tify, bleeding is often excessive and healing is delayed with

![Fig. 1. Tissue necrosis after laryngectomy in a patient
previously treated with X-ray therapy.](image-url)

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 radio­
therapy had caused gross necrosis of his larynx and at
laryngectomy a gangrenous larynx was removed. Radio­
therapy 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 sur­
prised 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 Wasserman 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 ± 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 tracheobronchial 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 towellled. 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 Moun-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 3/4-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 Collodex 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 Collodex 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 preoperative tracheostomy is performed. We insist on a preoperative 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.

**TABLE IV. CASES SUBJECTED TO LARYNGECTOMY 1961—APRIL 1965**

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<tr>
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<td>13</td>
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**TABLE V. LARYNGECTOMY IN CASES OF INTRINSIC CANCER OF THE LARYNX**

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<tr>
<td>1965</td>
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<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>26</td>
<td>4</td>
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</tbody>
</table>

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 fistula 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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**BIBLIOGRAPHY**


**FURTHER DEVELOPMENTS IN THE TREATMENT OF POISONING WITH ALKYLPHOSPHATE (ORGANOPHOSPHATE) INSECTICIDES**

**DOUW G. STEYN, Poisons Committee, State Department of Health, Pretoria**

In 1958 I reviewed the then existing methods of treatment of alklyphosphate poisoning. In this paper, I shall discuss the more recent knowledge we have gained as to the symptoms caused by, and the mechanisms and modes of action of, different alklyphosphate insecticides, as well as the more successful methods of treatment of cases of poisoning. It is a great step forward in the treatment of cases of alklyphosphate poisoning that a reactivator (Toxogonin) of the inactivated ChE (cholinesterase) which passes the blood-brain barrier, has been discovered. Not only does Toxogonin pass the blood-brain barrier but, according to reports in the literature, it is also more effective in cases of poisoning with some organophosphates, and is less toxic than P.AM which does not pass the blood-brain barrier, or does so only to a very limited extent.

**SYMPTOMS OF ORGANOPHOSPHATE POISONING**

It is clear that the symptoms of poisoning with organophosphates are due not only to inactivation of cholinesterase (ChE), i.e., cholinergic, but that other factors also have