Diseases of the Ear, Nose and Throat

LECTURE NOTES ON

Diseases of the Ear, Nose and Throat

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Preface to the Ninth Edition

This ninth edition of *Lecture Notes on Diseases of the Ear, Nose and Throat* again allows an updating of the text. We have been able to include on this occasion further colour photographs rather than line drawings which I hope will remain in the memory better and serve as reminders to the readers of the conditions that can occur within the upper aerodigestive tract. It is interesting in revising this little book every few years how much there is to change in fairly subtle ways as the specialty develops and technology improves. The trend in educational circles in the early part of the 21st century seems to be that students should learn less and less factual knowledge and there is far more concern with process and in a spirit of concordance with this (though not entire agreement), I have reduced the text of some of the chapters considerably and omitted quite a lot of details, particularly where it relates to surgical procedures. As before, I have avoided the cumbersome use of 'he or she', or 'they' as a singular pronoun and I hope that I will be forgiven again in the interest in avoiding prolixity for using 'he' to mean either gender without prejudice or favour.

Acknowledgements

I am pleased to acknowledge the invaluable help of the editorial and production departments of Blackwell Publishing who have encouraged the production of this new edition of *Lecture Notes in Diseases of the Ear, Nose and Throat*, and in particular to Fiona Goodgame and Alice Emmott.

I am grateful to my clinical colleagues for advice willingly given and for help with the illustrations. I am indebted particularly to Mark Yardley, Tim Woolford, Charles Romanowski and Tim Hodgson.

Without the skill and cooperation of the Department of Medical Illustration at the Royal Hallamshire Hospital, I would have had few images to include in this little book.

I am grateful to Alun Bull for the cover images.

P.D. Bull
January 2002

Preface to the First Edition

This book is intended for the undergraduate medical student and the house officer. It is hoped that, though elementary, it will also prove of use to the general practitioner.

Many conditions encompassed within the so-called 'specialist' subjects are commonly seen in general practice, and the practitioner is therefore obliged to be familiar with them. He is not asked to perform complex aural operations, or even to be acquainted with their details, but he is expected to appreciate the significance of headache supervening in otitis media, to treat epitaxis, and to know the indications for tonsillectomy.

Emphasis has therefore been laid on conditions that are important either because they are common or because they call for investigation or early treatment. Conversely, some are rare conditions and specialized techniques have received but scant attention, whilst others have been omitted, because the undergraduate should be protected from too much 'small print', which will clutter his mind and which belongs more properly to postgraduate studies.

The study of past examination questions should be an integral part of the preparation for any examination, and students are strongly advised to 'work-up' the examination questions at the end of the book. Time spent in this occupation will certainly not be wasted, for the questions refer, in every case, to the fundamentals of the specialty.

E.H. Miles Foxen

CHAPTER 1

The Ear: Some Applied Anatomy

THE PINNA

The external ear or pinna, is composed of cartilage with closely adherent perichondrium and skin. It is developed from six tubercles of the first branchial arch. Fistulae and accessory auricles result from failure of fusion of these tubercles.

THE EXTERNAL AUDITORY MEATUS

The external auditory meatus is about 25 mm in length, has a skeleton of cartilage in its outer third (where it contains hairs and ceruminous glands) and has bone in its inner two-thirds. The skin of the inner part is exceedingly thin, adherent and sensitive. At the medial end of the meatus there is the antero-inferior recess, in which wax, debris or foreign bodies may lodge.

THE TYMPANIC MEMBRANE (Fig. 1.1)

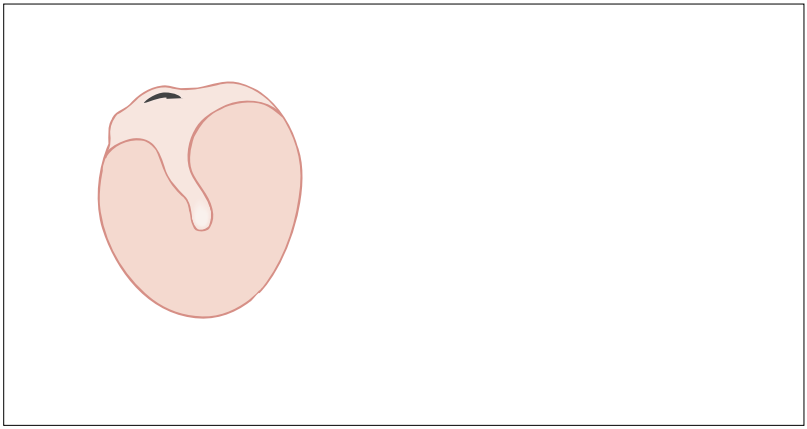
The tympanic membrane is composed of three layer—skin, fibrous tissue and mucosa. The normal appearance of the membrane is pearly and opaque, with a well-defined light reflex due to its concave shape.

THE TYMPANIC CAVITY

Medial to the tympanic membrane, the tympanic cavity is an air-containing space 15 mm high and 15 mm antero-posteriorly, although only 2 mm deep in parts. The middle ear contains the ossicular chain of malleus, incus and stapes (Fig. 1.2) and its medial wall is crowded with structures closely related to one another: the facial nerve, the round and oval windows, the lateral semicircular canal and basal turn of the cochlea. The major reason for having an air-containing middle ear is to reduce the acoustic impedance that would be caused if a sound wave in air were to be applied directly to the cochlear fluids. Without this impedance matching, 99% of the sound energy would simply be reflected at an air/fluid interface.

THE EUSTACHIAN TUBE

The Eustachian tube connects the middle-ear cleft with the nasopharynx and is responsible for the aeration of the middle ear. The tube is more



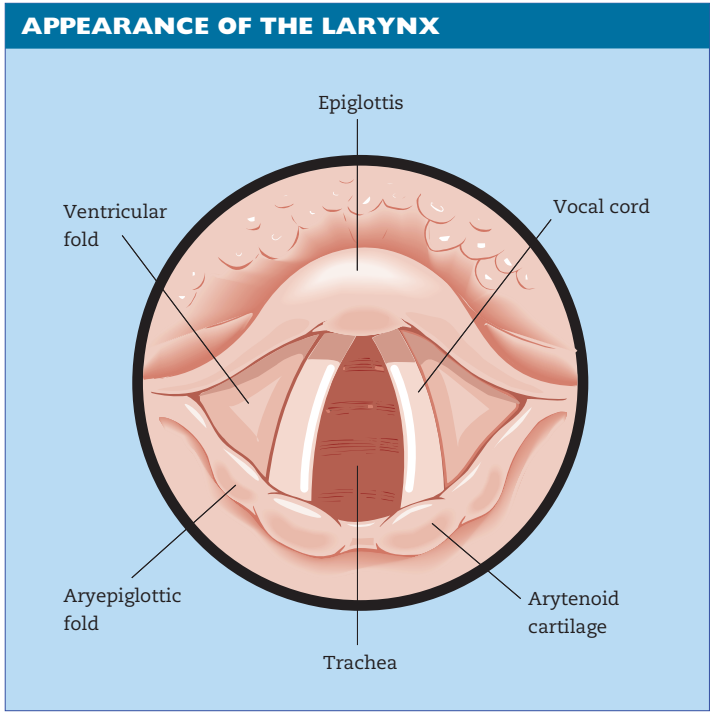


Fig. 31.2 The appearance of the larynx on indirect laryngoscopy.

The patient protrudes his tongue, which is held gently between the examiner's middle finger and thumb (Fig. 31.1). The forefinger is used to hold the upper lip out of the way and a warmed laryngeal mirror is introduced gently but firmly against the soft palate in the midline. By tilting the laryngeal mirror, the various structures shown in Fig. 31.2 can be inspected. Mobility of the cords is assessed by asking the patient to say 'EE', causing adduction, or to take a deep breath, which causes abduction. The beginner will often see only the epiglottis, with a fleeting glimpse of the cords, but continued practice will allow visualization of the larynx and hypopharynx in most subjects.

In recording your findings, bear in mind that the image you see is reversed. It is advisable to label your diagram L and R in case confusion with direct examination occurs.

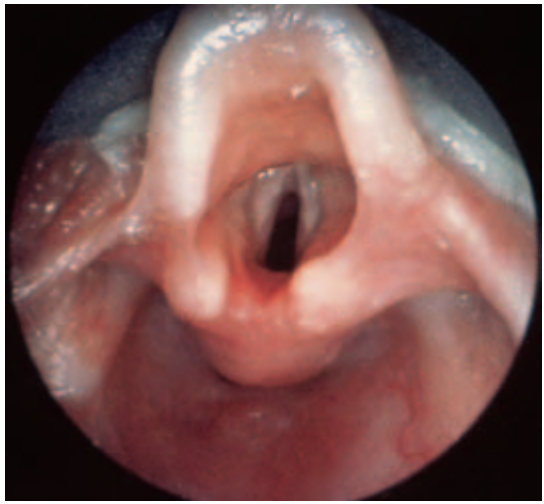


Fig. 31.3 The appearance of the larynx as seen by direct laryngoscopy.

FIBRE-OPTIC LARYNGOSCOPY

In some cases the patient will not tolerate indirect laryngoscopy, or the view of the vocal cords is obstructed by an overhanging epiglottis. In these cases, fibre-optic laryngoscopy makes examination possible without recourse to general anaesthesia. The flexible fibre-optic instrument is passed through the anaesthetized nose into the pharynx. It is then manoeuvred past the epiglottis until the interior of the larynx is seen. Although the image is smaller than that obtained by mirror examination, it allows inspection of the cords during phonation and also enables a photographic record to be made. The patient can even view his own larynx through a teaching attachment.

DIRECT LARYNGOSCOPY

Under general anaesthesia, a laryngoscope supported by some form of suspension apparatus is introduced into the larynx. With the aid of an operating microscope, a superb binocular-magnified view of the larynx is obtained and endoscopic surgery can be carried out with precision. This technique also allows the use of a carbon dioxide laser for the treatment of such lesions as papillomata and leukoplakia. Closed-circuit television, video or still photography are simple to attach to the microscope for making a record of the findings (Fig. 31.3).

Injuries of the Larynx and Trachea

The larynx and trachea may be injured by:

1. penetrating wounds, e.g. gunshot or cut throat injuries (Fig. 32.1);
2. blunt trauma, especially from road traffic accidents;
3. inhaled flames or hot vapours;
4. swallowed corrosive poisons;
5. endotracheal tubes and inflatable cuffs.

MANAGEMENT

The diagnosis of laryngeal trauma is often missed amid other serious injuries, but should always be suspected when injury to the neck has occurred. Cricotracheal separation may not cause immediately obvious signs but may lead to asphyxia. Fractures of the larynx will produce hoarseness and stridor, and tracheostomy may be needed urgently. In cases of cut throat, it may be possible to intubate the larynx through the wound, prior to formal tracheostomy and laryngeal repair. The two priorities of treatment are:

1. to protect the airway by intubation or tracheostomy;
2. to restore laryngeal function by careful repair of the injury.

Laryngeal stenosis may result, despite repair of the larynx, and a permanent tracheostomy is sometimes necessary.

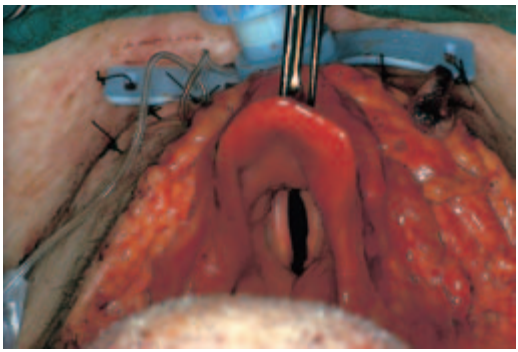


Fig. 32.1 A self-inflicted cut throat, giving a good view of the anatomy.

Various manoeuvres for the correction of laryngeal stenosis have been devised, most depending on widening the lumen with some form of skeletal graft, such as rib cartilage or the hyoid bone.

INTUBATION

A particular problem is that posed by long-term endotracheal intubation of patients on intensive care units. The avoidance of red rubber tubes and awareness of the need to control cuff pressures have led to a reduction in the incidence of stenosis, and with modern tube design, tracheostomy can usually be postponed for 2–3 weeks. Once a problem mainly limited to adult intensive-care units, there has been an increased incidence of subglottic stenosis among very premature babies as a result of improved survival rates, owing to the excellent care of neonatologists. Prolonged endotracheal ventilation for broncho-pulmonary dysplasia and respiratory distress syndrome has inevitably resulted in cases of laryngeal stenosis in tiny infants, the care of whom is highly specialized and beyond the scope of this book.

Acute Disorders of the Larynx

Acute laryngitis—adults

Acute laryngitis is more common in winter months and is usually caused by acute coryza (common cold) or influenza. It is predisposed to by vocal over-use, smoking or drinking of spirits. If factors from both groups coexist—the heavy smoker with a cold, shouting abuse at the referee on a winter's afternoon—acute laryngitis is (fortunately for everybody else) sure to follow.

CLINICAL FEATURES

Clinical features include aphonia (the voice reduced to a whisper) or dysphonia (a painful croak) and pain around the larynx, especially on coughing.

Examination by indirect laryngoscopy shows the larynx to be red and dry, with stringy mucus between the cords.

TREATMENT

1. Total voice rest.
2. Inhalations with steam.
3. No smoking.
4. Antibiotics are rarely necessary.

Acute laryngitis—children

As a result of acute upper respiratory infection, laryngitis may develop. This may lead to airway obstruction.

CLINICAL FEATURES

1. Unwell.
2. Harsh cough.
3. Hoarse voice or aphonia.

This early stage will often respond to paracetamol and a steamy environment. If oedema develops within the limited space of the subglottis, stridor

may supervene. This combination of acute laryngitis and stridor is known as croup. If there is significant or worsening airway obstruction, the child should be admitted to hospital, preferably where paediatric intensive care facilities are available.

Acute epiglottitis

More common in North America than the UK, acute epiglottitis is a localized infection of the supraglottic larynx usually by *Haemophilus influenzae*. It causes severe swelling of the epiglottis, which obstructs the laryngeal inlet. In children it constitutes the most urgent emergency—the child may progress from being perfectly well to being dead within the space of a few hours on account of airway obstruction. Fortunately, it has now become very rare in the UK because of the widespread use of HIB vaccine.

CLINICAL FEATURES

The child will become unwell, with increasing dysphagia and a quack-like cough. Stridor will develop rapidly and the child will prefer to sit up, leaning forward to ease his airway.

If the diagnosis is suspected and even though symptoms may be mild, the child should be admitted at once to hospital. At one time tracheostomy was the treatment of choice but most cases are now managed by endotracheal intubation and therapy with chloramphenicol, which will result in rapid resolution.

In adults the pain is severe and is worsened on swallowing. It is slower to develop and to resolve than in children. Respiratory obstruction is less likely to occur, but may do so with a fatal result.

Laryngotracheobronchitis

This condition occurs in infants and toddlers and is a generalized respiratory infection, probably viral in origin. In addition to laryngeal oedema, there is the production of thick tenacious secretions, which block the trachea and small airways. It is of slower onset than acute epiglottitis and there is a harsh, croupy cough. Mild cases will settle on treatment with humidified air, but more severe cases will require airway support and possible ventilation.

Laryngeal diphtheria

Laryngeal diphtheria is rarely seen now in the UK. The child is ill and usually presents the clinical picture of faucial diphtheria. Stridor suggests the spread of membrane to the larynx and trachea.

TREATMENT

1. Antitoxin.
2. General medical treatment for diphtheria.
3. Tracheostomy (q.v) may be indicated.

Chronic Disorders of the Larynx

Chronic laryngitis

More common in males than females, chronic laryngitis is aggravated by:

1 habitual shouting;

2 faulty voice production coupled with excessive vocal use. Seen in teachers, actors, singers;

3 smoking;

4 spirit drinking;

5 chronic upper airway infection, such as sinusitis.

The voice is hoarse and fatigues easily. There may be discomfort and a tendency to clear the throat constantly. Examination shows the cords to be thickened and pink and the surrounding mucosa is often red and dry.

TREATMENT

Treatment is often ineffective. The voice should be rested as far as possible, any upper airway sepsis dealt with and steam inhalations given to humidify the larynx. Voice therapy may be helpful in cases of faulty voice production and referral to a singing teacher is of value to professional or amateur singers.

Hyperkeratosis of the larynx

Hyperkeratosis of the larynx may supervene upon chronic laryngitis. The cords become covered in white plaques of keratinized epithelium, which may become florid. Histology shows dysplasia, which may progress to malignancy, and the plaques should be removed for histology.

Vocal cord nodules

Vocal cord nodules (singer's nodes) occur most commonly in children and result from excessive vocal use. The appearance is of a small, smooth nodule on the free edge of each cord, composed of fibrous tissue covered with epithelium. Removal by microlaryngoscopy followed by voice rest may be necessary but most cases respond to speech therapy.

Tuberculosis of the larynx

Tuberculosis of the larynx is now very rare and occurs only in the presence of pulmonary tuberculosis. Hoarseness occurs as a result of tuberculous granulations and agonizing dysphagia may follow. Treatment is by antituberculous drugs.

Syphilitic laryngitis

Syphilitic laryngitis is also extremely rare but the possibility of a gumma must be considered in cases of chronic hoarseness. Malignant change may also be present.

NB. Any case of persistent hoarseness must be considered malignant until examination and, if necessary, biopsy have excluded such a cause.

Tumours of the Larynx

BENIGN TUMOURS

Benign tumours of the larynx are rare and cause persistent hoarseness. The commonest tumours encountered are:

1. papilloma—solitary or multiple;
2. haemangioma—almost exclusively in infants;
3. fibroma.

Papillomata and haemangiomata are considered in more detail in Chapter 37.

MALIGNANT TUMOURS

PATHOLOGY

Malignant tumours of the larynx are virtually always squamous cell carcinoma. Adenoid cystic carcinoma and sarcoma may occur on rare occasions.

AETIOLOGY

Malignant tumours are commoner in males by a ratio of 10:1, occurring almost exclusively in smokers. The peak age incidence is 55–65 years, but it can occur in young adults.

Glottic carcinoma (60% of cases)

The prime symptom of glottic carcinoma (Fig. 35.1) is hoarseness, which may persist as the only symptom for many months. Only when spread from the cord has occurred will earache, dysphagia and dyspnoea supervene.

Supraglottic carcinoma (30% of cases)

Supraglottic carcinoma, as well as producing a change in the voice, may metastasize early to the cervical nodes.

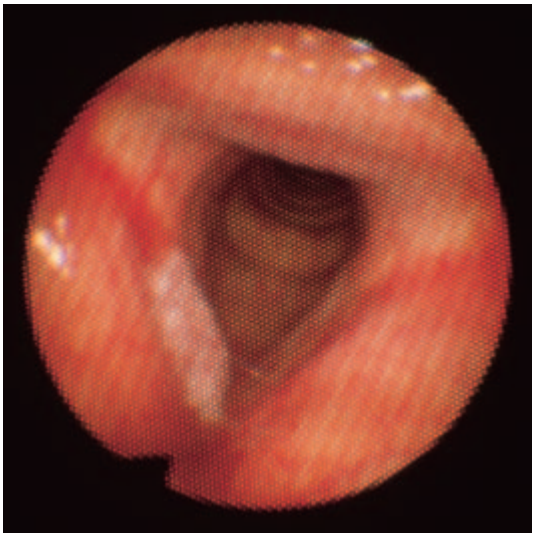


Fig. 35.1 Early glottic carcinoma.

Subglottic carcinoma

Subglottic carcinoma produces less hoarseness but increasing airway obstruction. It must not be mistaken for asthma or chronic bronchitis.

SPREAD OF LARYNGEAL CARCINOMA

Spread is local initially and proceeds:

1. along the cord to the anterior commissure and onto the opposite cord;
2. upwards onto the ventricular band and epiglottis;
3. downwards to the subglottis;
4. deeply into the laryngeal muscles, causing cord fixation.

Lymphatic spread from glottic lesions is late, but occurs readily from supraglottic and subglottic sites to the deep cervical nodes.

Pulmonary metastases occur occasionally but other distant metastases are rare.

DIAGNOSIS

Every case of hoarseness should be examined by indirect laryngoscopy; malignant growths are usually seen easily. Diagnosis is confirmed by microlaryngoscopy and biopsy.

The chest must be X-rayed as bronchial carcinoma also may be present. CT scanning of the larynx is often helpful in defining the extent of spread, and is usually performed prior to deciding on treatment.

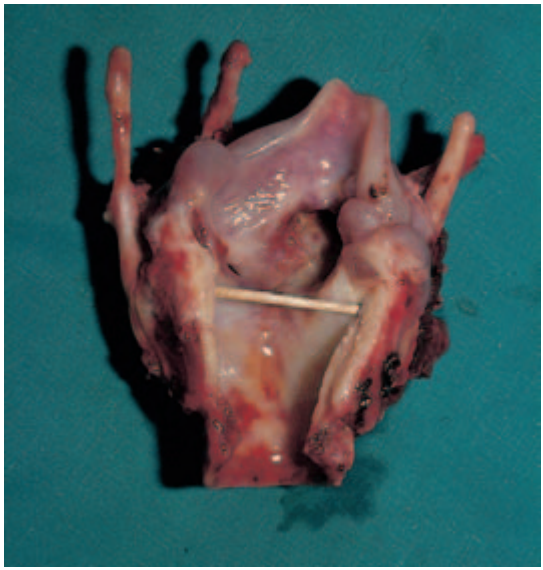


Fig. 35.2 Laryngectomy specimen opened from posteriorly, showing a left-sided carcinoma.

TREATMENT

1 Radiotherapy by external radiation is usually employed. In a small tumour limited to one cord (the stage at which it should be diagnosed), the 5-year survival rate is 80–90% and the patient retains a normal larynx.

2 In very extensive disease or if there is recurrence following radiotherapy, total laryngectomy is necessary (Fig. 35.2). The patient obviously then has a permanent tracheostomy and will need to develop oesophageal speech. Good oesophageal speech is attained by about 30% of patients; a further 30% develop reasonable voice but the remainder never manage more than a mouthed whisper.

Many patients are now provided with a tracheopharyngeal valve. A fistula is formed between the trachea and pharynx and a prosthetic valve fitted to the fistula. Occlusion by the finger of the tracheostomy allows air to flow into the hypopharynx, while vibration of the soft tissue produces phonation. This then allows fluent lung-powered voice for the laryngectomee.

Rehabilitation following laryngectomy concentrates on the development of speech with help from the speech therapist, but also requires training in looking after the tracheostomy, changing the tube as necessary and developing confidence socially after mutilating surgery.

PROGNOSIS

Glottic carcinoma diagnosed early and treated effectively is virtually a curable disease. The later the diagnosis is made, the worse the prognosis. *Never neglect hoarseness*.

Supraglottic and subglottic tumours have a poorer prognosis owing to the likelihood of rather later development of symptoms and early nodal spread. About 10% of all patients successfully treated for laryngeal cancer will subsequently develop carcinoma of the bronchus.

Vocal Cord Paralysis

Nerve supply of the laryngeal muscles

All the intrinsic muscles of the larynx, with the exception of the cricothyroids, are supplied by the recurrent laryngeal nerves.

The cricothyroids, which act as tensors of the cords, are supplied by external branches of the superior laryngeal nerves.

Semon's law

In a progressive lesion of the recurrent laryngeal nerves, the abductors are paralysed before the adductors. Thus, in incomplete paralysis, the cord will be brought to the midline by the adductors, but in complete paralysis it falls away to the paramedian position. Semon's law is not fully understood, but may reflect the fact that the adductor muscles are much more powerful than the abductors.

Recurrent laryngeal nerve palsy (Figs 36.1 and 36.2)

The left recurrent laryngeal nerve has a long course, extending down into the chest before recurring around the arch of the aorta to return to the larynx. It is therefore more susceptible to disease than the shorter right recurrent nerve, which turns around the subclavian artery.

The voice in recurrent nerve palsy is weak and breathy, and the cough is ineffective. As compensation by the opposite cord occurs, the voice improves.

The causes of *left* recurrent nerve palsy in the chest are:

1. carcinoma of the bronchus;
2. carcinoma of the oesophagus;
3. malignant mediastinal nodes;
4. aortic aneurysm;
5. cardiac and oesophageal surgery.

The causes of paralysis of the *right* or *left* recurrent nerve in the neck are:

1. thyroid surgery;
2. carcinoma of the thyroid gland;
3. carcinoma of the hypopharynx and oesophagus;

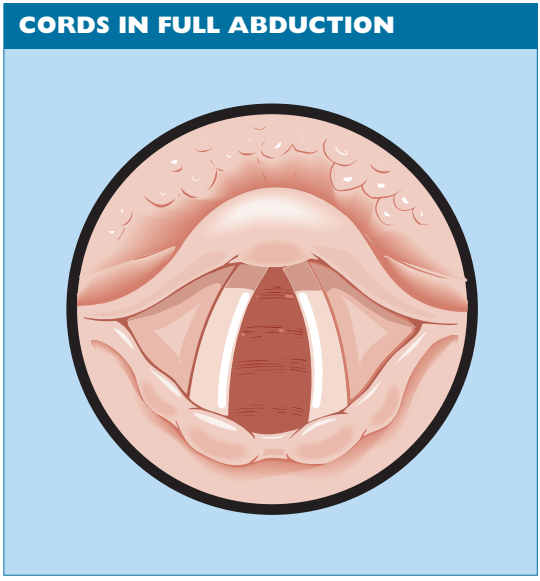


Fig. 36.1 The cords in full abduction during inspiration.

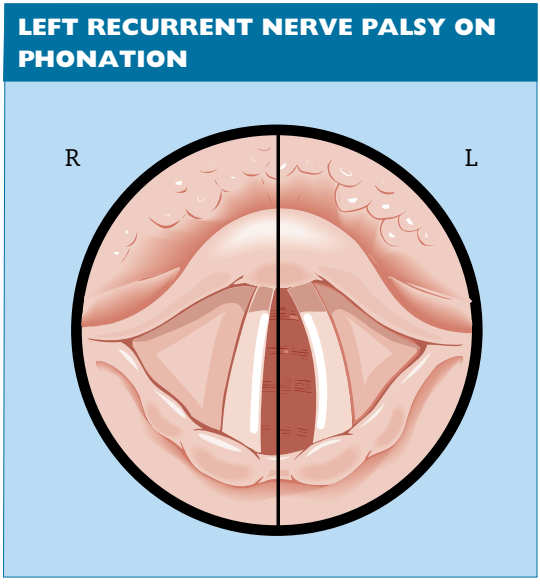


Fig. 36.2 Left recurrent nerve palsy on phonation (mirror view). Note the persisting glottic aperture owing to the inability of the left cord to move to the midline.

4 cervical spine surgery (Cloward's operation);
5 penetrating wounds;
6 mediastinoscopy.

Some cases of recurrent nerve palsy are idiopathic or may follow viral infections, such as influenza.

Bilateral recurrent laryngeal nerve palsy

Bilateral recurrent laryngeal nerve palsy occurs most commonly following surgery or malignancy of the thyroid gland, but may be the result of pseudobulbar palsy. Because the cords lie near the midline, the airway is impaired and tracheostomy may be necessary.

Combined vagal and recurrent nerve palsy

Combined vagal and recurrent nerve palsy occurs in lesions of the medulla or vagus trunk.

1 Medulla—neoplasm, vascular lesions, syringobulbia, bulbar poliomyelitis.

2 Vagus trunk—tumours of the skull base, e.g. carcinoma of the nasopharynx; tumours of the jugular foramen—glomus jugulare tumour; chemodectoma of the vagus.

Functional aphonia

Functional aphonia is a condition found mostly in teenaged females and is psychogenic. The voice is reduced to a whisper, examination shows weak adduction of the cords but sound is produced normally on coughing. Treatment lies in the realm of the communication therapist or psychotherapy.

Treatment of vocal cord paralysis

The first step is always to try to identify the cause.

Bilateral cord palsy will probably produce stridor and urgent tracheostomy may be required. The airway can be improved by arytenoidectomy, but the voice will be worse as a result.

The voice can be improved in cases of unilateral cord palsy by the endoscopic injection of a suspension of microspheres of inert plastic material alongside the paralysed cord. This will move the paralysed cord medially and allow the opposite cord to meet its fellow. Improvement in voice quality results. It will also restore laryngeal competence and improve the ability to cough effectively. It is a very good palliation in cases of carcinoma of the

bronchus. For unilateral vocal cord palsy of a cause compatible with survival, the operation of vocal cord medialization is available. A window is cut in the thyroid cartilage and a block of silastic inserted to displace the cord towards the mid line. It has the advantage of being reversible if the cord palsy should recover. Functional aphonia is usually self-limiting, or responds to explanation and encouragement. The help of the speech therapist is valuable in persistent cases and some patients may require psychiatric treatment.

Airway Obstruction in Infants and Children

Upper airway obstruction in children is dangerous and may progress rapidly. It is essential to make a firm diagnosis and take the appropriate action without delay.

SIGNS OF AIRWAY OBSTRUCTION

1 **Stertor** is the noise produced by obstruction in the throat, i.e. above the larynx, and is usually a low-pitched choking type of noise.
2 **Stridor** is a high-pitched sound produced by narrowing within the more rigid confines of the larynx or trachea. In laryngeal obstruction the stridor is inspiratory; in tracheal lesions it is usually both inspiratory and expiratory.
3 Use of accessory muscles of respiration.
4 Pallor, sweating and restlessness.
5 Tachycardia.
6 Cyanosis. It is important to examine the child in adequate lighting, preferably daylight. The lips particularly will show the dusky coloration, which may be very subtle.
7 Intercostal and sternal recession (Fig. 37.1). The sternum may be sucked in almost to the vertebrae in the child's attempts to breathe.
8 Exhaustion—a late stage in asphyxia, which should be avoided. The child makes less effort to breathe, stridor and insuction become less pronounced and apnoea is not far off.

Box 37.1 Signs of airway obstruction.

Management of airway obstruction

The management of airway insufficiency always depends on the severity of the obstruction, and severe obstruction necessitates immediate airway support by oxygen, endotracheal intubation or even tracheostomy.

If time and the child's condition allow, every child with stridor should have a PA chest X-ray and a lateral soft-tissue film of the neck, which will show the larynx and upper trachea clearly. If a vascular ring or tracheo-oesophageal fistula is suspected, a barium swallow is a necessary investigation.

Fig. 37.1 Baby with severe upper airway obstruction. Note the sternal recession and paradoxical abdominal movement.

Neonates may be intubated without the need for general anaesthesia but great care must be taken not to damage the larynx and cause further obstruction from haematoma or oedema. Older children, unless so anoxic as to be unconscious, will require general anaesthesia for intubation, and at the same time the larynx, trachea and bronchi should be inspected. The diagnosis is then usually apparent and further management can be directed appropriately.

LARYNGOSCOPY AND BRONCHOSCOPY

Inspection of the airways in cases of respiratory obstruction calls for the highest degree of cooperation between surgeon and anaesthetist.

The larynx is inspected under deep anaesthesia using a rigid paediatric laryngoscope and Hopkins rod telescope (Fig. 37.2). An anaesthetic type laryngoscope usually gives an inadequate view owing to its poorer lighting.

Bronchoscopy in babies and children has been facilitated greatly by the introduction of ventilating bronchoscopes, which allow coupling to a T-piece anaesthetic circuit and at the same time provide superb vision through a rod-lens telescope system (Fig. 37.3). A side channel allows for instrumentation and suction. Using this type of bronchoscope, the airways of even small premature babies may be examined with a much greater degree of precision and safety than is possible with the older type open bronchoscope tube.

Fig. 37.2 A small laryngoscope used for examining young children.

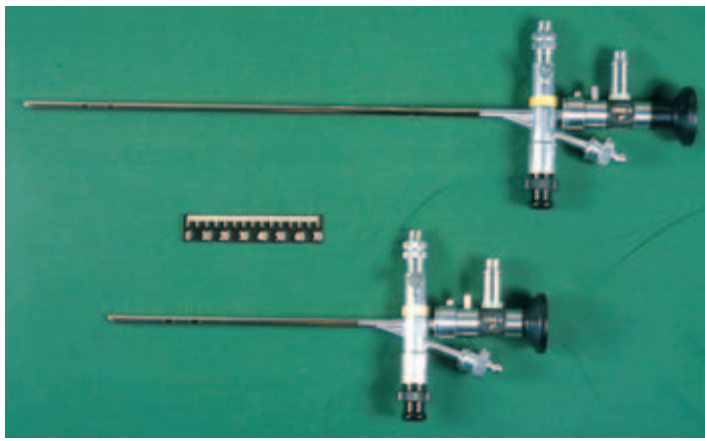


Fig. 37.3 Ventilating bronchoscopes. Note the telescope, the side channel for instrumentation and the inlet for anaesthetic gases and oxygen.

Causes of upper airway obstruction in infancy

SUPRA LARYNGEAL CAUSES

Choanal atresia
Failure of posterior canalization of the nasal airways results in severe neonatal airway obstruction, which is relieved by crying. Surgical correction will be required.

Micrognathia
Underdevelopment of the mandible as in Pierre Robin syndrome or Treacher–Collins syndrome results in posterior displacement of the tongue and oropharyngeal obstruction. The neonate may asphyxiate unless corrective measures are taken.

Adeno-tonsillar hypertrophy
Large tonsils and adenoids may occlude the naso-oro-pharyngeal airway to a serious degree, especially during sleep. This may result in obstructive apnoea during sleep, with loud snoring punctuated by periods of silence followed by a large gasp. If not recognized and treated, right heart failure may ensue.

LARYNGEAL CAUSES

Congenital

Laryngomalacia (Fig. 37.4)
The stridor starts at or shortly after birth and is due to inward collapse of the soft laryngeal tissues on inspiration. It usually resolves by the age of 2 or 3 years, but meanwhile the baby may have real respiratory difficulties. Diagnosis is confirmed by laryngoscopy without intubation when the supraglottic collapse is seen on inspiration. It can be relieved by division or excision of the aryepiglottic folds.

Congenital subglottic stenosis
This occurs at the level of the cricoid cartilage. There will be stridor from birth and the stenosis may be visible on a lateral X-ray of the neck. Diagnosis is confirmed by laryngoscopy.

Laryngeal webs
Laryngeal webs are anteriorly situated (Fig. 37.5) and if large can cause

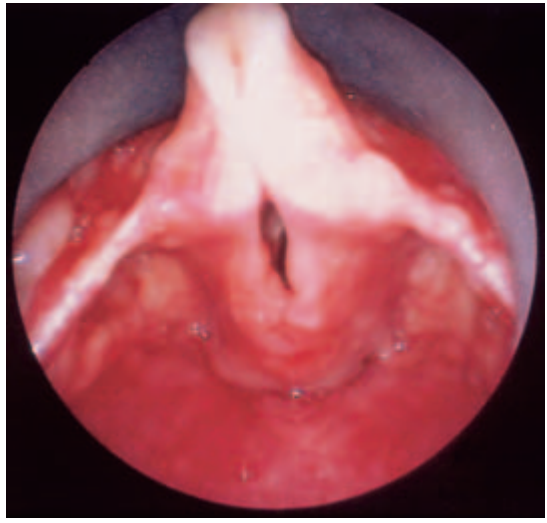


Fig. 37.4 Laryngomalacia. Note the insuction of the supraglottic structures, causing airway narrowing.

Fig. 37.5 Anterior laryngeal web.

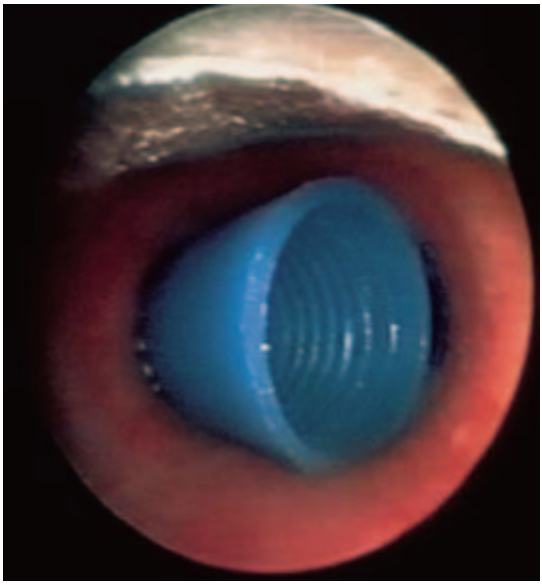


Fig. 37.6 Part of a ball-point pen lodged in the left main bronchus as seen at bronchoscopy. The chest film shows loss of lung volume and mediastinal shift.

severe stridor and obstruction. The most extreme degree of webbing, atresia, is fatal unless immediate tracheostomy is performed.

Laryngeal cysts
Laryngeal cysts may be congenital or may be the result of endotracheal intubation. They may cause variable airway obstruction, often dependent on position.

Vascular ring
A vascular ring developmental anomaly of the aorta—surrounds the oesophagus and trachea, causing constriction. Diagnosis is made by barium swallow and angiography, and the treatment is by surgery to divide the vascular ring.

Acquired

Foreign body (Figs 37.6 and 37.7)
The sudden onset of stridor in a formerly normal child must always be regarded as being due to a foreign body until proved otherwise. A history of choking and coughing, especially if while eating, should alert the attending doctor to the likelihood of aspiration; peanuts are particularly dangerous in this respect and should *never* be given to youngsters. Examination and chest X-rays may be entirely normal and the only way to exclude a foreign body in the bronchus is by bronchoscopy.

A larger foreign body may lodge in the larynx and cause severe respiratory distress. It may be possible to remove it by the Heimlich manoeuvre (compression of the upper abdomen to raise intrathoracic pressure) but if this fails, endoscopy or tracheostomy will be necessary.

Acute laryngitis, acute epiglottitis and laryngotracheobronchitis
Described in Chapter 33.

Subglottic stenosis (Fig. 37.8)
Subglottic stenosis is now seen most commonly in low-birth-weight babies who have required prolonged ventilation by endotracheal tube, but may occur at any age from intubation or trauma. Treatment is highly specialized and entails some form of laryngotracheoplasty. Subglottic stenosis cannot always be avoided.

Multiple laryngeal papillomata (Fig. 37.9)
Multiple laryngeal papillomata should be suspected in a child with progressive hoarseness or aphonia and airway obstruction. There may be little

Fig. 37.7 Foreign body in the right main bronchus in a baby of 6 months. Note that the right lung is hyperinflated and therefore darker on the X-ray.

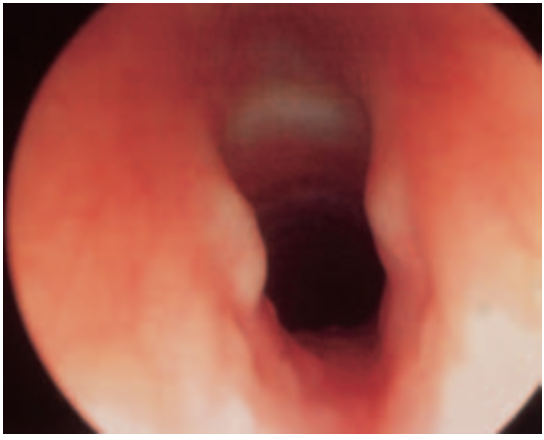


Fig. 37.8 Endoscopic view showing moderate subglottic stenosis and small ductal cysts following ventilation as a neonate.

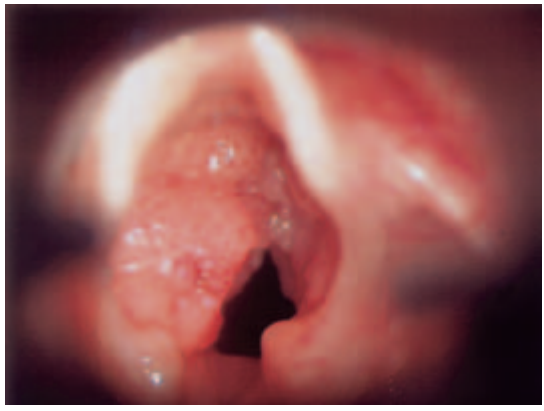


Fig. 37.9 A large mass of papillomata on the left vocal cord.

stridor since the mass of papillomata is too soft to vibrate the air column. Diagnosis is by direct laryngoscopy, and removal of the papillomata is best accomplished using the carbon dioxide laser, which is very accurate and, if used carefully, causes least damage. The papillomata are of viral origin (HPV 6 or 11) and have a strong tendency to recur.

NB. Any child with stridor is potentially at risk of dying from asphyxia and every case should be investigated to determine the cause. It is dangerous to believe that all children 'grow out' of a tendency to stridor.

CHAPTER 38

Conditions of the Hypopharynx

FOREIGN BODIES

Fish, poultry and other bones are often swallowed inadvertently. Usually they will scratch or tear the pharyngeal mucosa before passing down into the stomach. However, they may on occasions lodge in the hypopharynx or oesophagus, where they may lead to perforation, mediastinitis or abscess, or even fatal perforation of the aorta. Children and the mentally disturbed may swallow coins, toys or more bizarre objects (Fig. 38.1) and the elderly may swallow their dentures.

MANAGEMENT

It may be very difficult for the casualty officer or novice ENT surgeon to decide whether a foreign body has simply caused an abrasion and has passed on, or is impacted. The following routine should be adopted.

1 Take a careful history, noting the nature of the suspected foreign body (is it radio-opaque?) and the time of ingestion.

2 Examine the pharynx and larynx, paying particular attention to the tonsils and valleculae. (Fish bones often stick here.) A foreign body lodged in the cervical oesophagus will cause pain on pressing the larynx against the spine.

3 X-ray the chest and neck (lateral view) — remember that fish bones and plastic are likely to be radiolucent and may not show.

4 If marked dysphagia is present, or a foreign body is seen on X-ray, oesophagoscopy is indicated.

5 If symptoms persist despite normal X-ray appearances, oesophagoscopy is necessary to exclude a foreign body.

The potential gravity of an impacted foreign body cannot be overemphasized, and if there is any doubt, expert advice must be sought.

Post-cricoid web

The Paterson–Brown Kelly syndrome (later described by Plummer and Vinson) usually occurs in middle-aged women but can occur in males, though rarely. It is associated with iron-deficiency anaemia and the develop-

Fig. 38.1 Man eats dog.

ment of a postcricoid web. The features of iron deficiency (glossitis, angular stomatitis and microcytic anaemia) will be present and the web will be demonstrated by barium swallow.

TREATMENT

The iron deficiency is corrected by iron supplements and the web is dilated periodically. A small number of patients with this condition will go on to develop postcricoid carcinoma.

PHARYNGEAL POUCH (PHARYNGEAL DIVERTICULUM)

The pharyngeal mucosa herniates between the oblique and transverse fibres of the inferior constrictor muscle to produce a persistent pouch (Fig. 38.2). The condition occurs almost exclusively in the elderly and is thought to be due to failure of the cricopharyngeus part of the inferior constrictor to relax during swallowing, thus building up pressure above it.

CLINICAL FEATURES

1. Discomfort in the throat initially.
2. Dysphagia as the pouch enlarges.
3. Regurgitation of undigested food.
4. Aspiration pneumonia if untreated.
5. Gurgling noises in the throat on swallowing or pressure on the neck.

NB. A pouch almost never causes a palpable neck swelling.

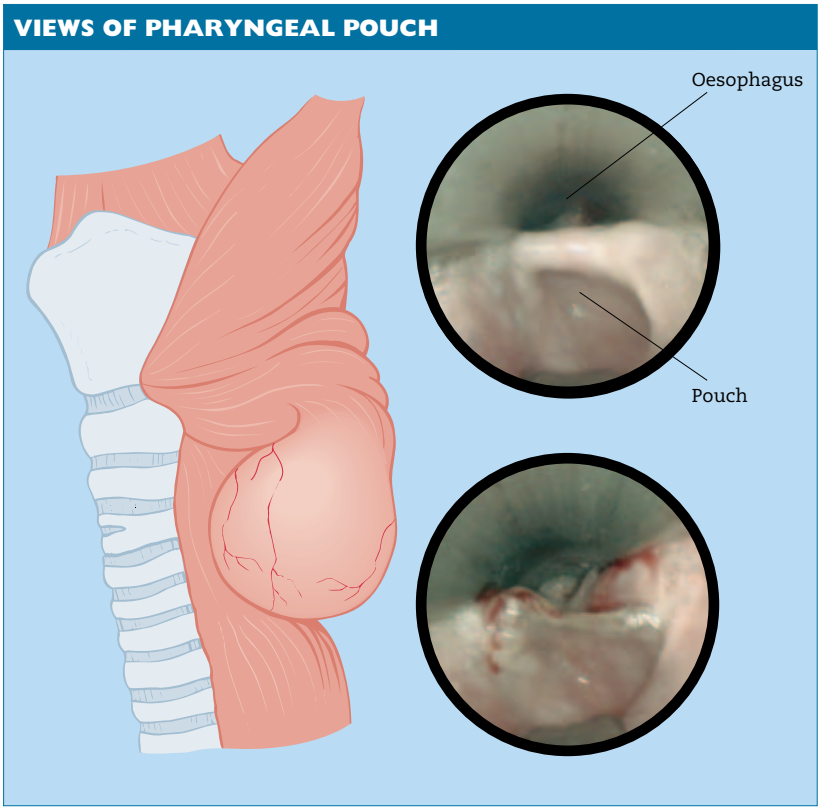


Fig. 38.2 External and endoscopic views of the pharyngeal pouch. The photographs show appearances before and after endoscopic diverticulotomy with a stapling device.

INVESTIGATION

The pouch is revealed by barium swallow (Fig. 38.3).

TREATMENT

1 The early case can be managed by periodic dilatation of the cricopharyngeus.

2 An established pouch causing symptoms will require surgical treatment. Under general anaesthesia, a dilating rigid pharyngoscope is used to demonstrate the party wall between the oesophagus anteriorly and the pouch posteriorly. A staple gun is then used to divide the wall and at the same time staple the cut edges (Fig. 38.2). The patient is usually able to eat the following day and the hospital stay is very short.

3 Only rarely is it now necessary to excise a pouch by external approach through the neck.

(a)

(b)

Fig. 38.3 A barium swallow X-ray showing a pharyngeal pouch (left); lateral view (right).

MALIGNANT DISEASE OF THE HYPOPHARYNX

Malignant disease of the hypopharynx occurs in two main forms.

1 Carcinoma of the piriform fossa—predominantly a disease of males (Fig. 38.4).

2 Post-cricoid carcinoma—predominantly a disease of females (Fig. 38.5). This may supervene on long-standing Paterson–Brown Kelly syndrome.

CLINICAL FEATURES

1 Increasing dysphagia and weight loss.

2 An enlarged cervical node due to metastasis may be the first complaint of a patient with a small hypopharyngeal cancer not yet large enough to produce dysphagia.

3 Hoarseness may be present from involvement of the recurrent laryngeal nerve or direct spread to the larynx.

4 Referred otalgia is often present, especially on swallowing.

5 Mirror examination may reveal the malignant ulcer, or pooling of saliva in the hypopharynx.

Spread occurs locally by direct invasion, but nodal metastases in the neck occur early in the course of the disease. Distant metastases sometimes occur (compare with laryngeal carcinoma).

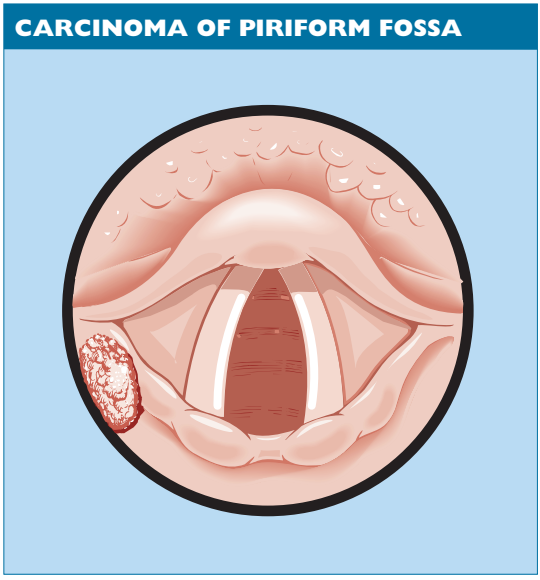


Fig. 38.4 Carcinoma of the piriform fossa.

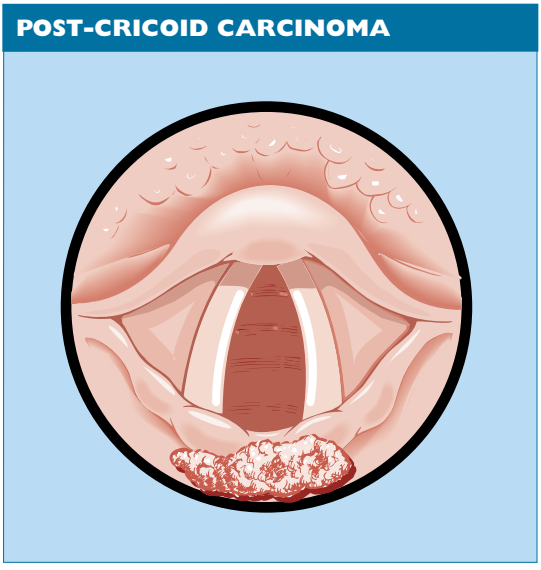


Fig. 38.5 Post-cricoid carcinoma.

Fig. 38.6 A sword swallower in Prague. The first ever oesophagoscopy was performed in the 19th century on a sword swallower by Küssmaul to demonstrate its feasibility.

INVESTIGATIONS

Every case of dysphagia must be investigated by barium swallow and oesophagoscopy. Even if the X-ray is normal, direct examination must be performed in the presence of dysphagia.

TREATMENT

1 Hypopharyngeal cancers are usually treated by pharyngolaryngectomy, a major operation with a definite mortality. Repair of the pharynx is difficult and accomplished either by stomach pull-up or by the use of vascularized skin flaps. The use of a free graft of jejunum with microvascular anastomosis has been shown to be effective and is a less severe operation than stomach pull-up, though with less certain results. The 5-year survival rate is of the order of 35%.

2 Radiotherapy may produce cure or good palliation but the patient will suffer considerable discomfort during the course of treatment and should be warned accordingly.

3 Many cases are unfortunately untreatable when first diagnosed and no effort must be spared to relieve the patient's misery with analgesics, tranquillizers and devoted nursing care.

GLOBUS PHARYNGIS

Globus pharyngis is the term applied to the sensation of a lump or discomfort in the throat, probably owing to cricopharyngeal spasm. The discomfort is relieved by eating and there is no interference with the swallowing of food or liquids.

The symptoms tend to be aggravated by the patient's constant action of swallowing, and frequently introspection and anxiety add to the problem. A proportion of patients with globus pharyngis will be found to have reflux oesphagitis or a gastric ulcer and a barium swallow should always be performed, both to find such conditions and to exclude as far as possible organic pathology in the throat. Many cases have a psychological cause and are aggravated by anxiety and introspection.

If symptoms persist, oesophagoscopy is essential—a normal barium swallow does not rule out organic disease.

If no organic cause for the symptoms exists, most patients improve with reassurance reinforced by adequate examination and investigation. A short course of tranquillizers is often helpful.

Tracheostomy

Tracheostomy, the making of an opening into the trachea, has been practised since the first century BC, and is a procedure with which all doctors should be familiar.

INDICATIONS

Indications for tracheostomy may be classified as follows:

1. conditions causing upper airway obstruction;
2. conditions necessitating protection of the tracheobronchial tree;
3. conditions causing respiratory failure.

Protection of the tracheobronchial tube

Any condition causing pharyngeal or laryngeal incompetence may allow aspiration of food, saliva, blood or gastric contents. If the condition is of short duration, e.g. general anaesthesia, endotracheal intubation is appropriate, but for chronic conditions tracheostomy is necessary. It allows easy access to the trachea and bronchi for regular suction and permits the use of a cuffed tube, which affords further protection against aspiration. Examples of such conditions are:

1. polyneuritis (e.g. Guillain–Barré syndrome);
2. bulbar poliomyelitis;
3. multiple sclerosis;
4. myasthenia gravis;
5. tetanus;
6. brain-stem stroke;
7. coma due to:
   (a) head injury;
   (b) poisoning;
   (c) stroke;
   (d) cerebral tumour;
   (e) intracranial surgery (unless the state of coma is likely to be prolonged, endotracheal intubation is preferable in the first place);
8. multiple facial fractures.

UPPER AIRWAY OBSTRUCTION

Congenital

1. Subglottic or upper tracheal stenosis.
2. Laryngeal web.
3. Laryngeal and vallecular cysts.
4. Tracheo-oesophageal anomalies.
5. Haemangioma of larynx.

Trauma

1. Prolonged endotracheal intubation.
2. Gunshot wounds and cut throat, laryngeal fracture.
3. Inhalation of steam or hot vapour.
4. Swallowing of corrosive fluids.
5. Radiotherapy (may cause oedema).

Infections

1. Acute epiglottitis (see Chapter 33).
2. Laryngotracheobronchitis.
3. Diphtheria.
4. Ludwig's angina.

Malignant tumours

1. Advanced malignant disease of the tongue, larynx, pharynx or upper trachea.
2. As part of a surgical procedure for the treatment of laryngeal cancer.
3. Carcinoma of thyroid.

Bilateral laryngeal paralysis

1. Following thyroidectomy.
2. Bulbar palsy.
3. Following oesophageal or heart surgery.

Foreign body

1. Remember the Heimlich manoeuvre — grasp the patient from behind with a fist in the epigastrium and apply sudden pressure upwards towards the diaphragm. It may need to be repeated several times before the foreign body is expelled.

Box 39.1 Upper airway obstruction.

Respiratory failure

Tracheostomy in cases of respiratory failure allows:

1. reduction of dead space by about 70 mL (in the adult);
2. bypass of laryngeal resistance;
3. access to the trachea for the removal of bronchial secretions;
4. administration of humidified oxygen;
5. positive-pressure ventilation when necessary.

Respiratory failure is often multifactorial and may be considered under the following headings.

1 Pulmonary disease—exacerbation of chronic bronchitis and emphysema; severe asthma; postoperative pneumonia from accumulated secretions.
2 Abnormalities of the thoracic cage—severe chest injury (flail chest); ankylosing spondylitis; severe kyphosis.
3 Neuromuscular dysfunction—e.g. Guillain–Barré syndrome; tetanus; motor neurone disease; poliomyelitis.

Criteria for performing tracheostomy

Tracheostomy should, whenever possible, be carried out as an elective procedure and not as a desperate last resort. There are degrees of urgency.
1 If the patient has life-threatening airway obstruction when first seen, it is obvious that urgent treatment is required. If endotracheal intubation fails, tracheostomy must be done at once. There is no time for sterility—with the left hand, hold the trachea on either side to immobilize it, make a vertical incision through the tissues of the neck into the trachea and twist the blade through 90° to open up the trachea. There will be copious dark bleeding but the patient will gasp air through the opening. Using the index finger of the left hand as a guide in the wound, try to insert some sort of tube into the trachea. The blood should then be sucked out by whatever means are available. Once an airway is established, the tracheostomy can be tidied up under more controlled conditions.
2 In patients with airway obstruction of more gradual onset, do not allow the situation to deteriorate to that described above. Stridor, recession and tachycardia denote the need for intervention, and cyanosis and bradycardia indicate that you are running out of time. The case should be discussed with an experienced anaesthetist, and the patient taken to the operating theatre. The ideal is to carry out tracheostomy under general anaesthesia with endotracheal intubation. Once a tube has been inserted, the airway is safe and the tracheostomy can be performed calmly and carefully with full sterile precautions. If the anaesthetist is unable to intubate the patient, it will be necessary to perform the operation under local anaesthetic using infiltration with lignocaine. The anaesthetist meanwhile will administer oxygen through a face-mask.
3 Elective tracheostomy should be carried out before deterioration occurs in non-obstructive cases as listed above and patients who have previously been intubated because of obstruction or for ventilation but who cannot be extubated safely.
Such elective tracheostomy cases are ideal for trainees to learn the technique of the operation safely under supervision and every such opportunity should be taken.

Dictum

In cases of respiratory obstruction and respiratory failure and in the absence of steady improvement, support the airway by tracheostomy or endotracheal intubation.

Remember that children may deteriorate with dramatic suddenness.

THE OPERATION OF ELECTIVE TRACHEOSTOMY

Like any other operation, tracheostomy can be learned only by instruction and practice, so that only a brief description will be given.

The operation should be carried out under general anaesthesia with endotracheal intubation. The neck should be extended and the head must be straight, not turned to one side. A transverse incision is preferable to a vertical incision, and should be centred midway between the cricoid cartilage and sternal notch (Fig. 39.1). The strap muscles are identified and retracted laterally (Fig. 39.2) and the thyroid isthmus is divided. Once the trachea has been reached (it is always deeper than you expect), the cricoid must be identified by palpation and the tracheal rings counted. An opening is made into the trachea, centred on the third and fourth rings (Fig. 39.3). In adults, an ellipse of sufficient size to accept the tracheostomy tube is excised, but in children, a single slit in the tracheal wall is preferable, after

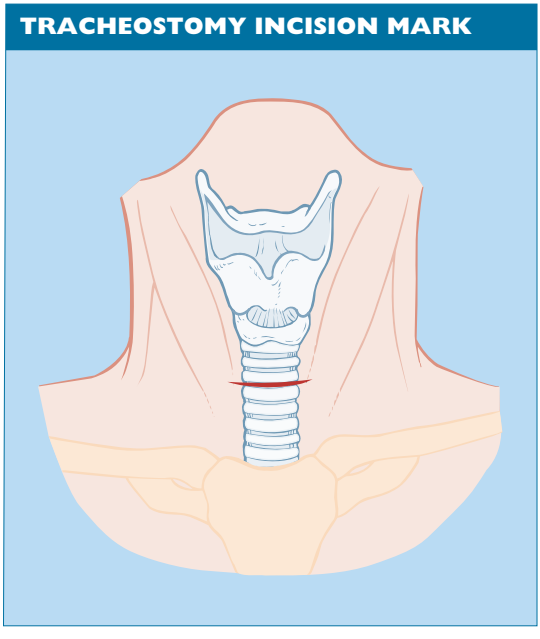


Fig. 39.1 Tracheostomy showing the land marks of the neck and the incision for operation.

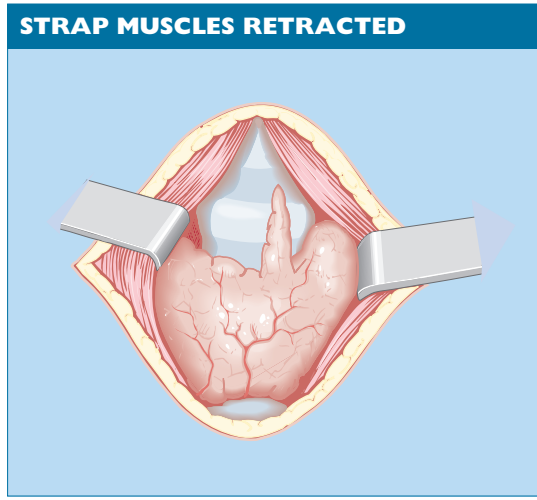


Fig. 39.2 The strap muscles are retracted, exposing the trachea and the thyroid isthmus.

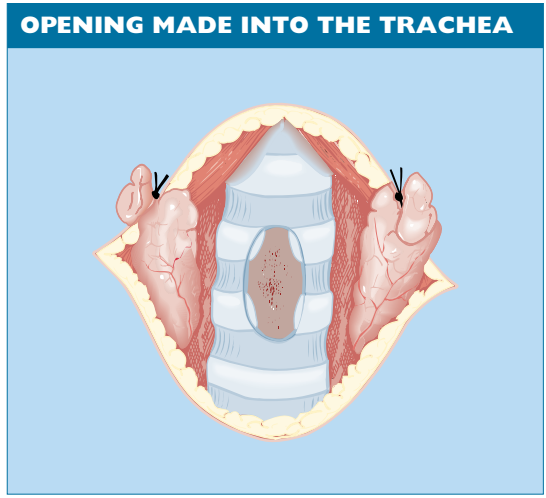


Fig. 39.3 The thyroid isthmus has been divided and an opening made in the anterior tracheal wall.

first inserting stay sutures on either side to allow traction on the opening in order to insert the tube.

After insertion of the tracheostomy tube, the trachea is aspirated thoroughly and unless the skin incision has been excessively long it is left unsutured. To sew the wound tightly makes surgical emphysema more likely and replacement of the tube more difficult.

Choice of tracheostomy tube

The choice of tube depends on the reason for the tracheostomy.

1 In cases of airway obstruction, a silver tube such as the Negus is ideal. It has an inner tube, which can be removed for cleaning, and has an expiratory flap-valve (sometimes called a speaking valve) to allow phonation.

2 In cases requiring ventilation or protection from aspirated secretions, a cuffed tube is necessary. The day of the red rubber tube has gone, and inert plastic tubes are now used. The cuff should be of a low-pressure design to prevent stricture formation.

3 Small children should never be fitted with a cuffed tube because of the risk of causing stenosis. A plain silastic tube should be used initially, and if ventilation is not required it can be changed at a later date to a silver tube fitted with an optionally valved inner tube (e.g. Sheffield tracheostomy tube). It is beyond the scope of this book to consider in detail the indications for metal or plastic tubes.

After-care of the tracheostomy

Nursing care

Nursing care must be of the highest standard to keep the tube patent and prevent dislodgement.

Position

Adult patients in the postoperative period should usually be sitting well propped up; care must be taken in infants that the chin does not occlude the tracheostomy and the neck should be extended slightly over a rolled-up towel.

Suction

Suction is applied at regular intervals dictated by the amount of secretions present. A clean catheter must be passed down into the tube in conscious patients. Unconscious or ventilated patients will require deeper suction and physiotherapy.

Humidification

Humidification of the inspired air is essential to prevent drying and the formation of crusts and is achieved by any conventional humidifier. Remember that the humidity you can see is due to water droplets, not vapour, and may waterlog small infants.

Fig. 39.4 A newly performed tracheostomy in a small child. Note the stay sutures on either side to aid replacement of the tube should it become dislodged.

Avoidance of crusts

Avoidance of crusts is aided by adequate humidification; if necessary, sterile saline (1 mL) can be introduced into the trachea, followed by suction.

Tube changing

Tube changing should be avoided if possible for 2 or 3 days, after which the track should be well established and the tube can be changed easily. Meanwhile, if a silver tube has been inserted, the inner tube can be removed and cleaned as often as necessary. Cuffed tubes need particular attention, with regular deflation of the cuff to prevent pressure necrosis. The amount of air in the cuff should be the minimum required to prevent an air leak.

Decannulation

Decannulation should only be carried out when it is obvious that the tracheostomy is no longer required. The patient should be able to manage with the tube occluded for at least 24 h before it is removed (Fig. 39.4). Decannulation in children often presents particular difficulties. After decannulation, the patient should remain in hospital under observation for several days.

Complications

Periochondritis and subglottic stenosis

Periochondritis and subglottic stenosis may result, especially if the cricoid cartilage is injured. Go below the first ring.

Mediastinal emphysema or pneumothorax

Mediastinal emphysema or pneumothorax may occur after a very low tracheostomy, or if the tube becomes displaced into the pretracheal space. The chest should be X-rayed after operation.

Obstruction

Obstruction of the tube or trachea by crusts of inspissated secretion may prove to be fatal. If the airway becomes obstructed and cannot be cleared by suction, act boldly. Remove the whole tube and replace it if blocked. If the tube is patent, explore the trachea with angled forceps to remove the obstruction. An explosive cough may expel the crust and the tube can then be replaced.

Complete dislodgement

Complete dislodgement of the tube may occur if it is not adequately fixed. Hold the wound edges apart with a tracheal dilator and put in a clean tube. A good light is essential.

Partial dislodgement

Partial dislodgement of the tube is more difficult to recognize and may be fatal. The tube comes to lie in front of the trachea, the airway will be impaired and, if left, erosion of the innominate artery may result in catastrophic haemorrhage. Make sure that at all times the patient breathes freely through the tube, and such an occurrence should be avoided. Surgical emphysema of startling severity may occur if the patient is on positive-pressure ventilation.

It is common experience that as soon as a tracheostomy has been performed there is pressure from all concerned to close it. A tracheostomy must be retained until you are sure it is no longer necessary.

Diseases of the Salivary Glands

The salivary glands consist of:

1 the parotid glands;

2 the submandibular glands;

3 minor salivary glands throughout the mouth and upper air passages. (The sublingual collection is included in this group.)

Parotid gland

The parotid gland lies on the side of the face in close relationship to the ear, the angle of the mandible and styloid muscles. The facial nerve enters the posterior pole of the parotid gland and divides within its substance into its various branches, which exit at the anterior margin of the gland. It is the presence of the facial nerve within the parotid that makes surgery of this gland so difficult. Its duct opens opposite the second upper molar tooth, where it forms a small visible papilla. Its secretomotor nerve supply comes from the glossopharyngeal nerve via the tympanic plexus in the middle ear.

The saliva produced is entirely serous. The surface outline of the gland is shown in Fig. 40.1.

The submandibular salivary gland

The submandibular gland lies in the floor of the mouth below and medial to the mandible and its greater part is external to the mylohyoid muscle. The deep part of the gland curves around the back of the mylohyoid and the duct runs forwards to open at the sublingual papilla. The deep part of the gland lies on the lingual nerve, from which it receives its secretomotor supply derived from the facial nerve via the chorda tympani in the middle ear. The saliva from the submandibular gland is both serous and mucous.

The minor salivary glands

The minor salivary glands can be seen and felt in the lips, cheeks, palate and upper air passages. They produce mainly mucous saliva (remember the noun is *mucus*) and are responsible for a large proportion of the total saliva secreted. They are subject to many of the diseases that affect the major salivary glands.

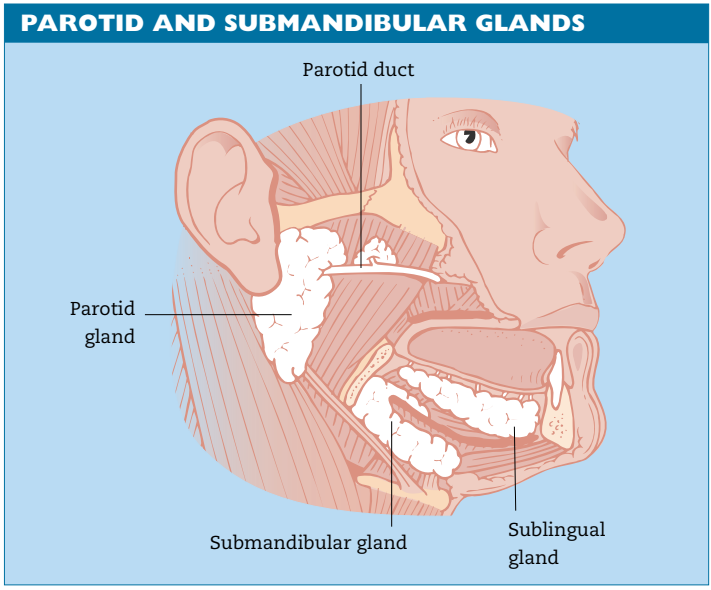


Fig. 40.1 The surface outline of the parotid and submandibular glands. The parotid gland is larger than is usually appreciated.

HISTORY-TAKING—SALIENT POINTS

In asking the history, enquire particularly about pain and swelling of the glands in relation to eating. If the duct is obstructed, the whole gland will become tense and painful and enlarge visibly during saliva production, and will resolve slowly over about an hour.

If a lump is present, ask about variation in size and whether it is related to food. Tumours do not enlarge during salivation, but do tend to get bigger with the passage of time.

Ask about dryness of the mouth, remembering that obstruction of even two major glands produces little apparent change. Persistent dryness suggests diffuse salivary gland disease.

Ask about recent contact with mumps.

EXAMINATION OF THE SALIVARY GLANDS

First, inspect the salivary glands externally, noting any swellings or asymmetry. The function of the facial nerve should be tested in all its divisions. The parotid and submandibular ducts should be inspected to assess saliva flow, redness and the presence of pus or an obvious stone. The mouth should be inspected to see if it is excessively dry.

After inspection, the glands should be palpated carefully by bimanual exploration. It is only in this way that a proper assessment can be made. The ducts should be felt carefully for calculi and then massaged gently towards the opening to express any pus present.

The patient can be given an acid-drop to suck and any enlargement on salivation assessed.

The ears should be inspected to make sure that there is no salivary fistula or tumour extension through the anterior meatal wall.

Gentle probing of the duct may produce a gush of turbid saliva.

INVESTIGATION

1 Plain X-ray, including occlusal views, will show a radio-opaque calculus.

2 Ultrasonic scanning of the gland is quick, non-invasive and exposes the patient to no radiation. It will identify masses, cysts and calculi but is only comprehensible to the radiologist!

3 Sialography will outline the duct system. Contrast medium is injected into the gland after cannulation of the duct, and will show radiolucent stones or strictures. A solid tumour will not fill with contrast, but an area of sialectasis will be seen as droplets in the dilated ducts. Sialography contributes little to tumour diagnosis and is not usually performed in such cases.

4 If there is a large parotid tumour with parapharyngeal extension, an MR scan will outline its extent.

Acute inflammation

Mumps

Mumps is the commonest acute inflammatory condition of salivary glands. It affects mainly the parotid glands, which become uniformly swollen and painful, but the submandibular glands may also be involved. Its incidence had fallen to very low levels as a result of immunization, but is now rising alarmingly as some parents decline to have their children immunized.

Acute suppurative parotitis

Acute suppurative parotitis is uncommon and usually occurs in debilitated patients. Treatment is with antibiotics, rehydration and oral hygiene. If an abscess develops, surgical incision is required.

Acute sialadenitis

Acute sialadenitis may affect the submandibular gland (commonly) or the parotid gland (rarely) because of the presence of a duct calculus. The

affected gland is painful and swollen and is made worse by eating. The patient is usually unwell with a pyrexia.

Removal of the stone provides dramatic relief in most cases.

Recurrent acute inflammation

Recurrent acute inflammation of the major salivary glands presents a problem of management if no stone is present. If there is a duct stricture, gentle dilatation may be curative. In childhood, recurrent episodes of acute inflammation will usually subside by puberty and should be treated conservatively.

Chronic inflammation

Chronic inflammation of the parotid or submandibular gland is usually due to sialectasis (duct dilatation leading to stasis and infection) and will not usually respond to conservative measures. The gland is thickened with episodic pain and infection, and can be felt easily on bimanual examination.

TREATMENT

The submandibular gland so affected can be excised; chronic sialectasis of the parotid poses a difficult problem. Excision has a high risk of facial nerve damage and long-term antibiotics should be tried before resorting to parotidectomy.

Sjögren's syndrome

Sjögren's syndrome is an auto-immune systemic disorder affecting the salivary and lacrimal glands. There is enlargement of the glands and loss of secretion, leading to dryness of the eyes and mouth. In many cases, biopsy of the lip mucosa will show minor salivary glands heavily infiltrated by lymphocytes. Symptomatic relief can be obtained by the use of artificial saliva or glycerin and warm-water mouthwash.

Salivary retention cysts

Salivary cysts occur most commonly in the floor of the mouth, where they may become very large and expand the loose tissues (Fig. 40.2). The name 'ranula' is often applied. Less commonly, such retention cysts occur on the mucosal aspect of the lips.

Fig. 40.2 Sublingual retention cyst.

Fig. 40.3 Calculus in left submandibular duct orifice.

Salivary calculi

Most salivary calculi occur in the submandibular gland because of the mucoid nature of its saliva, which can become inspissated (Fig. 40.3). However, calculi do also occur in the parotid gland.

CLINICAL FEATURES

The flow of saliva from the affected gland becomes obstructed, causing the gland to swell during salivation. Such swelling is painful and its size may be alarming. The swelling will usually resolve over about an hour.

The calculus can be seen if it presents at the duct opening, or felt within the duct or gland.

INVESTIGATION

Most, but not all, calculi are radio-opaque, and X-rays should be performed as described above.

TREATMENT

1 Intraductal calculi can be removed from the duct under local anaesthetic. A suture should first be passed around the duct proximal to the stone to prevent its movement back into the gland. Removal of such a stone may be more difficult than you might expect.

2 If the stone is within the substance of the salivary gland, excision of the gland will have to be considered. The submandibular gland presents no problem as it is straightforward to excise, but parotidectomy for calculus requires a high degree of skill.

Salivary gland tumours

Salivary glands, because they contain lymph nodes within their structure, may be the site of metastases from a non-salivary primary site or from blood dyscrasias such as leukaemia (Fig. 40.4). Salivary gland disease is uncommon in childhood, but a solid parotid tumour presenting under the age of 16 is more likely (60:40) than not to be malignant.

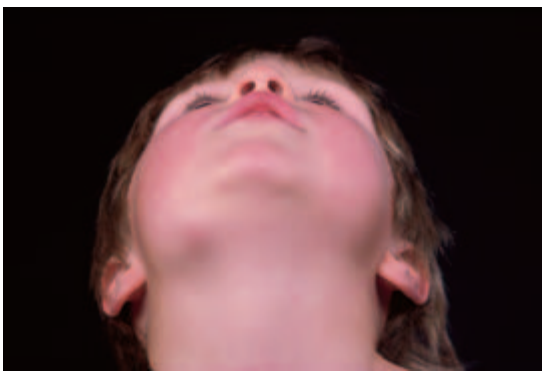


Fig. 40.4 Enlarged right submandibular gland from chronic infection.

Fig. 40.5 A pleomorphic adenoma in the tail of the parotid gland.

It is not usually possible to detect clinically whether a tumour in a salivary gland is benign or malignant. Fine needle aspiration cytology may be helpful in predicting the type of tumour present. All such tumours should be treated as malignant until the diagnosis is confirmed by histology. The same tumours occur in minor salivary glands as in the major glands but malignant tumours in minor glands have a more aggressive course.

PATHOLOGICAL CLASSIFICATION

Benign tumours

Pleomorphic salivary adenoma (mixed salivary tumour, PSA)
(Fig. 40.5)
Occurs most frequently in the parotid gland. Propensity for recurrence if not removed with surrounding cuff of tissue. PSA accounts for about 90% of parotid tumours in adults.

Warthin's tumour (cystic lymphoepithelial lesion)
Almost exclusive to the parotid gland, it causes a smooth swelling in the tail of the gland that may feel cystic.

Haemangioma
A rare tumour, usually congenital or occurring in early childhood; occurs most commonly in the parotid gland. A haemangioma is also often present on the skin of the face or in the mouth.

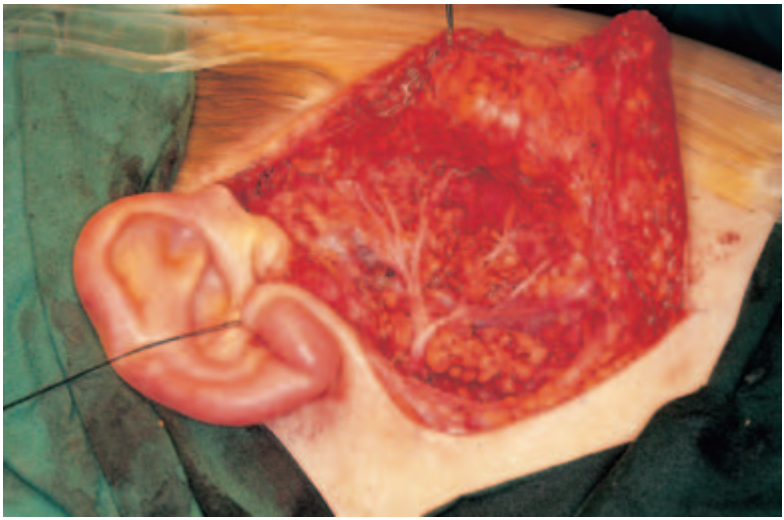


Fig. 40.6 The facial nerve after superficial parotidectomy for a benign tumour in a boy aged 12 years.

Malignant tumours

Adenoid cystic carcinoma

The commonest malignant tumour of salivary glands. With early perineural invasion, the long-term prognosis is poor but survival for many years is usual.

Muco-epidermoid tumours

Can arise in any of the salivary glands and have a variable degree of malignancy; the majority will behave as benign tumours but a small proportion are aggressively malignant.

Acinic cell tumours

Are usually of low-grade malignancy and occur almost exclusively in the parotid gland.

Malignant pleomorphic adenomata

May arise in an existing adenoma. The malignant change is made apparent by a rapid increase in size and, in the case of parotid tumours, the development of facial weakness. A benign tumour causes no such weakness.

Squamous carcinoma

Squamous carcinoma of the submandibular and parotid glands is uncommon and has a very poor prognosis. Radical excision followed by radiotherapy is the only treatment that offers any chance of cure.

Lymphoma

Lymphoma can occur in any of the salivary glands, major or minor. Surgery has no part in treatment other than for biopsy, but radiotherapy and/or chemotherapy may be curative. The lymphoma arises from lymphoid tissue within the salivary gland.

Salivary incontinence (drooling)

While not due to disease of the salivary glands, children or adults with, for example, cerebral palsy or stroke may be unable to control the saliva produced, particularly from the sublingual and submandibular ducts. This results in much distress and discomfort to patient and relatives. It can often be relieved by surgical relocation of the submandibular ducts to a posterior position near the tonsil combined with excision of the sublingual gland.

Surgery of the salivary glands

SUBMANDIBULAR GLAND EXCISION

This is usually performed for tumour removal but may be made necessary by calculus or by chronic infection. The gland is approached externally and care is taken not to damage the marginal mandibular branch of the facial nerve or the lingual nerve.

PAROTIDECTOMY

Again, usually undertaken for removal of tumour (Fig. 40.6). The facial nerve is identified at an early stage in the operation and its branches followed carefully. Usually the tumour lies superficial to the nerve but if it is deep, the nerve will need to be mobilized. All patients having parotidectomy must be warned of the risk of facial nerve damage.

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