Chapter 23: Lower respiratory conditions in otolaryngology

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Several otolaryngological conditions are aetiologically associated with respiratory disorders, and respiratory disease is a common cause of morbidity and mortality in the UK. Thus the principal conditions discussed are nasal and bronchial atopy, sinusitis and bronchiectasis, carcinoma of the bronchus and pulmonary metastases, malignant pleural effusions and postoperative respiratory complications. Some granulomata such as tuberculosis, sarcoidosis and Wegener's granulomatosis may involve the upper and lower respiratory tract and chronic bronchitis and emphysema may influence the treatment options of the otorhinolaryngologist. This chapter is written by a thoracic physician who regrets the historical anatomical barrier imposed by the larynx, which has separated the two disciplines.

Rhinitis, nasal polyps and bronchial asthma

Hippocrates recognized the association between nasal polyps and bronchial asthma, and pollen allergy can produce seasonal allergic rhinitis and seasonal asthma in atopic subjects. The reported incidence of asthma in patients with nasal polyps has ranged from 3% to 72%, while the incidence of nasal polyps in bronchial asthma has varied in reported series from 23% to 42%. Moloney and Collins (1977) calculated that a patient with nasal polyps or with bronchial asthma has a 25% chance of developing the other disorder.

Asthma and rhinitis can be divided into atopic or non-atopic groups according to skin prick testing and IgE levels. The atopic triad of allergic rhinitis, eczema and asthma is seen in up to 70% of all asthmatics. Atopy occurs in up to 30% of the population however, and is detected in all racial groups being maximal in the third decade. Only a proportion of atopic individuals ever develop nasal, skin or respiratory symptoms and it has been demonstrated that skin prick positive students are more likely to suffer from rhinitis and asthma than skin prick negative students after 3 years of follow-up (Hagy and Settipane, 1971). The common allergens by which the atopic status is determined are house dust mite and house dust, grass and tree pollens, animal danders and moulds, especially Aspergillus fumigatus. In 30% of asthmatics no extrinsic cause can be identified and these patients are skin prick negative with normal IgE levels and negative radioallergosorbent (RAST) values. They do however have raised sputum and blood eosinophil counts which are a marker of asthma and not of atopy. Such intrinsic asthmatics may also have rhinitis which, like their asthma, is perennial (Lessof, 1981).

Special mention must be made of bronchial asthma in association with nasal polyps and aspirin sensitivity. This affects up to 5% of all asthmatics who are sensitive to aspirin and other analgesics, as well as the azo dye, tartrazine, found in many food stuffs and drugs. It is thought that the salicylates and other analgesics alter the homeostasis of arachidonic acid mediators such as prostaglandins and leukotrienes, as well as platelet aggregating factor (PAF), thus precipitating bronchospasm (Szczwilkik, Gryglewski and Czerniawska-Mysik, 1975).

The histological changes in the nasal and bronchial mucosa of patients with rhinitis, polyps and asthma are similar and show thickening of the basement membrane, eosinophilic
infiltration, oedema and epithelial hyperplasia. In addition to atopy, possible aetiological factors common to all three disorders include bacterial and viral infections, drugs such as analgesics and beta blockers, autonomic dysfunction and exercise when cold dry air is inhaled. Occupational causes of bronchial asthma are being increasingly recognized, but the role of food allergy is not yet clearly established.

The effect of nasal polypectomy on asthma is controversial. Deterioration, improvement and the initial appearance of asthma have all been noted after polypectomy, and such changes may merely reflect the spontaneous fluctuation in asthma.

Clinical features

Bronchial asthma is characterized by attacks of wheezing breathlessness which often disturb sleep, are often most severe at breakfast time and limit exercise during the day time. In children, a persistent cough and a tentative diagnosis of recurrent bronchitis should suggest a diagnosis of asthma. In severe attacks, which can be fatal, progressive deterioration occurs which limits the victim first to his house, then his bed and finally interferes with eating, drinking and speech. Approximately 2000 people die annually from bronchial asthma in the UK and most have been breathless for several days before their final illness.

Management

There is a necessity for patients, their relatives and their medical advisers to appreciate the severity of an attack of asthma, and this is most effectively and economically achieved by obtaining a measurement of the peak expiratory flow rate. All general practitioners who visit a patient with asthma should have such an instrument, and in hospital patients, an estimate of the peak expiratory flow rate should be made regularly, not only on medical wards, but especially on surgical units. Regular monitoring of patients with asthma, which may demonstrate a deterioration in function, should alert the doctor and the patient to institute more effective treatment and seek assistance from physician colleagues (Clarke and Godfrey, 1983).

The treatment of asthma is not normally curative. Known allergens such as house dust mite, grass pollens and pet danders should be avoided if possible and strict measures to reduce house dust mite counts in the mattress can be beneficial. These can include the use of synthetic duvets, pillows, sheets and blankets, covering the mattress with plastic covers which should be damp dusted and scrupulous vacuuming of the bedroom carpet or its replacement with linoleum.

Although immunotherapy with hyposensitization may be effective in hay fever, there is no evidence to show that such procedures have any value in the management of bronchial asthma.

The principal drugs used to relieve an acute attack of asthma are the beta-adrenergic or sympathomimetic bronchodilators. Most mild to moderate attacks of asthma respond rapidly to the aerosol administration of a selective beta2-stimulant such as salbutamol, terbutaline, fenoterol or rimiterol. These agents produce few side-effects apart from tremor when inhaled and their speed of action is prompt when compared to oral administration.
Patients should be instructed in their use, their technique checked regularly, and they should be warned against excessive use. When a patient with asthma fails to respond to the usual dose of inhaled bronchodilator, he should be advised to seek further medical advice. Oral preparations are given to children who cannot operate aerosol inhalers and intravenous injections of salbutamol or terbutaline are of value in severe asthma when bronchospasm prevents the use of the aerosol. Aqueous aerosols or respirator solutions of salbutamol or terbutaline can be administered for 15-20 minutes from a nebulizer in both hospital and domiciliary practice, and are useful in the initial treatment of severe or worsening asthma.

Xanthine bronchodilators such as aminophylline and theophylline in sustained release preparations provide effective background bronchodilatation with twice daily oral administration and a slow intravenous injection of aminophylline is still used by many physicians to relieve acute severe asthma. When this is given, it is vital that the dose is adjusted according to the plasma concentration, if oral xanthine preparations have been previously prescribed.

Prophylactic treatment of asthma requires the regular administration of steroids or cromoglycate. Inhaled steroids such as beclomethasone or budesonide, and sodium cromoglycate inhaled from the spinhaler or aerosol must be taken regularly. Sodium cromoglycate has few side-effects; inhaled steroids may cause hoarseness and oral candidiasis. This can be treated with oral fungicides.

Oral steroids may be required for prophylaxis when control of airflow obstruction has not been achieved using maximum inhaled doses and a short high dose, quickly reducing course of prednisolone is used in acute asthma.

Acute severe asthma, formerly called status asthmaticus, should be treated in hospital by experts using oxygen, intravenous hydrocortisone, nebulized salbutamol and possibly intravenous aminophylline. Such patients require careful monitoring of pulse, blood pressure, peak expiratory flow and blood gas tensions, and the decision to transfer the patient to an intensive care unit should be made early rather than late. Intermittent positive pressure ventilation should only rarely be necessary.

**Sinusitis and bronchiectasis**

Upper respiratory tract infection accounts for up to 50% of lost working days per year from illness in the UK and infection of the paranasal sinuses develops in a significant number. While most paranasal sinus infection results from nasal disease such as deviated septum or polyps, it must be remembered that the columnar mucociliary lining is in continuity from the nose down to the terminal bronchiole. Our understanding of the interrelationship between the upper and lower airways has been advanced recently and sinusitis with or without polyps is frequently detected in patients with bronchiectasis.

**Clinical features**

Bronchiectasis is characterized by chronic dilatation of one or more bronchi. The disorder is recognized by recurrent cough with large volumes of infected sputum which may be complicated by haemoptysis, airways obstruction, or pneumonia and pleurisy. Bronchial
obstruction by mucus plug, foreign body or tumour will result in bronchiectasis if left untreated, and when accompanied by infection, structural distortion of the bronchial tree with pulmonary fibrosis will develop. Many cases of bronchiectasis used to follow tuberculosis, whooping cough and measles, but the incidence of these primary disorders is falling. In health, the bronchial tree is protected by the nasal filter, the cough reflex and normal function of the mucociliary escalator containing immunoglobulins. Congenital and acquired disorders of these functional elements lead to bronchiectasis and, in many cases, sinusitis and structural abnormalities of the paranasal sinuses coexist. Thus bronchiectasis is a constant feature of patients with the autosomal recessive disorder of cystic fibrosis, who frequently have sinusitis and nasal polyposis showing a lymphocytic infiltration. In Kartagener's syndrome and other inherited disorders of ciliary malfunction, a defect in the microstructure of the tubules of the cilia and sperm leads to male infertility, bronchiectasis, situs inversus with dextrocardia and sinusitis or absent frontal sinuses.

In congenital disorders of immunoglobulin synthesis such as agammaglobulinaemia or combined hereditary immunoglobulin and T-cell functional defects such as ataxia telangiectasia, bronchiectasis and sinusitis coexist. Immunoglobulin A is the functional immunoglobulin of sputum, and it may be reduced or disappear following chemotherapy and radiation treatment for Hodgkin's disease and allied disorders (Berdal et al, 1976).

In all these conditions characterized by sinobronchitis, the common infecting bacteria are *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Staphylococcus* spp. and *Pseudomonas* spp. Of special note is the fungus *Aspergillus fumigatus* which has a special predilection for the upper and lower respiratory passages in subjects with impaired mucociliary function. Proximal bronchiectasis may occur in allergic bronchopulmonary aspergillosis characterized by asthma, fleeting eosinophilic pulmonary shadows, positive skin prick tests to *Aspergillus*, eosinophilia and aspergillus precipitins in the serum.

**Treatment**

The sinuses and bronchiectasis require simultaneous and coordinated management. Bronchiectasis is principally controlled medically with postural drainage and self-physiotherapy, appropriate antibiotics for superadded infection and bronchodilators for concomitant airways obstruction. Surgery for bronchiectasis is rare nowadays. Previous surgical results have often been unsatisfactory as a consequence of the diffuse nature of the condition, leading to recurrent symptoms after surgery. However, if the bronchiectasis is demonstrably localized by bilateral bronchography and if pulmonary function is good, then localized resection may be considered, particularly after a spell of failed medical treatment. In some patients with immunodeficiency, substitution therapy with periodic gamma globulin injections may be beneficial.

**Chronic bronchitis and emphysema**

These disorders are the commonest cause of loss of work time in the UK and they are much more common in men. They frequently cause postponement or cancellation by the anaesthetist of elective surgery. Chronic bronchitis is defined as a persistent cough with sputum for more than 3 months per year for 2 consecutive years. In contrast, emphysema is defined as a dilatation of the air passages beyond the terminal bronchiole and is a pathological...
entity associated with destruction of the gas exchanging area of the lung. Both conditions usually exist together and are characterized by airflow obstruction with breathlessness, wheeze on forced expiration and physiological evidence of expiratory airways obstruction. The disorders, often referred to as chronic obstructive airways disease, are seen in smokers from major industrial conurbations. Acute infective exacerbations are a common cause of hospital admission in the winter. Patients have symptoms for decades with a progressive decrease in exercise tolerance, so that they become breathless at rest. The onset of right-sided cardiac failure heralds cor pulmonale caused by hypoxia. Death is associated with respiratory and cardiac failure and may follow elective surgery.

It is essential that a measure of respiratory function, such as the forced expiratory volume in one second and forced vital capacity and their ratio, is made in all patients with a history of chronic obstructive bronchitis about to undergo surgery. Blood gases may also be required to assess alveolar ventilation in these patients. It is important to realize that elective surgery should not be cancelled until all reversible features have been attended to. All patients should be encouraged to stop smoking. Antibiotics should be given for infected sputum, diuretics for cardiac failure and fluid retention, nebulized bronchodilators such as sympathomimetics (see Asthma treatment) and anticholinergics such as ipratropium bromide and physiotherapy for sputum retention. Especially in the summer months and after a careful medical assessment, many patients can negotiate surgery, who otherwise may be rejected or develop postoperative respiratory failure caused by sputum retention, painful respiratory excursions, or the injudicious prescription of respiratory depressants given to relieve pain.

Postoperative dyspnoea

Postoperative pulmonary complications may be anticipated in subjects suffering from the common cold or acute bronchitis undergoing surgery and the operation should be postponed until recovery is complete. In patients with chronic bronchitis and emphysema, bronchial asthma, bronchiectasis and lung fibrosis, intensive physiotherapy should be given before and after surgery. The anaesthetic and postoperative analgesia, retained secretions and impaired respiratory excursions caused by pain are likely to aggravate these conditions and may lead to postoperative atelectasis, pneumonia and bronchospasm.

Atelectasis

Atelectasis is the principal cause of dyspnoea within the first 24 hours after operation. Tachypnoea, tachycardia, restlessness and cyanosis develop and the physical signs are deviation of the trachea and mediastinum towards the affected side, impaired percussion note and diminished or absent air entry on that side. Only when bronchial obstruction is incomplete with alveolar collapse will there be bronchial breath sounds. The chest radiograph may show basal linear opacities, lobar or complete lung collapse. Treatment consists of physiotherapy and when sputum has been obtained, a broad-spectrum antibiotic such as amoxycillin or trimethoprim should be prescribed. Bronchoscopy should be considered when physiotherapy has failed to result in any air entering a pulmonary segment. In elderly patients with collapse, the increased work of breathing may lead to respiratory and cardiac failure, and this can be avoided by timely endotracheal intubation, tracheal toilet and, if necessary, intermittent positive pressure ventilation.
**Pneumonia**

In patients with pre-existing respiratory disorders such as chronic bronchitis and emphysema, deterioration may be detected on the second or third postoperative day by the onset of severe breathlessness, wheezing, fever, cough, tachycardia and signs of consolidation (bronchial breathing and whispering pectoriloquy). Pneumonia has developed and this should be confirmed by a chest radiograph. It is usually caused by infection with *Streptococcus pneumoniae* or *Haemophilus influenzae*. Treatment with broad-spectrum antibiotics, to which the organisms are likely to be sensitive is indicated.

**Pulmonary embolus**

A pulmonary embolus usually results from a deep vein thrombosis in the legs and less commonly from a pelvic venous thrombosis. Venous stasis, hypercoagulability and local injury to the vein may all be found postoperatively, especially in those with cardiac failure and with a poor peripheral arterial supply.

A massive pulmonary embolus may cause cardiac arrest, chest pains simulating a myocardial infarction, acute dyspnoea, syncope or faintness and a smaller embolus is more likely to produce a pulmonary infarction with dyspnoea, pleuritic chest pain and haemoptysis. These patients are usually cyanosed, shocked with a tachycardia, thready pulse and prominent jugular venous pulsation. There may be a triple rhythm on cardiac auscultation. The diagnosis should be considered on any postoperative day since preoperative immobilization may have produced venous stasis. The electrocardiogram may show the S1, Q3, T3 wave pattern which consists of a deep S wave in lead 1 and a Q wave and inverted T wave in lead 3. The T waves may also be inverted in leads V1-V4 and a right bundle branch block pattern may develop. A normal electrocardiogram does not rule out the diagnosis, nor does a normal chest radiograph. Nevertheless, chest radiographic changes are frequently detected such as linear atelectasis, a basal effusion, a raised hemidiaphragm, a wedge-shaped infarction or oligaemic areas. The definite diagnosis is made by pulmonary angiography, but ventilation perfusion lung scanning is usually available and provides adequate diagnostic information. Treatment consists of intravenous heparin pump therapy for at least 5 days, to be followed by oral anticoagulants. Nowadays thrombolytic therapy and surgical embolectomy are rarely required.

**Aspiration pneumonia and the adult respiratory distress syndrome**

Inhalation of vomit containing gastric contents leads to severe lung damage and occurs especially in children and the elderly and when emergency anaesthesia is given without gastric intubation.

If aspiration is suspected, the head should be lowered while the trachea and bronchi are lavaged with saline. Usually the inhalation is not detected and 3-5 hours after operation the patient deteriorates with cyanosis, tachypnoea and tachycardia. Crackles and wheezes are heard and arterial blood gases reveal profound hypoxia (low oxygen tension) and probably hypocapnia (low carbon dioxide tension) secondary to tachypnoea. The chest radiograph shows patchy areas of alveolar shadowing, more often right sided, but not confined to the lower zones. After the acute episode the patient may improve, but progressive deterioration may ensue over the succeeding days with increasing stiffness of the lungs requiring ever
increasing inspired oxygen tensions to combat hypoxaemia. The adult respiratory distress syndrome has developed. Patients should be transferred to the intensive care unit for oxygen therapy, antibiotics, intravenous hydrocortisone and if hypoxia cannot be relieved, intermittent positive pressure ventilation often with positive end expiratory pressure (PEEP). Even so the prognosis is poor. The adult respiratory distress syndrome may also be caused by shock and over-hydration, sepsis and endotoxaemia, oxygen toxicity, fat and thrombus embolism and extensive atelectasis.

Elderly or intoxicated adults can choke while chewing a large bolus of meat. This may impact in the larynx and lead to asphyxia. It should be relieved by the Heimlich manoeuvre, where sudden direct pressure is applied to the patient’s stomach by the attendant encircling his arms around the victim with expulsion of the bolus.

**Inhaled foreign bodies**

The otolaryngologist, the chest surgeon, or the chest physician may be called upon to deal with an inhaled foreign body depending on its type, location, and available resources and expertise. The foreign bodies may be divided into exogenous or endogenous, organic or inorganic. Most are aspirated into the right lobe in the conscious patient for anatomical reasons. In the unconscious patient, they may be inhaled into the apical segment of the right lower lobe or the posterior segment of the right upper lobe, and again less frequently on the left.

**Exogenous foreign bodies**

Holinger and Holinger (1978) have reported their experience in over 2000 patients with laryngeal, tracheal and bronchial foreign bodies. Of 534 of these patients seen between 1961 and 1975, 76% were children below 4 years of age, 18% were aged between 4 and 14, and only 6% were over 14 years of age. Peanuts, popcorn or seeds were present in 60%; hardware, pins and pens in 23%; dental objects in 3%; and a miscellany in 14%. Vegetable matter, such as a peanut, excites a rapid, severe chemical bronchitis and is more noxious than inorganic non-vegetable matter.

**Clinical picture**

Episodes of choking, gagging and cyanosis are followed by unilateral wheezing if the object lodges in the bronchus, or bilateral wheezing if in the trachea. Thereafter there may be a symptomless interval varying from hours to months depending on the nature of the foreign body, location and degree of bronchial obstruction.

Vegetable matter excites an early reaction leading to purulent bronchitis. Any foreign body may lead to obstructive emphysema seen on the expiration chest X-ray or to collapse with complete bronchial occlusion.

**Diagnosis**

The clinical history is usually suggestive but may be absent in infants who inhale tiny plastic toys, for instance, which are not radiopaque. Unilateral wheezing is highly suggestive,
particularly when associated with decreased chest movement, impaired percussion note, and reduced breath sounds distal to the foreign body.

Chest X-ray on expiration is essential, particularly if the foreign body is radiolucent and cannot therefore be seen. Bronchoscopy is mandatory.

**Removal of foreign bodies from the tracheobronchial tree**

Foreign bodies should be promptly removed since only 2-4% are coughed out spontaneously. In small children (below the age of 10 years) general anaesthesia with rigid open-tube bronchoscopy is indicated. This should be performed by a bronchoscopist expert using the variety of special forceps (see Volume 6, Chapter 29) now available. Thoracotomy with bronchotomy or segmental resection is rarely justified for removal of an endobronchial foreign body.

In older patients (over the age of 10 years), in whom the larynx and trachea are larger, fibreoptic bronchoscopy under local anaesthesia may be used. Rapid strides have been made in the past few years with this technique and Cunanan (1978) has reported his experience in 300 cases of which 89% were performed with a fibreoptic bronchoscope alone, the remaining 11% being carried out with a rigid bronchoscope. He was able to remove the same range of foreign bodies as above with special forceps. He mentioned a significant drop in mortality and morbidity from 12% in the previous 5 years to 1% in the last 5 years on switching to the fibreoptic bronchoscope. He attributed this fall in part to the avoidance of general anaesthesia in patients with complicating illnesses. Again it must be stressed that the bronchoscopist must be experienced and have the appropriate forceps. A point in favour of fibreoptic bronchoscopy is that the technique is simple enough to allow visual inspection to assess the situation without necessarily attempting immediate removal.

**Endogenous foreign bodies**

Saliva and mucopus may be inhaled by patients in coma from whatever cause and in those with neuromuscular disorders such as a bulbar palsy. In some such cases, a cuffed endotracheal tube with a floppy, low-pressure cuff released at regular intervals may be indicated. Releasing the cuff pressure periodically avoids tracheal trauma and subsequent stenosis. In protracted cases, tracheostomy may be necessary.

During ear, nose and throat surgery, blood and debris may be aspirated into the lungs, although modern anaesthesia with tracheal intubation has largely eradicated this complication.

**Tumours of the tracheobronchial tree**

Nearly all tumours of the tracheobronchial tree are malignant and bronchial carcinoma is the commonest neoplasm in the UK. Benign tumours such as hamartoma, chondroma or lipomata are rare and tumours of low malignancy such as bronchial carcinoid and cylindroma are unusual.
Carcinoma of the bronchus

Most cases occur in men over the age of 50 years but the mortality in women is rising with the increased prevalence of women smokers. The evidence incriminating cigarette smoking as the important aetiological factor throughout the world is overwhelming in both retrospective and prospective studies. Occupational hazards such as exposure to asbestos, radioactive materials, nickel and industrial arsenic are recognized risk factors.

Two-thirds of all patients present with respiratory symptoms including cough, haemoptysis and unresolved pneumonia. About 25% present with evidence of metastases or non-metastatic extra thoracic manifestations such as endocrine disorders (Cushing’s syndrome, inappropriate ADH secretion), neurological disorders (encephalopathy, neuropathy, myopathy), and constitutional symptoms such as weight loss, finger clubbing, hypertrophic pulmonary osteoarthropathy or thrombophlebitis. Five per cent of patients are symptom free when the lesion is detected on a routine chest radiograph.

Of special interest to the otorhinolaryngologist is the presentation of a carcinoma of the bronchus with a hoarse voice as a result of the left recurrent laryngeal nerve palsy, and a paralysed left vocal cord, malignant glands in the neck with or without a Horner's syndrome, superior vena caval obstruction with mediastinal invasion and stridor caused by narrowing of the trachea or main bronchi. The diagnosis is suggested by the history and radiological appearances. It is confirmed by histology, usually obtained by sputum cytology or bronchoscopy. Fibreoptic bronchoscopy employing biopsy and brushings yields positive results in about four out of five cases. In peripheral lesions out of range of even the fibreoptic bronchoscope, percutaneous needle aspiration is the diagnostic option of choice for lesions greater than 2 cm in diameter. For smaller lesions the diagnosis may only be made at thoracotomy.

When a diagnosis of bronchial carcinoma is suspected, referral to a thoracic surgeon or physician is advisable. In patients without metastases who have adequate pulmonary function, surgical resection by lobectomy or pneumonectomy offers the best chance of cure with 5-year survival figures for squamous carcinoma and adenocarcinoma in excess of 30%. It should be appreciated, however, that only 5% of all patients who present actually survive 5 years. Radiotherapy and chemotherapy rarely produce cure. Good palliation of haemoptysis, cough, dyspnoea and bone pain may result from radiotherapy, and intravenous chemotherapy regimens using multiple agents are significantly extending survival in those patients with small cell carcinoma. Laser therapy via the bronchoscope is a useful palliative procedure in controlling haemoptysis, stridor and severe breathlessness in patients with endotracheal and endobronchial tumours obstructing the main airways.

Bronchial adenoma

This tumour can become malignant and metastasize. Nevertheless, 75% survival at 15 years has been described in the largest reported series to date (Lawson et al, 1976).

Haemoptysis is the commonest presentation and bronchial carcinoma is usually suspected. At bronchoscopy a haemorrhagic cherry-like tumour is visualized, the histology of which reveals bronchial carcinoid or adenoid cystic carcinoma.
Depending on the site, lobectomy or pneumonectomy will be required and follow-up should be prolonged because of the late development of local recurrence which may be amenable to further surgical resection.

**Metastatic pulmonary and pleural disease**

The lungs and pleura are possible secondary sites of metastatic involvement of primary tumours originating in the head and neck. Pulmonary involvement by secondary deposits usually presents with cough and breathlessness. Crackles may be heard and the chest radiograph will reveal either multiple unequal irregular rounded opacities or linear reticular shadows indicative of carcinomatosis lymphangitis. Transbronchial lung biopsy via the flexible fibreoptic bronchoscope will be required to confirm the diagnosis. Chemotherapy may be given according to the site of the primary tumour and prednisolone may alleviate dyspnoea temporarily.

Malignant pleural effusions usually present with breathlessness and constitutional symptoms such as weight loss and malaise. Only in about 25% of patients is pain on the affected side a leading symptom. The effusion, which is an exudate, is often blood stained, should be tapped, and at the initial aspiration pleural biopsies should be performed to obtain histological proof concerning the nature of the effusion. Pleural fluid cytology and cytogenetics may also confirm the malignant nature of the fluid. The effusion should be tapped to dryness. If the fluid reaccumulates rapidly, pleurodesis should be attempted using tetracycline or bleomycin into the pleural cavity. After the instillation, the patient should be tipped into several positions over 2 hours in order to distribute the sclerosing agent as uniformly as possible over the whole pleural surface.

In a patient in good overall condition with a malignant recurrent pleural effusion, pleurectomy with decortication may be considered.

**Granulomata involving upper and lower respiratory tracts**

Tuberculosis, sarcoidosis and Wegener's granulomatosis all have characteristic clinical and histopathological appearances and may be diagnosed by the otorhinolaryngologist or the thoracic physician.

**Tuberculosis**

Although pulmonary and constitutional symptoms predominate in post primary pulmonary tuberculosis, the initial presentation may be with a hoarse voice as a consequence of laryngeal involvement. Swabs, biopsy with culture as well as histopathology are indicated and such patients, who are usually sputum smear positive, should be isolated, referred to a thoracic physician and the diagnosis notified to the environmental health officer.

Cervical tuberculous lymph glands are still removed and sent only for histopathology, thus denying the microbiologist the opportunity to culture the organism and determine its sensitivity to antituberculous drugs. All lymph nodes removed from the neck should be sent for culture. In adults, tuberculosis is especially seen in Asians and Africans. It is also seen in children and the elderly of all races, as well as in patients receiving immunosuppressants.
and others suffering from debilitating disorders such as neoplasia, diabetes mellitus, and alcoholism. Initial treatment consists of at least 2 months of combination therapy with bactericidal drugs including rifampicin, isoniazid and pyrazinamide and followed by a further 7 months of at least two of these. Because of side-effects these drugs should be administered and supervised by a thoracic physician with an expertise in tuberculosis, who will also arrange follow-up and contact tracing.

**Sarcoidosis**

This disorder of unknown aetiology commonly presents with erythema nodosum and bilateral hilar lymphadenopathy. Eighty per cent of such patients show no signs of disease nor recurrence after 2 years’ observation without any specific therapy. A systemic disorder, sarcoidosis can also present with symptoms referable to many body systems such as the skin, the eye, the cardiovascular system, the central nervous system, the endocrine system, the respiratory system and others (*Table 23.1*). Of special interest to the otorhinolaryngologist is the patient with sarcoidosis who presents with, or develops symptoms and signs such as cervical lymph nodes, parotid enlargement with a dry mouth, nasal obstruction and lupus pernio, epiglottic or vocal cord infiltration, or endobronchial sarcoidosis with stridor. Because of the multisystemic nature of this condition, it is wise to refer patients with sarcoidosis to a general or thoracic physician for an overall assessment. The value of diagnostic procedures such as biopsy, a negative Mantoux test (66%) and a positive Kveim biopsy revealing non-caseating epithelioid granuloma (80%) should be considered and treatment with steroids must be carefully evaluated for specific facets of the disorder, which may show serious deterioration if not treated.

**Table 23.1 Clinical manifestations in 537 patients with sarcoidosis reported from London**

<table>
<thead>
<tr>
<th>Clinical manifestations</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Lungs and hilar nodes</td>
<td>84</td>
</tr>
<tr>
<td>Erythema nodosum</td>
<td>31</td>
</tr>
<tr>
<td>Peripheral lymph nodes</td>
<td>29</td>
</tr>
<tr>
<td>Eyes</td>
<td>27</td>
</tr>
<tr>
<td>Skin</td>
<td>25</td>
</tr>
<tr>
<td>Spleen</td>
<td>12</td>
</tr>
<tr>
<td>Central nervous system</td>
<td>7</td>
</tr>
<tr>
<td>Parotid</td>
<td>6</td>
</tr>
<tr>
<td>Bones</td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
</tr>
</tbody>
</table>

**Wegener's granulomatosis**

The otorhinolaryngologist will be well aware of this rare but potentially fatal disorder which may involve the nose, paranasal sinuses, middle ear and larynx and, in many cases, pathological changes develop in the kidneys, lungs and joints. Symptoms suggesting lower respiratory tract involvement are cough, haemoptysis and pleuritic chest pain, and the chest radiograph shows single or multiple rounded opacities which may cavitate and may
spontaneously heal. The diagnosis in the lung or the kidneys requires adequate biopsy which may not be made from the nasal lesions. Therapy with immunosuppressant drugs such as prednisolone and cyclophosphamide is effective in pulmonary Wegener's granulomatosis and may induce remission so that treatment can be withdrawn.

The otorhinolaryngologist should be aware of the acquired immune deficiency syndrome and obstructive sleep apnoea syndrome which often present to the thoracic physician and are dealt with in chapter 5.