

# Lung abscess

## Definition:

Suppurative and destructive process occurring within the pulmonary parenchyma caused by pyogenic organisms, it must be carefully differentiated from cavitary TB and cavitary carcinoma.

## Causes

### Primary:

1. Abscess of aspiration origin: this is the most common cause of abscess formation, specially in combination of vomiting and unconsciousness
  - Unconsciousness
  - severe periodontal disease
  - dysphagia syndromes, esophageal reflux
2. Necrotizing pneumonia. (staph aureus, pneumococcus, P. aeruginosa, and K. pneumoniae).
3. Immunocompromized patients.

### Secondary:

1. bronchial obstruction.
  - Neoplasm
  - Foreign body
  - Lymphadenopathy
2. cavitating lesion
  - Neoplasm
  - Pulmonary infarct
  - Emphysema/bullous disease
3. Extension from abdomen or mediastinum(amebiasis, subphrenic).
4. Abscess following trauma: a hematoma of the lung following trauma may become infected by blood –borne or aspirated organisms or through the presence of foreign body.
5. hematogenous dissimulation(multifocal)

## Symptoms

Symptoms vary in severity and acuity(acute abscess is that abscess present for 6 weeks or less). However; there is nothing in the clinical setting that clearly differentiate lung abscess from other pyogenic or cavitating pulmonary pathology.

## Signs

Fever, tachycardia, tachypnea, ill health, malodorous breath, orolingival poor hygiene.

Tenderness, dullness, tubular breath sounds.

Clubbing of the fingers.

## Investigations

CXR: once bronchial communication is established, an air-fluid level will be seen.

CT scan

Chest ultrasound

Investigations to exclude aspiration of gastroesophageal contents into tracheobronchial tree ( specially in children).

## **Treatment**

We have to start with conservative management in a form of:

1. Sputum culture, percutaneous aspiration culture, and bronchoscopic wash culture (for aerobic, anaerobic, fungal, TB, and malignant cells).
2. Start high dose AB, IV penicillin and clindamycine.
3. Supportive measures in the form of blood transfusion, physiotherapy, postural drainage, and nutritional support.
4. Change AB according to culture results.
5. Clinical improvement is the rule within one week.
6. Continue on such conservative measures until radiological improvement occurs ( usually within weeks to month).

### **7. Indications of bronchoscopy:**

- slow resolution (whether clinical or radiological).
- suspected FB (<5y old)
- suspected Ca. ( middle aged smokers).

### **8. Indications for surgical drainage:**

- Giant abscess:
- Fever for more than 10-14 days (on treatment).
- No radiographic progress in 3-4 weeks.
- Development of complications e.g. empyema, BP fistula, or massive hemoptysis.
- 5. Young children <7 years old.

### **Types of surgical drainage:**

- Internal (bronchoscopy).
- External (percutaneous cavernostomy)

### **9. Pulmonary resection (segmentectomy vs. lobectomy).**

This is indicated for:

- Chronic abscess with destruction of pulmonary parenchyma and persistence of symptoms.
- Incomplete pus loculation removal.
- Massive or recurrent bleeding.
- Perforation of pus into pleural cavity and empyema formation
- Bronchostenosis.
- Suspected malignancy

# Bronchiectasis

This is defined as chronic irreversible dilatation of the medium-sized bronchi. There are several causes but there are two basic mechanisms that account for this dilatation:

A weakening of the bronchial walls and outward tension on the lung substance, These may occur following a suppurative pneumonia or bronchial obstruction. The process often starts in childhood following a respiratory infection and slowly progresses during adult life. It is rarely confined to one lobe or even one lung, which precludes surgery in many cases. The incidence of severe bronchiectasis is falling thanks to the reduction in cases of whooping cough, measles and tuberculosis, and the improved management of infantile bronchiolitis. Inhalation of foreign bodies remains a potential cause of bronchiectasis and this possibility should be borne in mind.

## Presentation

Some patients remain asymptomatic and the problem is discovered by chance on chest radiograph or postmortem. Usually there is a history of frequent chest infections from infancy with the production of copious volumes of sputum. In advanced cases foul-smelling sputum is produced with pain over the affected area, and there is weight loss and cachexia.

Physical examination may be normal but often there is finger clubbing (in advanced disease), wheezing and consolidation over the affected lobe. Chronic nasal sinusitis may be a presentation and, in severe cases, amyloidosis may occur.

## Investigation

- A good posteroanterior chest radiograph will often show crowding of the lung markings on the affected side. A series of chest radiographs taken over two to three exacerbations may show persistent collapse or recurrent consolidation affecting the same area of lung.
- CT is now the investigation of choice.
- Bronchography. This is rarely necessary to define which lobe(s) are affected.

## Complications

1. Recurrent chest infections
2. Septic emboli (particularly to CNS)
3. Hemoptysis
4. Respiratory failure
5. Cor-pulmonale (pulmonary hypertension)
6. Amyloidosis
7. Pulmonary hypertrophic osteoarthropathy
8. Delayed growth in children
9. Delayed sexual maturation
10. Cyanosis
11. Polycythemia

## Treatment

The initial management should be conservative which should be started after the initial diagnostic approach including a careful search for specific etiology, sputum cultures and usually bronchoscopy. In many instances symptoms will be controlled. Patients with generalized disease and those with cystic fibrosis are generally poor candidates for operation.

Indications for surgical intervention:

1. Recurrent pneumonia
2. complications of pulmonary infections
3. Continuing copious sputum
4. hemoptysis
5. failure to growth in children

At this time bronchoscopy should be done (if it is not yet), with other investigations (bronchography, CTscan, ventilation-perfusion scan, and pulmonary function test) to put a plan for resection based on the extent of the disease, and we have to proceed with surgery if the disease was **localized with good pulmonary function test**, or in case of **massive hemoptysis (only to control site of bleeding if less invasive measures such as bronchial artery Embolisation were unsuccessful)**.

Surgery here is based on segmental resection.

## Tuberculosis

This infection remains a major health problem in less developed countries but is increasing in frequency in Western countries as a result of immigration and immunosuppression [human immunodeficiency virus (HIV) and chemotherapy]. It commonly presents in the lungs and, if untreated or inadequately treated, can lead to serious complications. There is commonly a chronic cough with hemoptysis, weight loss and night sweats. The diagnosis should be firmly established by Ziehl-Neelsen staining of bacteria in the sputum or culture in Lowenstein-Jensen medium before starting antituberculous chemotherapy. Characteristic chest radiographic changes in symptomatic patients may be diagnostic if cultures are persistently negative; as a very last resort, chemotherapy may be tried for 2 weeks. An improvement in symptoms indicates that tuberculosis is the problem

The mainstay of treatment is antituberculous chemotherapy for the individual and bacille Calmette-Guérin (BCG) immunization for contacts, attention to hygiene and housing in the community. Combination chemotherapy is usually successful in treating the infection. Inadequate treatment or noncompliance leads to the development of resistant organisms. The course of treatment is often over 6 months and in some less developed countries this can result in noncompliance. Surgery is rarely indicated for tuberculosis in developed countries but, when it is, it must be combined with adequate antitubercular chemotherapy or the benefit of surgery will be lost.

### Indications for surgery:

1. Development of multidrug resistance in patients with localized disease (or cavitary lesion) and adequate pulmonary reserve.  
Surgery include resection of the maximally diseased portion (or cavity) of the lung, with postoperative chemotherapy.
2. Bronchopleural Fistula.  
Closure of the fistula with muscle flap enforcement.
3. Massive hemoptysis (>600 cc\24 h).  
Necessitates resectional surgery. The source of bleeding may be obvious or may need bronchoscopy or angiography to be localized.
4. Bronchial Stenosis.  
Resection with end-to end repair, or resection of distal lung may be required.
5. Empyema.
6. To rule out cancer.

Resection for a scar area of a known arrested inflammation with recent radiographic changes.

#### 7. aspergilloma within a tuberculous cavity

Surgery is indicated for certain situations and is always used in conjunction with chemotherapy. With effective treatment and earlier diagnosis, the role of surgery is gradually decreasing in the management of this condition.

## Aspergillosis

There are three different clinical syndromes

1. Aspergillus bronchitis: allergic or hypersensitivity manifestations.
2. Invasive aspergillosis: opportunistic infection.
3. Chronic mycetoma (aspergilloma). Which is of special interest to the surgeon.

### Chronic Mycetoma (Aspergilloma)

The aspergilloma is a round, friable, necrotic looking mass of hyphae, fibrin and inflammatory cells. It will shift the position within the cavity when the patient changes position.

It may be asymptomatic, or presented as a case of hemoptysis; whether mild or severe.

Physical findings are few and they are more likely to be related to underlying chronic lung diseases such as TB, sarcoid, histoplasmosis, bronchiectasis, bronchogenic cyst, abscess, or cavitating bronchogenic carcinoma.

### Diagnosis

- Sputum exam: by finding the species Aspergillus
- Sputum culture: more reliable than sputum exam
- CXR: characteristic findings
- Bronchoscopic aspirate

### Treatment

Medical: with amphotericin B, which is more effective in treatment of invasive aspergillosis

Surgical: which is the only sure method of curing aspergilloma.

Aspergilloma by itself is an indication for resection because of the risk of life threatening bleeding.