
UNIT 4 INFECTIONS OF RESPIRATORY SYSTEM

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4.0 OBJECTIVES

By the end of the study of this unit, you should be able to:

- 1 identify various respiratory infections in the elderly;
- 1 discuss the aetio-pathogenesis of various respiratory disorders;
- 1 diagnose respiratory infections and differentiate the symptomatology of elderly from the young;
- 1 discuss the systemic approach to the relevant investigation for various respiratory infections; and
- 1 manage various respiratory infection.

4.1 INTRODUCTION

Respiratory infections result in much higher morbidity and potentially avoidable mortality in the elderly. European studies suggest an incidence of Pneumonia approaching 20 cases per 1000 population per year in the 70 to 79 age groups compared with one or two per 1000 in the young adults. The vast majority (over 90%) of deaths from Pneumonia in developing

countries occur in the elderly patients. In this unit, you will learn about the different types of acute respiratory tract infections prevalent in elderly. Since pneumonias are the most common of all infections, they have been dealt in greater details. You will learn about the aetiopathogenesis also before we dwell upon the variance of clinical symptomatology. Do note the difference between presentation of the illness in elderly as compared to the young population.

Lung abscess is another common ailment of the elderly. This has been discussed in the next section. Pulmonary tuberculosis is 12 times more frequent in elderly compared to the young patients. Not only burden of infection is high in this age group, but also the likelihood of atypical and non-specific presentation of respiratory problems is becoming increasingly recognised in recent years. The sensitivity and specificity of physical signs may be diminished. Your practical sessions in the practical centres will adequately equip you to diagnose and manage respiratory illnesses in the elderly.

4.2 ACUTE UPPER RESPIRATORY TRACT INFECTIONS

Acute upper respiratory tract infection (URTI) are less common in healthy normal elderly as compared with small children in whom URTI have high incidence. A number of viruses are responsible, but the most common are rhino viruses. In a small percentage beta haemolytic streptococci cause acute URTI and antibiotic treatment is helpful in those but not in patients with viral infection. The incubation period is 1-3 days and the infection lasts for 7-10 days. Most elders tolerate URTI well but in those having preexisting chronic respiratory disability like COPD, the patient can suffer acute reduction of Functional Vital Capacity (FVC) and ventilatory capacity. The reason is probably associated bronchiolitis.

You must provide symptomatic relief to your patient suffering from viral infection. For example, for fever, you may choose to give paracetamol in small doses, so as to make your patient comfortable without suddenly lowering the temperature. You should realize the importance of maintaining proper hydration and nutrition in your elderly patient. If secondary bacterial infection occurs appropriate broad-spectrum antibiotics may be given.

Viruses causing acute upper respiratory tract infections in elderly

- 1 Rhinoviruses—most common
- 1 Adenoviruses
- 1 Corona viruses
- 1 Syncytial viruses
- 1 Influenza viruses.

4.3 PNEUMONIA

Pneumonias are inflammation of lung parenchyma distal to terminal bronchioles i.e. of respiratory bronchioles, alveolar ducts and alveoli. This infection is mainly due to infection. When the infection results in consolidation of a lobe, it is called lobar pneumonia, while patchy widespread consolidation presenting bilaterally is called bronchopneumonia and represents less severe infection.

4.3.1 Pathogenesis

The infective micro-organisms reach the lung tissue by one of the following four methods:

- i) By direct inhalation of infective aerosol from environment.
- ii) By aspiration of infective organisms from the naso-oro-pharyngeal region.
- iii) Hermatological spread from distal infective sites.
- iv) Infection reaching lung by contiguous spread from adjacent sites or by penetrating Lung injury.

Normal lungs are kept sterile below the first major bronchial division by the defense mechanisms of the lungs like mucociliary clearance, cough response and intraluminal I gA. When infective organisms reach alveoli, they are phagocytised by alveolar macrophages.

The lung defenses are complemented by systemic humoral immunity; cellular immunity also helps macrophages to eradicate certain intracellular microorganisms like mycobacterium, legionella pneumophillia, pneumocystis carinii and cytomegaloviruses.

In case the defense mechanisms fail, the offending microorganisms reach alveoli and start an inflammatory reaction, leading to consolidation (Pneumonia). Pending successful containment of infection, resolution and healing eventually occur.

4.3.2 Classification

Pneumonias have been classified in various ways, depending on the etiological agent (bacterial, viral, mycoplasmal, fungal etc.), anatomical distribution (lobar, segmental and broncho pneumonia), mode of infection. However, the most accepted classification is clinical, into primary and secondary pneumonias and this will be used in the following sections.

Table 4.1: Salient Features of Primary and Secondary Pneumonias

Occurance	Primary Pneumonia	Secondary Pneumonia
	In previously normal lungs 1 Acquired in community surrounding	1 In lungs with preexisting disease like COPD, bronchial obstruction due to bronchial tumour or structure. 1 Acquired in lower immune resistance of body.
Visual mode of infection	Aerosol infection	1 Aspiration
Causative organism	Visual microorganisms like from text: i) Infection is by virulent microorganisms. Usual organisms are Streptococcus pneumoniae, staphylococcus aureus, Klebsella pneumoniae, Mycoplasma pneumoniae (causing primary atypicalpneumoni a) Legionella pneumophillia, and viruses. Rarely they may be streptococcus pyogenes, other Gram-negative bacteria, Chlamydia psittaci and coxiella burnetti (H/o exposure to animals and birds), Actinomyces Israeli.	1 Low virulence organism The organism causing secondary pneumonias are: Grain negative organisms like Pseudomonas aerogenosa, proteous vulgaris, klebsella aerogenosa, H. influenza; others are streptococcus pneumonac, staph aureus anaerobic bacteria and fungi like aspergillous furnigatus, pneumocystis carini, cytomegalovirus, mycobacterium tuberculosis and atypical mycobactaria.
Typical signs	1 Signs of lobar consolidation except in a typical and viral pneumonia. It is generally unilateral.	1 Generally widespread patches of consolidation in bilateral lower lobes.

4.3.3 Clinical Features

The clinical features depend on the host defense, virulence of microorganisms and the dose of microorganisms reaching the lungs. In the young elderly i.e. between age group of 60-75 years with good health, the symptomatology is typical in the majority and similar to that in the young and middle aged patients while in the senior elderly i.e. those above 75 years of age and those with poor health, typical symptoms and signs are usually not manifested and onset is insidious. The patient may develop 'Geriatric Giants' like confusion, falls, declining mobility, incontinence, lethargy, loss of appetite and thirst, vague aches and pains and mild fever. Deterioration of a co-existing disease like heart disease/diabetes is also common. An

index of suspicion for pneumonia is more from indirect clues like rapid deterioration of consciousness (patient becoming confused, drowsy and talking irreverently) tachypnoea and mild rise of temperature. Rigors are uncommon. In most patients, oral temperature is unreliable in presence of increased respiratory rate. You must take rectal temperature or axillary for 5 minutes. Presence of axillary sweating is highly suggestive that patient is not dehydrated. Aged people do not complain of breathlessness unless it is severe. Spontaneous coughing is usually slight initially but within few days cough becomes productive with rusty/purulent sputum. Patient may complain of pain in the retrosternal region on coughing or pain in the chest over the areas of consolidation. Signs of consolidation on auscultation i.e. bronchial breathing, later with added crepitations mostly in the lower lobes are found in less than 50% of the patients.

Some causative organisms have special features which will help you in the diagnosis and management. These are given below:

- 1 Staphylococcal pneumonias may occur due to hematological spread. The lesions are multiple and bilateral and may lead to thin wall cysts called pneumatocysts or pneumalocoels which can be picked up radiologically.
- 1 Klebsiella pneumonia is usually associated with massive purulent greenish sputum with pneumonia consolidation in the upper lobe seen as dense lobar consolidation.
- 1 Legionella pneumonia:
 - i) Spreads by infected water droplets originating from infected cooling towers, humidifiers, and stagnant water in cisterns and showerheads.
 - ii) Occurs in epidemic/sporadic forms.
 - iii) In addition to respiratory symptoms, other associated symptoms are mental confusion, gastro-intestinal symptoms, and protein urea and hypo natraemia.
- 1 Viral Pneumonia is uncommon in the elderly and usually follows influenza or acute respiratory infection. Symptoms like cough and fever are out of proportion to the lung signs. Associated symptoms like headache, body ache and anorexia are marked. The disease is self-limiting and usually resolves spontaneously in 5-7 days.
- 1 In Secondary pneumonia, associated clinical features of the underlying disease are also present. There is evidence of existence of factors that predispose to retention of nasopharyngeal secretions into the lungs. Pneumonia associated with bronchial malignancy usually occurs at unusual sites i.e., anterior segment of upper lobe. In case of delayed resolution or recurrent pneumonia at the same site, an obstruction in the bronchus leading to the affected part of the lung should be suspected. Aspiration pneumonia occurs more commonly in the right lung due to right main bronchus being more in line with the trachea. Usual segments involved are apico-posterior of the upper lobe and the apical segment of the lower lobe.

Nosocomial Pneumonias are pneumonia occurring after 48 hrs of hospital admission. The elderly persons are prone to hospital-acquired infections because of preexisting disease or due to low resistance with aging factors enumerated earlier. Hence, the elderly patients should not be encouraged for hospital admissions. The usual microorganisms are aerobic gram negative like E. coli, proteus vulgarus, klebsiella pneumonia, pseudomonas, and staph. aureus or H. influenza. These are usually multiple antibiotic resistant.

4.3.4 Complications of Pneumonia

While examining the patient, you should also look for any complication that may occur, especially so in secondary pneumonia. The common ones are:

- i) Lung abscess
- ii) Pleural effusion/empyema
- iii) Pyogenic meningitis and other metastatic abscess e.g. brain abscess, osteomyelitis.
- iv) Collapse-segmented/lobar.

4.3.5 Laboratory Investigations

The laboratory investigations in a case of suspected pneumonia are done to :

- 1 confirm diagnosis of pneumonia;
- 1 find out the organisms responsible and their sensitivity to various antibiotics;
- 1 assess existence of predisposing factors and complications;
- 1 assess follow up response to treatment.

You can achieve these objectives by judicious choice out of the following investigations:

- i) **X-ray chest PA and Lateral view for lobar/segmental localization of pneumonia:** X-ray chest does not give exactly the etiological diagnosis, yet certain findings are more common with some organisms than others. Three types of radiological patterns are seen in pneumonia. (a) Alveolar or air space pneumonia (lobar consolidation) with air bronchogram seen usually in pneumococcal pneumonia (b) interstitial pneumonia producing reticular radiographic appearances. These are seen more frequently with mycoplasma pneumoniae, P. carini and viruses and (c) Bronchopneumonia where inflammation is restricted to conducting airways, especially terminal and respiratory bronchioles and their surrounding alveoli. Air bronchogram is absent. Staphylococcal pneumonia is a typical example. The radiological shadows are multiple and may be scattered bilaterally. Radiological shadows mimicking pneumonia may be seen in congestive heart failure, pulmonary embolism and neoplasm.
- ii) **Routine blood examinations for total and differential leukocyte count:** In bacterial pneumonia there is polymorphonuclear leucocytosis while the leukocyte count is usually normal in viral and mycoplasmal pneumonia.
- iii) **Sputum Examination for infecting organisms:** Properly collected sputum sample should have polymorphonuclear cells and macrophages and very few oral squamous cells. If patient is not producing any sputum, bronchial secretions may be collected by one of the following methods: (1) Ultrasonic nebulisation with super-saturated (3%) saline solution (ii) percutaneous transtracheal aspiration (iii) Fibroptic bronchoscopy (if facilities available with protected brush catheter (iv) percutaneous transthoracic needle aspiration. Gram's Staining and Zeil-Neelsen Staining and special staining for pneumocystis carini if indicated we should subject such samples to (a) Smear Examination. This is an important simple investigation that can give valuable guideline information for possible organisms and starting antibiotic treatment (b) Culture Examination for aerobic, anaerobic bacteria and fungi -and antibiotic sensitivity test.
- iv) **Blood Culture and Sensitivity Test:** If patient has high fever, this may give clue to nature of microorganisms causing pneumonia,
- v) Serological tests for mycoplasma, chlamydia and legionella etc.
- vi) Pleural aspiration (if present) examination for cytology, smear examination (as for sputum) and culture and sensitivity tests.
- vii) Blood gas analysis (ABG) of arterial blood for PO₂, PCO₂ and pH. ABG often reveals hypocarbia and respiratory alkalosis due to hyperventilation and hypoxaemia from perfusion of non-ventilated alveoli. Respiratory and metabolic acidosis may complicate severe bronchopneumonia, respiratory failure or sepsis.
- viii) Fibroptic bronchoscopy is indicated when pneumonia presents at unusual site, delayed healing, poor response to treatment and recurrent pneumonia at the same site, to detect presence of any bronchial obstruction proximal to pneumonia site and to get bronchial secretions for appropriate examination.
- ix) If the above investigations are unrevealing or contra indicated, diagnostic Open Lung biopsy is often necessary in immuno-compromised patient with progressively increasing pulmonary infiltrates.

If facility for appropriate investigation are not available, you may refer the patient to a referral centre.

4.3.6 Treatment

You should make all efforts to prevent pneumonia in the elderly. Influenza vaccine may be given annually, especially in high risk elderly with chronic obstructive pulmonary disease and cardiac disease. The vaccine must contain prevailing strains of the virus. Vaccine is of no benefit in established cases of pneumonia. Amantidine is given when vaccination is contra indicated or the epidemic of influenza is spreading rapidly. Polyclonal pneumococcal vaccine can also be given yearly but is of doubtful value, however, it should be given preferably in at risk patients.

Before starting treatment, you should consider other preexisting problem and the drugs that may worsen the prevailing situation.

Treatment of pneumonia consists of:

- 1 Symptomatic and
- 1 Antibiotic treatment.
 - a) Symptomatic treatment consists of (a) Oxygen therapy for breathlessness and tachypnoea (b) Cough sedatives — if cough is irritative and dry while mucolytic agents like bromhexine should be given if cough is productive; (c) anti-pyretics if patient has high fever; (d) bronchodilators if evidence of broncho construction; (e) treatment of respiratory failure, if present; (f) physiotherapy to encourage cough and take deep breathing as soon as pleuritic pain disappears; (g) chest percussion and gravity drainage should be done to prevent collapse; and (h) treatment of predisposing factors to help faster recovery.
 - b) Antibiotic therapy is the corner stone of treatment and its early start fastens recovery and prevents complications. However, the initial choice of the antibiotics (till we receive the culture and sensitivity reports) is emperical and depends on the circumstances under which pneumonia occurs. Detailed history, knowledge of predisposing factors, sputum smear examination, and severity of pneumonia helps initial choice of appropriate antibiotics. For primary community acquired pneumonia, in a previously healthy elderly, erythromycin (500 mg every 6 hourly) would be effective for most strains of *S. pneumoniae*, *L. pneumophillia* and *Mycoplasma pneumoniae* but is not suitable for *H. influenza* and other Gram-negative organisms. Since with increasing age the probability of gram negative bacteria, is more, cefotamine (1 to 2 gm iv 8 hourly) or ceftizoxime (2 gm iv every 12 hourly) or cefuroxime (750 mg iv every 6 hourly) would be effective.

Initial treatment for nosocomial pneumonia in a non-immuno compromised elderly patient is use of a third generation cephalosporin such as ceftoxime, ceftizoxime, ceftazidime (1 to 2gms i.v. 8-12 hourly) or cefoperazone (1 to 2 grams iv 12 hourly). If the patient is neutropenic, it is preferable to use the two antibiotic -an aminoglycoside like gentamycin (60-80 mg iv every 8 hourly), tobramycin (1 to 1.5 mg/kg. iv every 8 hourly) or amikacin (5 mg/kg iv every 8 hourly) with ceftazidime or a semisynthetic broad spectrum penicillin such as ticarcillin (40 mg/kg iv every 4 hourly) or piperacillin (40 mg/kg iv every 6 hourly). With these, synergistic action will be provided against most bacteria including *Pseudomonas aerogenosa*. Reduced dosages are necessary in presence of renal failure. If the neutropaenic patient has already received extensive anti-microbial therapy, then chances of fungal infection are more and in such a case, amphotericin B should be utilized.

Aspiration pneumonia is polymicrobial including anaerobic bacteria. In such cases several antibiotic regiments have been used with success. These include penicillin G (1.0 million units IV every 4-6 hourly) or clindamycin (600 mg every 6 hourly IV). Amoxicillin or ampicillin (500-750 mg 6 hourly) combined with metronidazole 500 mg every 6 hourly) is also an effective regimen. If aspiration has occurred in the hospital, treatment should be directed towards gram-negative micro-organism and *S. aureus* and consists of third generation cephalosporin as outlined above. For viral pneumonia no anti biotic therapy is effective and their use may lead to superinfection with resistant bacteria and deterioration of patients condition. As soon as laboratory reports on sputum/bronchial secretion culture and sensitivity become available, patient should be switched over to the appropriate antibiotic therapy.

If there is no response to treatment for 5-7 days, bronchoscopy should be done and lavage sent for culture and sensitivity.

We should also look for any occurrence of complications and they should be promptly treated. A resurgence of fever after initial improvement suggests onset of complication.

4.3.7 Special Considerations in Elderly Patients

Pneumonia is one of the leading cause of death in patients over age of 65. Acquired immunity with aging and abnormalities of swallowing reflexes (leading to aspiration) with preexisting presence multiple or chronic diseases in the elder have a role in causing this condition.

- 1 Pneumonia in elderly is difficult to distinguish from other cardio- pulmonary syndromes.
- 1 Altered metabolism of antibiotics must be known while presenting and one should keep in mind the many newer antibiotics that become available including the safety margin and therapeutic efficacy.
- 1 Older people are more likely to be definite but a respiratory rate of 256 resp/ minutes or more is a reliable indicator of respiratory infection.
- 1 Physical signs of consolidation are often absent because emphysematous lung cannot consolidate. Role and the pleural effusion can be mistaken for congestive cardiac failure.
- 1 Appropriate immunizations should be used in prevention.

Check Your Progress 1

- 1) The following statements are true/false for elderly patients:
 - a) Most common micro-organism in primary Community pneumonia is streptococcus pneumonia. True/False
 - b) Symptoms of pneumonia are usually typical. True/False
 - c) Pneumocystis carinii pneumonia is primary pneumonia. True/False
 - d) Antibiotics should be used in acute viral respiratory infection. True/False
 - e) Bronchopneumonia is more severe disease than Lobar Pneumonia. True/False

- 2) Define:
 - a) Nosocomial pneumonia
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 - b) Prophylaxis of pneumonia in elderly.
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3) Discuss:

a) Indications of bronchoscopy in pneumonia

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b) How sputum smear helps in treatment of pneumonia.

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c) Aims of Laboratory investigations in pneumonias.

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d) Discuss treatment of nosocomial pneumonia in non-compromised patient.

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4.4 LUNG ABSCESS

Lung abscess is a suppurative disorder of lung and is characterized by localized area of necrosis in lung parenchyma resulting in cavity formation, which is partially filled with purulent material.

4.4.1 Pathogenesis

Lung abscess occurs more commonly in the elderly because of lowered body resistance and prevalence of predisposing factors and malignancy. Most lung abscess are pyogenic in nature but sometimes they may be tubercular, fungal or may occur because of necrosis in malignant tumours — called malignant lung abscess. Lung abscess may occur by any of the following methods.

- i) Narcotizing infection by virulent micro-organism which start as fulminant pneumonic consolidation that subsequently undergoes necrosis leading to abscess formation. Micro-organisms usually responsible are - staphylococcus aureus, group A. Streptococci, Klebsiella pneumoniae and other gram negative bacteria, bacteroids, fusibacterium anaerobes, nocardia. This type usually occurs following naso-oropharyngeal secretion aspiration into lungs. Such patients have bad oro- dental hygiene. The aspiration is more common in unconscious patient or patients with impaired coughing or swallowing. Patients with bronchial obstruction of whatever cause, are prone to retain secretions, secondary infection of which may lead to abscess.
- ii) **Haematogeneous spread:** Septic emboli may originate from a distal site of infection or the thrombo embolus develops secondary infection with abscess formation.
- iii) **Cavitary Malignancy:** Necrosis in the bronchogenic carcinoma lesion and very rarely in the secondary metastatic malignancy.
- iv) Others:
 - a) Vasculitis causing necrosis in lungs i.e. Wegner's granulomatosis.
 - b) Infected cyst.

- c) Amoebic abscess usually secondary to hepatic amoebic abscess
- d) Infection in an emphysematous bullae.

4.4.2 Clinical Features and Diagnosis

The clinical features vary depending on the health status of the patient before development of lung abscess. In 'young elderly' i.e. between the age group of 60-75 with good health, the onset may be acute with high grade fever, cough with profuse purulent sputum sometimes blood tinged, dyspnoea, pain chest usually pleuritic, nocturnal sweating, rapid loss of weight and anorexia. Senior debilitating elderly may present with vague non-pulmonary 'Geriatric Giant' symptomatology. On examination we may find patient having foul smelling breath clubbing, signs of cavitation with cavernous bronchial breathing and crepitation in a localised area. In chronic lung abscess, the presentation is insidious and less dramatic. The lung abscess following aspiration is usually solitary and in the right lung due to the right bronchus being more in line with trachea and the usual sites are apico-posterior segment of upper lobe or apical segment of lower lobe. Malignant lung abscess is usually at unusual site like anterior segment of upper lobe with thick ragged abscess wall. On the other hand, lung abscess due to haematological spread are in the lower lobe, bilaterally and multiple.

Complications

- i) Rupture in the pleural cavity leading to empyema / pericardial effusion.
- ii) Amyloidosis of kidneys leading to nephrotic syndrome.
- iii) Hypoproteinaemia, anaemia and anasarca.
- iv) Massive haemoptysis.

Investigations are done to confirm clinical diagnosis, to know the causative microorganisms and their antibiotic sensitivity and the underlying predisposing factors, to detect presence of complications and plan the treatment. Judicious choice is needed from amongst the following investigations:

Investigations

- i) **X-ray chest:** Postero-anterior and lateral views for segmental localisation of lung abscess. X-ray chest will also reveal presence of empyema or pericardial effusion.
- ii) **Blood examination:** There may be anaemia usually normocytic normochromic; polymorpho nuclear leucocytosis is seen in acute onset lung abscess.
- iii) **Sputum examination:** Sputum examination is done for isolation of infective organisms by (a) Gram stain and Ziehl Neelsen stain (b) Sputum for culture and antibiotic sensitivity of aerobic and anaerobic bacteria, (c) sputum for malignant cell.
- iv) **Urine examination:** Urine examination for proteinuria and casts to detect amyloidosis of kidneys.
- v) **Serum Proteins:** Patients with chronic lung abscess usually have hypoproteinaemia which may cause generalised anasarca.
- vi) **Fibroptic bronchoscopy:** Fibroptic bronchoscopy to rule out any bronchial malignancy or when the healing is delayed or abscess is at atypical site.

4.4.3 Treatment

Treatment of lung abscess is (i) Medical and (ii) Surgical.

Medical Treatment

Antibiotics: Treatment with antibiotics is usually for long duration to prevent development of antibiotic resistance; antibiotics should be given in repeated courses depending on sputum culture and antibiotic sensitivity reports. Lung abscess following aspiration is usually polymicrobial and the initially chosen antibiotic should be broad spectrum one. Usually combination of Amoxycillin (500 mg 6 hourly orally) plus levulanic acid (125 mg T.D.S. orally) plus Metronidazole (500 mg T.D.S.) is given for 5-7 days or till sputum sensitivity report become available. For staphylococcus aureus lung abscess, oral Cephalosporin or Cloxacillin 500 mg 6 hourly or Clindamycin 600 mg iv 8 hourly is given. When clinical

improvement occurs, the dosage of Clindamycin may be reduced to 300 mg after every 6 hours for the rest of the period of therapy.

Postural Drainage: This is done to drain out the purulent secretions. The patient should be positioned in such a posture which helps to drain out the secretion by gravitation. When the abscess is in upper lobe, patient should be seated erect and if the abscess is in lower lobe, the patient's lower part of the chest should be placed in higher than head position so that the lung secretions drain out easily.

Mucolytic Agents like Bromhexine or Carbocystine should be given to liquify sputum. Hydration of the patient should be maintained.

High protein diet.

Drainage of empyema if present.

Surgical Treatment

Surgical Resection of lung abscess is rarely needed when patient develops massive uncontrolled haemoptysis, has localised malignancy, associated bronchiectasis or non-closure of lung cavity after 2 months of medical treatment.

Check Your Progress 2

1) The following statements are true/false for elderly patients:

- a) Aspiration Lung abscess is polymicrobial. True/False
- b) Staphylococcus aureus is common micro-organism in haematological lung abscess. True/False
- c) Malignant lung abscess also occurs on typical sites. True/False
- d) Aspiration lung abscess occurs usually in left lung. True/False

2) Enumerate complications of lung abscess.

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3) List Indications for surgery in lung abscess.

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4.5 PULMONARY TUBERCULOSIS

Pulmonary Tuberculosis is 5 times more common in elderly (over 60 years) than in the young and is 12 times more common in elderly over 75 years. Most cases of tuberculosis in elderly are due to reactivation of the previous disease due to depressed immunity because of old age, malnutrition (usually with chronic alcohol intake), AIDS, Corticosteroids or Chemotherapy or even because of Chronic Smoking.

4.5.1 Clinical Presentation and Diagnosis

The clinical features are usually weight loss, night-sweats, mild fever, cough and sometimes haemoptysis symptoms are sometimes difficult to differentiate from lung malignancy, However, unusual features associated in elderly are hypo albuminaemia, disordered liver function tests, hypo natraemia and hypokalaemia. Miliary tuberculosis is more frequent and the presentation may be atypical and sub acute. Associated bone tuberculosis, usually of the spine and joints is found in approximately 5%. Renal and genitourinary tuberculosis is less frequent than in the young.

Investigations

The radiological features of tuberculosis in elderly are similar to those in the young but with greater prevalence of middle and lower zone involvement. The most common radiological appearances are those of old healed disease with patchy fibrotic calcified lesion in the upper lobes and pleural thickening. Cavitation is present in approximately 20% and pleural effusion in 15%. Another problem in elderly is greater frequency of multiple drug resistant tuberculosis. Besides X-rays, other useful investigation are blood ESR and Monteaux test. However, these tests should be interpreted with caution. Monteaux test may be negative in 20% elderly patients. Sputum Examination, if available, for AFB is a useful test and in patients where cough is unproductive, bronchoscopy or other methods (mention in pneumonias) may be needed for taking bronchial secretions for AFB - Zeihl Neelson Smear and culture examination for diagnosis of tuberculosis. If genitourinary tuberculosis is suspected, three morning samples of urine for AFB smear and culture should be taken. Other tests for diagnosis of tuberculosis are Bone-marrow aspirate, Liver biopsy, Synovial aspiration or Lymphnode biopsy may be helpful in disseminated disease.

4.5.2 Treatment

Use of anti-tubercular drugs is same as for the young i.e. Rifampicin, INH, Pyrazinamide and Ethambutol, is usual dosage for first 2 months and only Rifampicin and INH for next 6-7 months. However, in view of risk of retinal toxicity of Ethambutol, its use should be cautious and if used, frequent visual and fundus check ups are indicated. Liver function tests before starting treatment and during treatment should be done. Slight rise of liver enzymes is no contra-indication to the use of anti tubercular drugs. Their use should be stopped only when patient develops hepatitis/jaundice. Pyridoxin 10 mg daily will help reduce chances of peripheral neuropathy. Sputum culture and sensitivity should be done to detect MDR tuberculosis, in which case, we may have to use other second line drugs like Prothionamide, Cycloserine, Kanamycin, or Ciprofloxacin/Oflaxacin. Use of Streptomycin is normally avoided in elderly for fear of ototoxicity in elderly.

Patients with smear positive tuberculosis should be isolated for at least first two weeks after starting anti-tubercular treatment.

The treatment of tuberculosis is not complete without contact tracing to be performed by public health department. Children in the family of index case should be kept under observations for at least six months after starting treatment of index case or they may be put on INT-1 prophylaxis.

Atypical mycobacterial diseases are relatively rare in elderly and their clinical picture and treatment is same although for longer period.

Check Your Progress 3

- 1) Enumerate special features of Pulmonary Tuberculosis in Elderly.

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2) List the precautions while treating elderly patients with Pulmonary Tuberculosis.

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3) Mention the elderly patient with active Tuberculosis be kept isolated.

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4.6 LET US SUM UP

Respiratory infections in elderly result in much higher morbidity and mortality. Pneumonias are the most common of all infections. They can lead to lung abscess, pleural effusion, emphysema, pyogenic meningitis and collapse of the lung lobar or segmental. Not only the burden of infection is high but also the likelihood of atypical and non-specific presentation of respiratory problem has assumed great importance. Diagnosis made by history, radiological, serological and microbiological studies. Treatment is based on specific antibiotic therapy to prevent complications and its sequelae. Pulmonary tuberculosis is 12 times more frequent compared to the young. Most cases are due to reactivation of the previous disease due to decreased immunity, malnutrition, AIDS, Corticosteroids or chemotherapy or even due to excessive smoking. Treatment is the same as for the young. In cases of MDR tuberculosis, the second line drugs are used and use of streptomycin is normally not recommended for fear of ototoxicity and Nephrotoxicity in elderly. Atypical mycobacterial diseases are relatively rare and require treatment for longer period.

4.7 KEY WORDS

COPD : Chronic Obstructive Airway Disease

Nosocomial Pneumonia : Pneumonia developing after 48 hours of hospital admission

4.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

- 1)
 - a) True
 - b) True
 - c) False
 - d) False
 - e) True
- 2)
 - a) Nosocomial pneumonias are pneumonia occurring after 48 hours of hospital admission.
 - b) Prophylaxis includes influenza vaccine to be given annually in patients with COPD and cardiac disease. Polyclonal pneumococcal vaccine can also be given yearly but is of doubtful value.

- 3) a) Bronchoscopy is indicated when pneumonia presents at unusual site, delayed healing, poor response to treatment and recurrent pneumonia at the same site. It helps to rule out any bronchial obstruction and to get bronchial secretions for appropriate examination.
- b) Sputum smear is a simple investigation that give valuable guideline information for possible microorganisms and starting antibiotic treatment before culture report available for specific antibiotic therapy.
- c) Aims of laboratory investigations are to confirm the diagnosis of pneumonia, to find out the organisms responsible and their sensitivity to various antibiotics, to assess the follow up response to treatment.
- d) The treatment for nosocomial pneumonia in non-immuno comprised patient is carried out by a third generation cephalosporin such as cefloxime, ceftizoxime and ceftazidime or cefoperazone In neutropenic patient, two antibiotics- an aminoglycoside with ceftazidime or semisynthetic broad spectrum penicillin (Ticarcillin or Piperacillin) are recommended. Sometimes antifungal therapy has also been added if patient has already received extensive antimicrobial therapy.

Check Your Progress 2

- 1) a) True
b) True
c) False
d) False
- 2) Complications of lung abscess are rupture in the pleural cavity leading to emphyema/pericardial effusion, Amyloidosis of kidneys leading to Nephrotic syndrome, hypoproteinemia, anaemia and anasarca and Massive Haemoptysis.
- 3) Surgical Resection is done if there is massive uncontrolled haemoptysis, or localised malignancy, associated Bronchietasis and non-closure of lung cavity after 2 months of medical treatment.

Check Your Progress 3

- 1) The pulmonary tuberculosis is 12 times more common in elderly over 75 years. Most cases are due to reactivation of previous disease due to depressed immunity, malnutrition, AIDS, corticosteroids or chemotherapy. Besides usual clinical features that is weight loss, night sweats, mild fever and cough and sometimes haemoptysis, unusual features are low protein in the blood, altered liver functions and electrolyte abnormality. Miliary tuberculosis is more frequent and presentation may be atypical or subacute.
- 2) During drug therapy with ethambutol caution should be used as it causes retinal toxicity. Frequent visual and fundus check ups are recommended. Liver function tests before and during therapy should be done to see the rise in enzymes and serum bilirubin. Pyridoxin therapy to be started to reduce changes if peripheral neuropathy.
- 3) Patients with smear positive tuberculosis should be isolated for atleast first two weeks after starting anti tuberculosis treatment.

4.8 FURTHER READING

Sainani, G.S. (ed.), *API Text Book of Medicine*, 6th edn., Association of Physicians of India, 1999.