UNIT 5 NON-INFECTIVE DISORDERS OF THE RESPIRATORY SYSTEM

Structure

5.0 OBJECTIVES

After studying this unit, you should be able to:

- define various non-infective diseases of respiratory system in elderly and explain their aetiopathogenesis;
- describe the clinical features;
- discuss the approach to the diagnosis; and
- outline the management of various non-infective respiratory disorders.

5.1 INTRODUCTION

In the previous unit, you were introduced to the common respiratory infections in the elderly. Besides infections there are several other respiratory diseases, which occur, more frequently in geriatric patients. These disorders could be degenerative or related to environment, or diseases, which could also be occurring in adults as well as elderly but with different

presentations. In this unit we would learn about few common diseases in this category of respiratory disorders e.g., bronchial asthma, COPD, Chronic Cor Pulmonale, Interstitial Lung Disease and Lung cancer.

5.2 BRONCHIAL ASTHMA

Asthma in the elderly patient encompasses a number of important issues, the foremost being the need to maintain a high index of suspicion for the diagnosis, as it is often overlooked in older patients. Factors that may account for this underestimation include the overlapping of asthma symptoms with those of chronic bronchitis and emphysema, the coexistence of other conditions such as angina and congestive heart failure that may mimic asthma, as well as the general misperception that the new-onset asthma in the elderly is rare.

The prevalence rate of asthma in elderly people indicate that it varies from 6.5 to 10%. However, the incidence is dependent on environmental conditions, occupational patterns, genetic configuration, and dietary patterns of the population besides diagnostic criteria adopted by the different investigators. Approximately one third of those in remission from childhood asthma have recurrence after age 45.

5.2.1 Etiopathogenesis

Non-specific hyperirritability of tracheobronchial tree is the main predisposing cause of bronchial asthma. The airway reactivity rises following viral infections, exposure to oxidant air pollutants and various allergens.

The common triggering agents of asthma besides infections and pollutants are gastro-oesophageal reflux, drugs like aspirin, NSAIDs, beta blockers etc.

Airway inflammation is the basic mechanism leading to bronchial asthma . These inflammatory changes lead to reduction in airway diameter by causing smooth muscle contraction, oedema of bronchial wall and thick tenacious secretions, which causes bronchospasm.

The symptoms of bronchospasm appear only when the forced vital capacity of any individual falls below 50% of normal. However, on presentation, these patients have significantly lowered FEV1 (<30%) and mid expiratory flow rates (<20%).

5.2.2 Clinical Presentation and Diagnosis

Cough is a prominent symptom of asthma in elderly which is most pronounced in the night. The onset of attack may be insidious, taking several weeks to develop. The perception of airway obstruction like wheezing and dyspnoea is reduced in elderly patients symptoms are episodic.

Identification of obvious trigger factor apart from respiratory infection is difficult in elderly patients. However, history of nasobronchial allergies in first degree relatives may be present.

Following conditions should be differentiated from bronchial asthma:

1) Bronchitis
2) Left ventricular failure
3) Pulmonary embolism
4) Pneumothorax
5) Anxiety states
6) Local Emphysema like pneumoconiasis
7) Tracheo-bronchial obstruction

Simple bed side examinations like ECG, PEFR (Peak Expiratory Flow Rate) measurement, X-ray chest besides a careful history and clinical examination can establish the diagnosis of

bronchial asthma in most of the cases. In all elderly having late onset asthma, chest skiagram is prudent to exclude a bronchostenotic lesion like carcinoma especially in those who do not respond to conventional therapy.

5.2.3 Management

Asthma is often preventable if environmental and other triggering agents can be identified and eliminated. Cessation of smoking, early treatment of chest infections are essential aspects of preventive care. Domiciliary use of PEFR using simple flow meter can be extremely helpful in initiating aggressive therapy to abort acute episodes of asthma. A value of < 60% of predicted PEFR indicates severe asthma.

In a vast majority of cases treatment of infection is the first step in management of Asthama.

Asthma therapy in the elderly is similar to that for younger individuals. However, in the elderly patient with asthma, therapeutic regimens should be carefully individualised for several reasons. First, there is higher incidence of adverse drug reactions due to altered drug metabolism and elimination. Second, medications used to treat concomitant diseases can lead to multiple drug interactions or can precipitate asthma exacerbations. Third, there may be noncompliance with medications due to financial, neuropsychiatric, or physically disabling disorders such as arthritis. Last, co-existing disorders that are more prevalent in the elderly and that may exacerbate asthma include chronic aspiration and gastroesophageal reflux.

The use of beta-agonists is relatively safe in the elderly, although even mild systemic absorption can lead to tachycardia and muscle tremor. Short acting beta agonists are Salbutamol, Terbutaline, Fenoterol where as longer acting are Salmetrol, Formoterol.

Although, other bronchodilator like theophylline, is generally not recommended for treatment of acute asthma if beta agonists and corticosteroids are used properly. Long acting theophylline, however, may be an useful adjunct agent for the patient with difficult-to-control nocturnal asthma.

Anti-inflammatory agents like corticosteroids both in inhalation as well as oral forms are very important adjunct to the bronchodilators. The commonly available inhaled corticosteroids are Beclomethasone, Budesonide, Flunisolide, Trimacilone.

As regards the drug delivery, the inhalation route is the most preferred as it evokes quick response and minimises the side effects of systemic drugs. While using metered dose inhalers (MDIs) in elderly asthmatics, the use of spacer devices ensures higher drug delivery and requires less efforts and coordination by the patient.

5.2.4 Prognosis

The mortality rate for asthma in many parts of the world has significantly increased in recent years and is most striking in patients older than 55 years of age. Age is an important factor in determining the prognosis of asthma because of the greater prevalence of other diseases coincident to, or complicated by, asthma in the elderly.

Check Your Progress 1

1) List three causes for overlooking the diagnosis of bronchial asthma in elderly.

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2) What is the basic mechanism for bronchial spasm?

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3) What is best mode of drug delivery in bronchial asthma and why?

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5.3 CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

COPD, defined as chronic bronchitis or emphysema, is a disease the prevalence of which increases in the sixth decade, thus making it a disease of the elderly.

The prevalence of chronic bronchitis in rural India may be as high as 30% in the over 40 years age group where as in urban India the incidence is around 10%. While smoking is the commonest cause of chronic bronchitis in males, exposure to cooking fuels is the commonest cause in females especially in rural areas.

5.3.1 Etiopathogenesis

A number of factors are important for the development of COPD. Tobacco smoking, alpha-1 antitrypsin deficiency, occupational exposure to dust and fumes and indoor pollution caused by combustion of traditional fuels are some of the primary causes. Smog, smoke, air pollution, genetically determined predisposition to develop allergy and bronchial hyper-responsiveness are other factors which leads to insidious development of airway obstruction.

Chronic bronchitis and emphysema are characterised by changes in the large bronchi, bronchioles and parenchyma. The changes mainly consists of inflammation, hypertrophy of goblet cells and submucosal glands, muscle hyperplasia, bronchial wall thickening etc. Various types of emphysema like centriacinar, panacinar, distal acinar, bullous emphysema are present in the lung parenchyma of these patients.

5.3.2 Clinical Features and Diagnosis

Cough with mucoid expectoration followed by exertional dyspnoea in over fifty years aged, smoker, is the presenting feature of COPD. Cough is worst in the morning.

The physical findings in a patient of COPD is mainly dependent on the predominant component of chronic bronchitis or emphysema. Cor pulmonale is more common in patients of chronic bronchitis and is called “blue bloaters” due to presence of cyanosis. While emphysematous patients are “pink puffers” because they maintain a normal PaO2 and PCO_2. Besides the presence of cyanosis and CHF, these patients in an advanced state may present with respiratory failure. The patient may develop flapping tremor, bounding pulse, confusion and mental obtundation.

These patients have a barrel shaped chest with poor chest expansion and diminished breath sounds. There may be accompaniments in form of ronchi and inspiratory crackles. There may be evidence of associated pulmonary hypertension in form of accentuated second heart sound with functional tricuspid regurgitation.

The diagnosis of COPD is based on clinical features. However, plain skiagram of the chest will show the changes of emphysema. High resolution computerised tomography (CT) of the chest is an excellent method of diagnosis for emphysema, although expensive and cannot be done in all cases.

In COPD, spirometry reveals reduction in FEV_1 and FEV_1/FVC ratio with increased residual volume (RV) and total lung capacity (TLC); and a reduction in the diffusion capacity for CO.

The ECG may show clock-wise rotation of heart as reflected by right axis deviation, an RS pattern in V5, V6, aVL; a QR pattern in aVF. Changes of Cor pulmonale, such as right ventricular hypertrophy and p-pulmonale may be observed.

The disease should be differentiated from asthma that may be difficult. The important differences between the two conditions are:

Criteria	Bronchial Asthma	COPD
Age	Younger age	Middle age or older
History of Smoking	Less frequent	More Frequent
History of Atopy	Frequent	Infrequent
Symptoms	Symptom free in between (episodic)	Symptoms are persistent
	Wheezing is predominant symptom	Cough, expectoration and dyspnoea are main symptoms.
Response to Steroid and bronchodilators	Good response	Poor response
Eosinophilia and sputum eosinophils	Are usual	Unusual
Cor pulmonale	Unusual	Common
Chronic CO_2 retention and hypoxia	Not seen	Possible
Prognosis	Good	Poor

5.3.3 Management

For COPD, therapy with proven impact on outcome includes smoking cessation and oxygen therapy when indicated. It is never too late in the course of a disease for a patient to stop smoking. On the other hand, oxygen therapy in hypoxemic patients with COPD improves survival and the survival is directly related to the number of hours of oxygen use per day. Oxygen therapy also has been shown to improve quality of life, including benefits in sleep, exercise tolerance, neuro-psychiatric testing and reduction in secondary polycythemia and nocturnal arrhythmias. Nocturnal oxygen supplementation has further been shown to be safe.

Except for oxygen treatment, drug therapy for COPD has so far failed to have an impact on outcome. Pharmacological medications are similar to those outlined in the previous section for asthma but they also include early use of anticholinergics like ipratropium bromide. Combination MDIs with ipratropium bromide and a beta agonist have been found to be more effective than either agent alone.

The use of theophylline in the treatment of COPD is controversial, but in addition to bronchodilation, it may improve diaphragmatic strength, may prevent fatigue, and may improve nocturnal symptoms.

It is estimated that 10-20% of patients with COPD respond to corticosteroids.

Pulmonary rehabilitation, which is composed of (1) exercise, (2) patient education, (3) psycho-social, nutritional and respiratory therapy counselling, (4) smoking cessation, and (5) optimization of medication, is recommended for patients with severe symptoms.

Since acute exacerbation of COPD can occur because of chest infections due to bacteria like H. influenza, S. pneumoniae, M. catarrhalis, antibiotic therapy generally produces an earlier resolution of symptoms. The useful antibiotics are amoxycillin, cotrimoxazole, tetracycline, cefaclor, amoxycillin-clavulanic acid and cefuroxime.

Check Your Progress 2

1) List three important causes of COPD

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2) What is the cardinal presentation of COPD?

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3) State whether the following statements are true or false:

a) Chronic bronchitis patients are “pink puffers”. True/False

b) Cor pulmonale is commonly associated with COPD. True/False

c) In COPD FEV_1 is reduced and RV is increased. True/False

d) Outcome of oxygen therapy in COPD is not related to the duration of its administration. True/False

5.4 CHRONIC COR PULMONALE

Chronic cor pulmonale is defined as hypertrophy of the right ventricle due to the diseases of the chest wall, lung parenchyma and pulmonary vasculature. The presence of right ventricular failure is not necessary for the diagnosis of cor pulmonale. In an elderly-COPD patient, the development of cor pulmonale effects the prognosis. However, the severity of airflow obstruction is not directly related to the development of cor pulmonale.

5.4.1 Pathophysiology

The causes of cor pulmonale are diseases of the pulmonary vasculature like pulmonary embolism, pulmonary vasculitides, primary pulmonary hypertension and the diseases of the lung (COPD, restrictive lung disease), which obstruct the flow of blood.

The most common cause of chronic cor pulmonale is chronic obstructive pulmonary disease (COPD). In emphysematous patients, loss of vascular surface area and alveolar hypoxia induce pulmonary vasoconstriction. Normal cardiac output flowing through a reduced pulmonary vascular bed that has lost the normal ability to accommodate increases in blood flow associated with exercise in the patients of COPD. In such patients, pulmonary vascular resistance rises during exercise, the opposite of a normal response. This rise in pulmonary artery pressure increases the after load on the right ventricle both at rest and during exercise.

The enlargement of right ventricular in cor pulmonale ranges from slight to severe. In COPD, hypoxemia is a potent pulmonary vasoconstrictor and is a primary factor leading to pulmonary

hypertension. The severity of airway disease further aggravates the pulmonary vascular resistance. Hypoxia increases pulmonary vascular resistance (PVR). In general, PVR is not affected at low levels of oxygen instauration but at high levels of instauration, PVR rises disproportionately. Hypoxemic pulmonary vasoconstriction and resting pulmonary hypertension with associated cor pulmonale are generally considered to confer a poor prognosis for patients with COPD. Increased blood viscosity caused by the frequently associated polycythemia may be an additional factor for an increase in PVR.

5.4.2 Clinical Features and Diagnosis

Initially symptoms of cor pulmonale are unrecognized for a long time by those who are heavy smokers. There is usually a history of previous episodes, often requiring hospitalisations. There is history of progressively worsening dyspnea, cough and expectoration. The dyspnea may be worse when upright (platpnea) or while lying on one side (trepopnea) due to gravitational shifts, particularly of the heart. Paroxysms of coughing may increase intrathoracic pressure and decrease cardiac output and blood pressure. There may be associated light-headedness or loss of consciousness and convulsions (ictus-laryngus) when the blood pressure falls during the paroxysms of cough and subsequent inhalation. CO_2 retention during night leads to morning headache and occasional vomiting with mental confusion and papilloedema due to cerebral vasodilatation.

Physical signs include raised jugular venous pressure, a palpable tender liver, and ankle edema in a case of COPD. Tachycardia is usually present and there may atrial fibrillation. Warm skin, bounding pulse and perhaps, raised intracranial pressure due to CO_2 retention are often present. Patient may have central cyanosis.

Investigation

Investigations in the case of cor pulmonale are mainly directed to confirm the presence of chronic obstructive airway disease and chronic cor pulmonale . These include following:

a) ***X-ray Chest***

It shows marked emphysema (“peripheral pruning”), sometimes with a big pulmonary artery hilar segment and descending right pulmonary artery. Increased right ventricular size may not be obvious because of hyperinflation. CT scan is not contributory in cor pulmonale.

b) ***Pulmonary Function Tests***

PFT exhibits low FEV_1, reduced FEV_1/FVC ratio, and reduced vital capacity. Diffusing capacity and arterial O_2 whereas PCO_2 is elevated.

c) ***ECG***

ECG in Cor pulmonale may exhibit right axis deviation, incomplete or complete RBBBB, prominent S waves in leads I, II, III, P-pulmonale, evidence of right atrial enlargement, right ventricular hypertrophy. Common forms of arrhythmias, which can be observed in Cor pulmonale, are atrial fibrillation and multifocal atrial tachycardia.

d) ***Echocardiography***

Echocardiography may reveal increased cross-section of right-ventricular cavity and a greater thickness of the right ventricular wall, however, a good quality examination is often not possible due to hyper inflated lungs and closeness of the densely reflective sternum.

e) ***Radio nuclide Techniques***

The right ventricular ejection fraction can be non-invasively measured by $Technetium^{99m}$ angiography. Similarly, right ventricular myocardial imaging with $Thallium^{201}$ detects hypertrophy. These techniques are costly and available only in very few places.

Differential Diagnosis

In the presence of COPD, it is often difficult to detect mild right heart failure. Even without failure, there may be increased venous pressure due to intrinsic (positive end expiratory

pressure), and normal liver may be palpable, apparently enlarged when the low diaphragm in COPD displaces it downward. The left ventricular failure (LVF) should be differentiated from the right heart failure of COPD. In left heart failure, history of past ischemic episodes is often present. There are fine end-inspiratory crackles rather than coarse crackles or wheezes of COPD. ECG and echocardiography easily differentiate the two conditions.

5.4.3 Management

The management of cor pulmonale in a COPD patient requires compressive treatment of both the conditions. The following modalities of management are helpful in improving the condition of patient.

1) **Oxygen Therapy**

Oxygen therapy relieves hypoxic vasoconstriction and does not allow PCO_2 to rise quickly or to very high levels. Some rise in PCO_2 is almost inevitable which is usually harmless. The target of O_2 saturation should be brought between 85 to 90% and the arterial PO_2 pressure to above 60 mmHg. Oxygen administration by venturi mask is preferred. However, oxygen administration by nasal catheter at rates between 1 and 2.5 L/min yield saturation above 10%, which can simply be monitored by oxymeter. The most convenient way of oxygen therapy for patients is through nasal prongs. Pulmonary artery pressure falls (2.5 mmHg per year) in these patients if oxygen therapy (15 to 18 hours a day) is administered for 1 to 6 years.

2) **Diuretics**

Diuretics help in improving the right heart failure if used judiciously. Excessive fluid loss care should be taken to prevent since it lowers the ventricular preload besides inducing metabolic alkalosis that can in turn promote further hypercapnia.

3) **Digitalis**

The role of digitatis in cor pulmonary treatment is not yet established in right heart failure. It is not useful but when right heart failure is associated with some degree of left sided failure, it may be useful. The effect of digitalis on right ventricular function is complex since it enhances right ventricular myocardial contractility but also produces pulmonary vasoconstriction. Digitalis therapy is often associated with increased frequency of adverse side effects, including cardiac arrhythmias. In the presence of concurrent left ventricular dysfunction, digitalis apparently improve cardiac function or exercise performance. In elderly and cigarette smoking COPD patients with combined ischemic left ventricular disease, digitalis may therefore, have some beneficial effect.

4) **Vasodilators**

Vasodilation reduce pulmonary artilary pressure in high doses which are not tolerated. Captopril (12.5 mg three times a day) may reduce pulmonary artery pressure and pulmonary vascular resistance in COPD patients. It improves cardiac output, oxygen-delivery and mixed venous oxygenation.

5) **Theophylline**

Theophylline is effective in improving myocardial contractility and reduced right ventricular after- load that effectively improves the right heart failure.

6) b_2**-adrenergic Agents**

β_2-adrenergic receptor agonists like Terbutaline, by subcutaneous administration, may augment cardiac output, reduce pulmonary vascular resistance and biventricular ejection fractions. These cardiovascular effects are largely from pulmonary vasodilatation as well as its inotropic action.

7) **Phlebotomy**

Phlebotomy probably should be reserved for use as adjunctive therapy in the acute management of markedly polycythemic patients who have acute decompensation of cor pulmonale.

Check Your Progress 3

1) Is it necessary to have right ventricular failure for the diagnosis for cor pulmonale?

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2) Enlist three ECG abnormalities in cor pulmonale

a) .....

b) .....

c) .....

5.5 INTERESTITIAL LUNG DISEASE

Interstitial lung disease (ILD) is a group of diseases that involve the alveolar walls and the pulmonary interstitium including the perivascular and peribronchial structures. Although there are several causes of interstitial lung diseases its clinical features, radiological findings and physiological changes are quite similar. These patients usually have exertional dyspnea and dry cough associated with impairment of pulmonary diffusing capacity and arterial hypoxemia, which is characteristically due to restrictive lung disease. Pneumoconiosis is an important group of preventable causes of interstitial lung disease.

5.5.1 Etiopathogenesis

There are many causes of interstitial lung disease however, some are more important. Geriatric patients frequently have pre-existing lung disease like chronic bronchitis, emphysema and chronic obstructive airways disease, which affect the result of investigations causing difficulty in diagnosing ILD.

Table 5.1: Important Causes of Interstitial Lung Disease

1. Secondary to Collagen Vascular Diseases
2. Pulmonary vasculitides
3. Infectious diseases
— Miliary tuberculosis
— Disseminated fungal infections
— Interstitial pneumonias (viral, Herpes simplex, Cytomegalovirus, bacterial, pneumocytis carinii)
4. Occupational lung disease - all types of pneumoconiosis Inorganic dust organic dust Organic dust (Hypersensitivity pneumonitis)
5. Immunological
6. Malignancies
7. Drug induced pneumopathy
8. Miscellaneous and unknown

Pathophysiological Changes in Lung

Most of the patients with ILD have evidence of alveolitis. Alveolitis may be characterised as being lymphocytic or neutrophilic. Inflammation of the lower respiratory tract is accompanied by granuloma formation in certain disorders, and certain ILDs produce a considerable degree of diffuse interstitial pulmonary fibrosis.

There is reduction in vital capacity, forced expiratory volume in first second (FEV1), peak expiratory flow rate and maximum mid expiratory flow rate. Additionally, ventilatory response to respiratory failure is much less in the elderly as compared to the young. Due to this fact, the elderly are more likely to have hypercarbia (type-II respiratory failure).

5.5.2 Clinical Features

Detailed clinical history and thorough physical examination are essential. History of occupational exposure to organic or inorganic dust at work is particularly important. Any such elderly may get ILD due to asbestosis at a later date. In elderly patients, there may be a co-existing lung disease such as chronic bronchitis, emphysema and chronic obstructive airways disease. In that situation, it is difficult to differentiate symptoms of ILD from those of these co-existing diseases. Because of reduced lung volume and capacities, the shortness of breath may be felt earlier as compared to that in younger patients with similar extent of interstitial lung. The symptoms of ILD are usually chronic and present from months to years. However, in some symptoms may manifest over a period of days or weeks.

The most common early symptom is progressively increasing shortness of breath on exertion, which, in advanced stages may also be present at rest. Cough can be a prominent and disturbing symptom. Other symptoms include substernal chest pain, pleuritic chest pain and rarely, sudden severe chest pain due to pneumothorax. Hemoptysis is an unusual symptom of ILD. Hemoptysis in a confirmed case of ILD should raise the suspicion of another co-existing disease such as a complicating malignancy.

The physical findings depend on the cause and stage of disease. A patient with severe disease may be dyspneic at rest and may be cyanosed. Digital clubbing may be present (classically in idiopathic pulmonary fibrosis). On chest examination, the expansion of the chest may be diminished. The most common physical finding in chest examination is bilateral basal crepitations. Other physical findings depend on the severity of disease and co-existing conditions. Other findings, quite often, offer clues to the primary disease leading to ILD.

Patient should be examined carefully for extra thoracic manifestations of the disease, particularly in the skin, bones and joints, eyes, and peripheral lymph nodes, proximal muscle weakness (polymyositis), peripheral neuropathy, Raynaud's phenomenon, dryness of mouth, sinusitis or renal involvement, hepatosplenomegaly, cardiac involvement, central nervous system involvement etc. Patients with silicosis have few clinical findings in the chest.

5.5.3 Investigations

The following investigations are usually undertaken:

Chest Skiagram

In early disease there is a fine granular appearance (ground glass appearance) on chest X-ray. With progression of disease a coarse reticular , reticulonodular pattern or multiple cystic or honeycoombed areas (translucencies measuring 0.5 to 1.0 cm) are seen and denote advanced disease and poor prognosis. The reticular or reticulonodular shadows are seen more at the lung bases. These are classical radiological features of idiopathic pulmonary fibrosis. There is radiological evidence of reduced lung volume that is evident by raised diaphragms.

Pulmonary Function Tests

Reduction in total lung capacity, vital capacity and tidal volume are characteristic abnormalities of ILD. The minute volume is maintained by increasing the respiratory rate. The FEV1/FVC is normal or high. The diffusion capacity for carbon monoxide is reduced and may be an early finding in some patients. In early stages, the abnormality in diffusion may be only evident on exercise. Pulmonary function tests indicate the severity of disease and help in monitoring the progress of the disease, including the response to treatment.

Arterial Blood Gases and Oxygen Saturation

The arterial blood gases may be normal and hypoxemia is only evident on exercise. There may be retention and PCO_2 may rise in chronically ill patients due to fatigue of respiratory muscles. The classical findings are hypoxemia with normal low PCO_2.

Bronchoscopy and Lung Biopsy

The confirmation of the diagnosis of interstitial lung diseases is only by histopathological examination of lung. Bronchoscopy and transbronchial lung biopsy is a much simpler procedure but is rarely adequate for the diagnosis of idiopathic pulmonary fibrosis or other forms of pulmonary vasculitis were an open lung biopsy is preferred. Bronchoalveolar lavage may yield the diagnosis in infections (e.g. tuberculosis, pneumocystic carinii and carcinomatosis). In the elderly, open lung biopsy should be avoided if there is sufficient evidence of ILD. Biopsies of certain extra thoracic organs may help in the diagnosis of ILD. Lymph node biopsies are most helpful and may help in diagnosing tuberculosis, sarcoidosis or histiocytosis-X. Typical granulomas may be seen in biopsy of hip muscle, liver or skin in patients with sarcoidosis. In disseminated fungal or tubercular infections also, liver biopsy may show granulomas.

Serological Investigations: These are helpful in collagen diseases.

Other Investigations needed in only few cases (bronchial secretion after lavage)

5.5.4 Management

The management of ILD basically depends upon treatment of the identified cause. In the following paragraphs management of the most common cause of ILD i.e. idiopathic pulmonary fibrosis has been outlined.

Corticosteroids

Corticosteroids are the mainstay of treatment. Prednisolone is the drug of choice and is given in a dose of 1.5 to 2 mg/kg/day. These elderly patients with advanced pulmonary fibrosis respond poorly to corticosteroids. Over all subjective improvement occurs in a majority of patients, but objective improvement in lung functions and radiological features occur only in a minority. The initial dose of prednisolone is continued for 2-3 months and is then reduced gradually to the lowest point at which improvement can be sustained. Patient should be continued on this dose for 3 to 6 months. If the patient deteriorates, the dose of prednisolone may be stepped up. Usually it is not possible to stop corticosteroids completely. Patients should be monitored for adverse effects of corticosteroids.

Cyclophosphamide

This is used as a second line drug. Its mode of action is depletion of lymphocytes thereby suppressing lymphocyte function. The usual dose is 2 mg/Kg/day. Prednisolone is concomitantly given in low dosages (0.25 mg/Kg/day). Cyclophosphamide should be continued for 9-12 months. Blood count should be taken regularly.

Azathioprine

It is less effective than cyclophosphamide. The recommended dose is 200 mg/day. A trial of 3-6 months should be given for adequate response. Blood counts and liver function tests should be performed regularly.

Oxygen therapy and lung transplantation

Patients with advanced disease and respiratory failure may require long-term oxygen therapy. Finally lung transplantation offers hope to patients with chronic respiratory failure.

Check Your Progress 4

1) Which is a preventable cause of ILD?

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2) What is the classical spirometry finding in ILD?

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3) What is the classical ABG abnormality in ILD?

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4) What is the confirmatory test for ILD?

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5.6 LUNG CANCER

Chronic cough not responding to routine treatment and heemoptysis are the early clinical symptoms of lung cancer. In majority of the early stage patients, a coin lesion in chest X-ray is the only findings. You will be reading more about lung cancer in Unit 2, Block 7 of this Course.

5.7 LET US SUM UP

We have learnt that common non-infective disorders of respiratory system are mainly bronchial asthma, COPD, chronic cor pulmonale, ILD and lung cancers. There is quite high incidence of 'new onset' asthma in elderly that is often overlooked due to several other associated diseases in this age group. Its diagnosis and differentiation from other diseases like LVF and COPD is of utmost importance, because the treatment of bronchial asthma is highly satisfactory, especially with introduction of steroid and beta aganist inhalers in the Indian market.

Smoking has been identified as the single most common etiological factor to cause respiratory diseases like COPD and associated cor pulmonale besides lung cancer. Once developed, these disorders are difficult to be managed. Nothing sort of long term domiciliary oxygen therapy is successful in the management of COPD. Once cor pulmonale complicates the disease, the treatment becomes further difficult since vasodilators, ionotropics, and diuretics etc. provide only temporary relief.

ILD is caused by several factors only few of which like pneumoconiosis are avoidable. Initial symptoms of ILD are although only related to exertion; spirometry suggestive of restrictive lung can easily confirm the diagnosis. A long-term administration of corticosteroids is often helpful in these patients.

5.8 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) The three causes for overlooking diagnosis of bronchial asthma are

   a) overlapping of asthma symptoms with those of chronic bronchitis and emphysema,

   b) coexistence of other conditions such as angina and congestive heart failure, and

   c) misperception that new-onset asthma is rare in elderly.

2) Airway inflammation is the basic mechanism for bronchial spasm.

3) Metered Dose Inhalation (MDI) due to its quick action and minimal side effects is the best mode of drug delivery in bronchial asthma.

Check Your Progress 2

1) Three important causes of COPD are :

   a) Smog

   b) Smoke

   c) Air-pollution

2) The cardinal presentation of COPD is cough with mucoid expectoration followed by exertional dyspnoea in elderly smoker male.

3) a) False

   b) True

   c) True

   d) False

Check Your Progress 3

1) No

2) The three ECG abnormalities in Cor Pulmonale are

   a) Right axis deviation

   b) P- pulmonale

   c) Prominent S waves in L I, II, & III

Check Your Progress 4

1) Pneumoconiosis is a preventable cause of ILD.

2) Reduced vital capacity, tidal volume and total lung capacity suggestive of restrictive lung are the classical spirometry finding in ILD.

3) Hypoxemia with normal low pCo_2 is the classical abnormality in ILD.

4) Lung biopsy

5.9 FURTHER READING

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