

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

WHEN TO SUSPECT/ RECOGNISE

Case definition:

Suspect case of COPD (For Level 1 & 2 facility) - Based solely on clinical grounds. Over 35 years of age, smokers or ex-smokers, exposure to environmental smoke or choolah smoke, occupational dust exposure, with symptoms of exertional breathlessness, chronic cough, sputum production, wheeze, and frequent winter bronchitis. Examination reveals barrel chest deformity, pursed-lip breathing, use of accessory muscles of respiration, paradoxical movements of chest or abdominal wall.

Tympanic sounds on percussion due to hyperinflation or bullae, adventitious rhonchi or crepitations on auscultation. As disease progresses, other signs like reduction in tracheal length above sternal notch, signs of cor pulmonale (neck vein distension, peripheral edema, liver enlargement, signs of pulmonary or tricuspid insufficiency) & loss of muscle mass and peripheral muscle wasting are seen. Cyanosis in form of bluish colour of mucosal membranes may indicate hypoxemia.

Probable case of COPD (For Level 2 & 3 facility) - A suspect case with chest radiography findings of hyperinflation of lungs (flattening of diaphragm, radiolucent lung fields, reduction of vasculature, prominent pulmonary artery at hila) and evidence of bullous disease. Also exclude other differential diagnosis like pneumonia, CCF, pleural effusion, pneumothorax.

Confirmed case of COPD (For Level 4 facility) - A suspect or probable case with pulse oximetry showing lowered SPO₂ & spirometry showing mild airway obstruction initially. Later the diagnosis of COPD is confirmed (post-bronchodilator FEV₁/FVC < 70%; pre-bronchodilators FEV₁ < 80% predicted). CT chest can detect bullae if in doubt (optional). Doppler Echocardiography to assess right ventricular function & pulmonary ventricular pressure. Arterial blood gas (ABG) during severe exacerbation to detect hypoxemia, when FEV₁ < 40% or clinical signs suggestive of respiratory failure or right heart failure. α 1-antitrypsin level can be done in younger patients (< 40 years) who develop COPD and have strong family history, as serum value of less than 20% is highly suggestive of homozygous deficiency.

INCIDENCE OF THE CONDITION IN OUR COUNTRY

- COPD is characterized by airflow limitation that is progressive and not fully reversible. The lungs exhibit an abnormal inflammatory response to noxious particles or gases, the primary insult being cigarette smoke.
- Earlier, diagnosis of either chronic bronchitis or emphysema or both were made, now included under the umbrella condition called COPD. The relative contribution of either condition is difficult to assess and most patients have clinical features of both these diseases.
- Incidence of COPD in India is high. 13 million people suffer from it out of which 62% are males

DIFFERENTIAL DIAGNOSIS

- Bronchial Asthma
- Congestive heart failure
- Bronchiectasis
- Tuberculosis
- Interstitial lung disease
- Obliterative Bronchiolitis

DIAGNOSTIC CRITERIA, INVESTIGATIONS, TREATMENT & REFERRAL CRITERIA

LEVEL 1: AT SOLO PHYSICIAN CLINIC:

Clinical Diagnosis: Essentially as described for a suspect case. Clinical history of chronic cough with exacerbation in winters in a smoker/ ex-smoker, or occupational exposure to smoke or dust with examination findings of barrel chest deformity, pursed-lip breathing, use of accessory muscles of respiration, paradoxical movements of chest or abdominal wall would be seen. Tympanic sounds on percussion due to hyperinflation or bullae, adventitious rhonchi or crepitations on auscultation would help diagnosis.

Investigations: The diagnosis would be mostly clinical. However lab investigations and chest radiography may be done outside:

- Haemogram reveals polycythaemia
- Chest radiography findings of hyperinflation of lungs and evidence of bullous disease. Also excluding other differential diagnosis like pneumonia, CCF, pleural effusion, pneumothorax.

Treatment

Pulmonary Rehabilitation & Risk alleviation: This can be initiated at all levels. It includes exercise training (deep breathing exercises, walks, shoulder girdle exercises) & nutritional therapy (adequate calories and protein rich diet). In addition, mandatory advice should include cessation of smoking. Other preventive measures include substitution of solid fuels with LPG or electricity in kitchens which should have proper chimneys and be well ventilated. Avoidance of open burning of crops residue, use of water to suppress dust & wearing masks at work places in areas of dust generation are also to be advised

Pharmacological Treatment: In mild COPD, start with salbutamol MDI (100 µg inhalational), 2- 4 inhalations/day or "as and when needed" basis. In moderate to severe COPD, start with oral theophylline-sustained release preparation (150mg twice daily lifelong), inhalational ipratropium bromide (20 µg three to four times daily) or tiotropium (18 µg OD) on regular basis, inhalational salmeterol (50 µg) or formeterol (12 µg) twice daily & salbutamol (100µg) on as and when needed basis. In the presence of infection, a course of oral antibiotics for 7 to 10 days -amoxicillin (500 mg thrice daily), quinolones (levofloxacin 500 mg OD), macrolides [roxithromycin (150 mg BD)] or Tab doxycycline (100 mg OD).

Referral criteria

- Non response to pharmacological treatment for 48h
- Evidence of increase in severity/ complications

LEVEL 2: AT 6-10 BEDDED PRIMARY HEALTH CENTRE

Clinical Diagnosis : Same as Level 1 for a fresh case reporting directly.

Investigations: Same as Level 1 for a fresh case reporting directly.

Treatment

- Same as Level 1
- Higher grade antibiotics may be required (Tab azithromycin 500 mg OD/ clarithromycin (500 mg BD) or oral first/ second generation cephalosporin (cephalexin, cefadroxil) to be given.

Management of acute exacerbations at Levels 1 & 2

Exacerbation of COPD is defined as "a sustained worsening of the patient's condition from the stable, and beyond normal day-to-day variations that is acute in onset and necessitates a change in regular medication".

Patient Assessment The symptoms of an exacerbation are increased breathlessness accompanied by wheezing, increased cough and sputum, change of the colour or tenacity of sputum, and fever. The common causes of an exacerbation are infection of the tracheo-bronchial tree and air pollution. Conditions that may mimic an acute exacerbation include pneumonia, congestive heart failure, pneumothorax, pleural effusion, pulmonary embolism, and arrhythmias. These conditions should be ruled out by clinical examination and investigations.

Treatment of Acute Exacerbation

- **Bronchodilators** are the cornerstone of managing exacerbations of COPD. Patients need to increase the dose and / or frequency of existing bronchodilator therapy. New drugs, which patient is not taking at the time of worsening, may be added. Short-acting bronchodilators should ideally be administered using inhalers (preferably with spacers). In a severe case, nebulizers may be used for drug administration. In situations where these drugs are not available, parenteral aminophylline (5 mg/ kg loading dose over 30 min followed by 0.5 mg/ kg/ hr infusion for maintenance) can be used with due attention to its toxicity. Aminophylline dose should appropriately be modified in elderly patients, those in congestive cardiac failure or having liver cirrhosis, and those already taking oral methylxanthines, cimetidine, ciprofloxacin or erythromycin.
- **Antibiotics** should be used when symptoms of breathlessness and cough are increased and sputum is purulent and increased in volume. The choice of antibiotic depends on the affordability and the bacteria spectrum. Amoxicillin (500 mg thrice daily), Doxycycline (100 mg OD), cotrimoxazole (960 mg BD), flouroquinolones (Tab levofloxacin 500 mg OD) or a second generation macrolide (Tab azithromycin 500 mg OD) / cephalosporin (Tab cefadroxil 500 mg BD) are used as the first choice for a period of 7 to 10 days. For severe exacerbation higher -grade antibiotics, such as coamoxiclav (625 mg TDS) or a third/ fourth generation cephalosporin can be used.
- **Systemic Glucocorticoids** should be used in acute exacerbations. They shorten recovery time and help to restore lung function more quickly. A dose of 40mg oral prednisolone per day (or equivalent) for 5-10 days is recommended. Carefully look for tuberculosis by sputum examination and chest radiograph before starting corticosteroids.
- Controlled oxygen therapy can be administered at low flow rates (preferably with a venturi mask) with monitoring for features of CO₂ retention.
- Chest physiotherapy, inhaled corticosteroids and mucolytic agents are generally not useful in the management of acute exacerbations.

Referral criteria

- Non response to pharmacological treatment for 48h
- Evidence of increase in severity/ complications:
 - Marked increase in intensity of symptoms, such as sudden development of resting dyspnoea
 - Onset of new physical signs (e.g. cyanosis, drowsiness, confusion, flaps, peripheral oedema)
 - Failure of exacerbation to respond to initial medical management
 - Significant co-morbidities, such as diabetes or associated cardiac disease
 - Diagnostic uncertainty

LEVEL 3: AT 30-100 BEDDED COMMUNITY HEALTH CENTRE

Clinical Diagnosis: Same as Level 1 & 2.

Investigations:

- Same as Level 2 for a fresh case reporting directly
- Confirm diagnosis and severity of COPD with the help of Spirometry

Treatment

- Same as Level 1 & 2.
- Consider addition of inhaled corticosteroids (beclomethasone, fluticasone or budesonide), if FEV₁ < 50% and/ or if the patient has recurrent exacerbations (>2 per year). Add long term inhaled corticosteroid therapy only if the patient shows good response to a trial of about six weeks.

- Faulty technique is perhaps the important cause of failure of response to inhalational therapy. It is therefore important to properly explain and let the patient practice inhalation technique in your presence.

Referral criteria:

- Uncertain diagnosis
- Onset of cor pulmonale
- Onset of COPD < 40yrs
- Assessment for home nebuliser use
- Bullous lung disease requiring surgery
- Assessment for rehabilitation

If no signs of improvement in 5 days or complications not controlled by specialists at the centre, refer to next level.

LEVEL 4: AT 100 OR MORE BEDDED DISTRICT HOSPITAL

Clinical Diagnosis: Usually severe/ complicated cases referred from Level 3. Diagnostic criteria same as in earlier levels.

Investigations:

- Same as Level 3 for a fresh case reporting directly
- Pulse oximetry showing lowered SpO₂ & spirometry showing mild airway obstruction initially. Later the diagnosis of COPD is confirmed (post-bronchodilator FEV₁/FVC < 70%; pre-bronchodilators FEV₁ < 80% predicted).
- CT can detect bullae in doubtful cases.
- Doppler Echocardiography to assess right ventricular function & pulmonary ventricular pressure.
- Arterial blood gas (ABG) during severe exacerbation to detect hypoxemia, when FEV₁ <40% or clinical signs suggestive of respiratory failure or right heart failure.
- α1-antitrypsin level can be done in younger patients (< 40 years) who develop COPD and have strong family history, as serum value of less than 20% is highly suggestive of homozygous deficiency.

Treatment

A tertiary care centre must have facilities for special advice and intensive respiratory care. This should include assisted ventilation and all other steps of acute care such as the monitoring of vital parameters, blood gas assessment, and maintenance of blood pressure, fluids, electrolytes, nutrition and general organ functions.

- Oxygen -
 - LTOT for at least 15 hours a day @ 2L/min improves survival, exercise, sleep and cognitive performance
 - Therapeutic goal is to maintain O₂ saturation above 90% during rest, sleep and exertion.
 - Physiological indications for oxygen includes
 - PaO₂ < 55 mmHg, SpO₂ <88 % on room air, irrespective of PaCO₂ and FEV₁ <1.5L or PaO₂ 55- 59 mmHg in presence of
 - Pulmonary Hypertension
 - Polycythemia (PCV>55%)
 - Congestive heart failure
- Surgery possible only in tertiary care centre

May be required in selected patients.

Common surgical procedures in COPD are

- Bullectomy
- Lung volume reduction surgery
- Lung transplantation

SUGGESTED READING

1. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2006. Available at: <http://www.goldcopd.org>. Accessed Aug 16,2007.
2. Standards for the diagnosis and treatment of patients with COPD: a summary of the ATS/ERS position paper. *Eur Respir J* 2004; 23: 932-946.
3. Jindal SK, Gupta D and Aggarwal AN.Guidelines for Management of Chronic Obstructive Pulmonary Disease (COPD) in India: A Guide for Physicians (2003). *Indian J Chest Dis Allied Sci* 2004; 46 : 137-153