

Chronic Obstructive Pulmonary Disease

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James talks to Dr. Paul Hamor about the management of a patient with chronic obstructive pulmonary disease (COPD) on the wards.

About Dr. Paul Hamor

Paul Hamor is a Respiratory and Sleep Physician and Basic Physician Training Network Director at [Prince of Wales Hospital](#). He has interests in the formulation of educational programs, presentation skills, delivering best evidence based-practice to the ward, as well as change methodology.

Chronic Obstructive Pulmonary Disease

With Dr. Paul Hamor, Director of Prevocational Training and Respiratory Physician at Royal Prince Alfred Hospital, New South Wales.

Introduction

Chronic obstructive pulmonary disease (COPD) is a common respiratory condition and can present with varying degrees of severity. This podcast will discuss an approach to a patient with COPD, and how to manage exacerbations of COPD.

1. What is the definition of COPD?

- COPD encompasses emphysema and chronic bronchitis.
- Three criteria are required for diagnosis:
 - Reduced spirometric ratio (FEV1/FVC <0.7) with incomplete reversibility with bronchodilators (unlike asthma).
 - Exposure to irritant, e.g. smoking.
 - Symptoms such as productive cough and dyspnoea.

Case 1

You are a junior doctor called to review a 64-year-old lady who presented to ED earlier in the day with a fractured neck of femur and is awaiting operation. Her other comorbidities

include COPD and type 2 diabetes. The nurses report that on arrival to the ward, she reports difficulty breathing, desaturating to 86% on RA with a respiratory rate of 28, although she is afebrile. She has a chronic cough which she states is unchanged. Her ABG shows a pH of 7.36, PaO₂ of 70, PaCO₂ of 52, bicarbonate 33. On examination, she has a generalised expiratory wheeze. She is charted for Seretide 250/25 2 puffs twice daily but has no other medications.

2. Initial questions over the phone?

- What are her other observations?
- Need to recognise clinical urgency.
- Ask nurse to apply oxygen prior to arrival.

3. Outline your assessment approach by the bedside

- **ABCs:**
 - Airway: patency, consider foreign body as a cause of wheeze
 - Breathing: use of accessory muscles, respiratory rate, auscultate chest for wheeze, apply supplemental oxygen
 - Circulation: heart rate, rhythm (e.g. atrial fibrillation)
- **History:**
 - Need two of three cardinal symptoms for consideration of infective exacerbation of COPD:
 - Increase in sputum volume
 - Change in sputum colour
 - Increase in dyspnoea
- Rule out differentials: ask about chest pain, time frame of symptom onset
- **Examination:**
 - Well or unwell? Look for use of accessory muscles e.g. tracheal tug, sternocleidomastoid muscle use, listen for wheeze
 - Auscultate chest for wheeze, crackles
 - Auscultate heart for evidence of pulmonary hypertension (loud P2)
 - Assess for peripheral pedal oedema as evidence of right heart failure
- **Differential diagnoses:**
 - Silent myocardial infarction with acute pulmonary oedema
 - Pneumonia
 - Infective exacerbation of COPD

4. Investigations for COPD:

- Spirometry:
 - FEV1 as a marker of severity, with comparison to baseline spirometry results.
 - Please note that although by definition the FEV1/FVC ratio in COPD does not completely return to normal with bronchodilators, bronchodilators such as salbutamol are still important in the management of acute exacerbations of COPD. In the setting of constricted airways in acute COPD, even small increases in the diameter of bronchi can result in much improved rates of airflow.
- Bloods:
 - FBC looking for leukocytosis.
 - EUC to check potassium as salbutamol can cause hypokalaemia.
- Chest X-ray: rule out consolidation suggesting pneumonia as this would warrant further treatment with antibiotics.
- Arterial blood gas:
 - Indicated if the patient is hypoxic with COPD to check CO₂ level.
 - If the patient is unwell and requiring oxygen to maintain saturations, oxygen should not be removed for the purposes of obtaining a PaO₂ on room air. A oxygen saturation probe is sufficient for checking oxygen saturation in most situations.
 - pH: identify and assess severity of respiratory acidosis.
 - PaCO₂: look for CO₂ retention, with an elevated PaCO₂.
 - Bicarbonate: elevated bicarbonate suggests chronic respiratory acidosis with metabolic compensation.
 - If CO₂ retainer, aim oxygen saturations 88-92% to prevent CO₂ retention.
- Venous blood gas:
 - Controversial.
 - If PaCO₂ is normal or low, it is unlikely PaCO₂ on ABG would be elevated.
 - If PaCO₂ is elevated, an ABG will usually be indicated.

5. Management for acute exacerbation of COPD:

- Titrate oxygen therapy to maintain saturations 88-92% in this patient.
- Reliever e.g. Salbutamol MDI with spacer 6-12 puffs 2-4hrly if acute, 6-8hrly otherwise.
- Preventer e.g. Seretide MDI with spacer.

- Corticosteroids e.g. 50mg oral prednisone for 5-7 days.
 - If the patient is too unwell to take tablets, and a faster onset of action is needed, consider IV hydrocortisone 100mg QID.
 - Note that steroids can take ~8hrs to take effect.

Case 2

A 52-year-old gentleman has been admitted for investigation of malaena and weight loss, on a background of COPD. You have been asked to review this patient for a fever of 38.6C, tachypnoeic and SpO2 90% on 6L HM.

1. Approach

- Fever and hypoxia suggests respiratory infection.
- Recognise that this patient is very hypoxic and unwell.
- Recognise the potential to decompensate further even with immediate institution of treatment.
- Escalate care.

2. Common causes of infective exacerbations of COPD

- Viral e.g. influenza, rhinovirus, parainfluenza, parapneumovirus.
- Bacterial e.g. Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis. These 3 are the most common bacterial pathogens, and cause the characteristic change in sputum volume and colour.
- Bacterial infections are often secondary infections in patients who initially had a viral infection.

3. Investigations

- Same as previous case; chest x-ray important to rule out pneumonia.

4. Management

- Antibiotic treatment for infective exacerbations of COPD (generally single agent):
 - Macrolides e.g. azithromycin, clarithromycin.
 - Penicillins e.g. Augmentin Duo Forte (in metropolitan regions with penicillin resistant H. influenza), amoxicillin.
- If CXR shows evidence of consolidation, treat as pneumonia with two antibiotics.
- Escalation of care to ICU, with consideration of NIV if severely hypercapnoeic or intubation as needed.

Take home messages

- Be cautious about the pre-existing diagnosis. Ensure history is consistent with COPD and use spirometry to confirm presence of COPD and assess severity.
- Don't assume the patient's symptoms are related to COPD. Consider CXR in the febrile patient to rule out pneumonia, and myocardial infarction in patients with cardiac risk factors.
- ABGs important to assess for CO₂ retention and assess need for non-invasive ventilatory support.

References

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- Global Initiative for Chronic Obstructive Lung Disease (GOLD)
- Algorithm - Managing a COPD Exacerbation in Primary Care

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