Traditionally, comorbid conditions, or comorbidities, have been generally defined as the other serious diseases and chronic medical conditions that affect patients with COPD. Both GOLD and the NICE guidelines recognise that COPD may have extrapulmonary effects that can contribute to its morbidity (Figure 1).

The COPD patient has, on average, 3.7 other chronic medical conditions compared with 1.8 for patients with other chronic illnesses. These accompanying medical conditions add to the burden of COPD, not only on the patient and their family but on society as a whole through direct and indirect costs on the healthcare system such as increased hospital admissions and poor prognosis. There is now a belief that these co-existing medical conditions should now be separated into a distinct series of clinical issues (and not under the umbrella of comorbidities as previously thought):

- A ‘true’ comorbid condition e.g., one that exists in isolation, along with COPD, in an individual
- A consequence, e.g., a medical condition that happens as a consequence of the impact of COPD (or its treatment) on a patient
- A systemic manifestation of COPD e.g., an inflammatory condition that happens to a patient because of an excess of inflammation making COPD a multi-system disorder.

COPD leads to disabling and distressing symptoms. These often arise because of the limitations imposed by COPD and its treatment on patients. Patients often become socially isolated and have to give up activities that they enjoy. Depression is relatively common in COPD patients and tends to be related to severity of COPD. High levels of anxiety are associated with poor outcomes. Anxiety or depression merit specific enquiry into the patient’s clinical history in order to treat these as early as possible. In particular, the presence of anxiety or depression should be considered in patients who have:

- Severe dyspnoea
- Been seen at or admitted to a hospital with a COPD exacerbation
- Hypoxia
- Physically disabled.

The following key questions may highlight the presence of depression in the COPD patient:

- During the last month, have you often been bothered by feeling down, depressed or hopeless?
- During the last month, have you often been bothered by having little interest or pleasure in doing things?

These two brief questions could be asked as part of a diabetes or coronary heart disease review and patients who answer “yes” to either questions could be referred to the GP for further assessment of other symptoms such as tiredness, guilt, poor concentration, change in sleep pattern and appetite and suicidal ideation to confirm a diagnosis of depression. This assessment should be informed by using a questionnaire measure of severity such as the PHQ-9 (Patient Health Questionnaire-9) or HADS (Hospital Anxiety Depression Scale). Depression should be treated according to NICE recommendations (‘Management of depression in primary care’ Guideline 91) which includes non-pharmacological approaches (e.g., counselling and cognitive behavioural therapy [CBT]) and conventional pharmacotherapy. Depending on the severity of the depression, patients should be treated with a combination of psychosocial interventions (e.g., CBT) and pharmacotherapy (usually a selective serotonin reuptake inhibitor [SSRI]). Choice of antidepressant should take into consideration the severity of COPD and other extrapulmonary effects and the side effect profile of the drug. For COPD patients with anxiety it is important to explore with the patient their worries, in order to jointly understand the impact of anxiety on their life. Anxiety should be treated according to the NICE guideline ‘Generalised anxiety disorder and panic disorder with or without agoraphobia in adults’. For anxiety, treatment choice depends on patient profile (age, comorbid conditions and side effects).
Maintaining normal social contacts may also help reduce social isolation and needs to be encouraged. Joining a support group can help patients with COPD and their families learn to cope with the disease, build friendships and enjoy a better quality of life. The British Lung Foundation’s Breathe Easy support group network provides an ideal forum for patients and carers to socialise and gain valuable peer support, as well as being a useful source of practical advice and information. By contacting the BLF, patients can find out where their nearest Breathe Easy group is and even find a PenPal (BLF helpline: 08458 50 50 20, www.lunguk.org).

**Lungs**

**Pneumonia.** Community acquired pneumonia (CAP) is one of the most common clinical conditions presenting in primary care, and is seen as a true comorbidity relating to COPD. Patients with pneumonia share many similar symptoms with COPD. Also, health care practitioners (HCPs) should be aware of the potential risk of developing non-fatal pneumonia in people with COPD treated with inhaled corticosteroids and be prepared to discuss this with patients. When confronted with a patient with potential symptoms, some helpful pointers in the clinical diagnosis of pneumonia include:

- Duration of symptoms (cough, fever, breathlessness, pleuritic chest pain, and lung crackles on examination) of <24 hours
- New focal signs on chest examination
- Presence of the following features:
  - Fever >37.8°C
  - Respiratory rate >25 breaths/min
  - Sputum production throughout the day
  - Myalgia and night sweats
  - Pleuritic chest pain
  - Hypoxia
  - Absence of sore throat and rhinorrhoea.

A chest x-ray is the definitive test for pneumonia. Severity of the disease will then determine whether the patient is managed within the community or by secondary care. An antibiotic is the disease will then determine whether the patient is managed within the community or by secondary care. An antibiotic is needed, and antibiotic treatment should follow local guidelines. Within the community or by secondary care. An antibiotic is needed, and antibiotic treatment should follow local guidelines.

**Asthma.** There are many conditions that are affected by cigarette smoke. The commonest, of course, is asthma. Asthma is more often an allergic condition and does not occur as a direct result of smoking as COPD often does. Patients with COPD can have co-existing asthma for many reasons, very often as a result of the asthma not being adequately controlled which leads to more irreversible obstruction in later life. Cigarette smoke worsens asthma, when added to the presence of COPD it increases morbidity and mortality as well as the total burden of lung disease.

**Bronchiecstasis.** Bronchiecstasis is defined by permanent and abnormal widening of the bronchi. This process occurs in the context of chronic airway infection and inflammation. Bronchiecstasis is also characterised by mild to moderate airflow obstruction and can occur as a result of COPD. Important clinical findings include chronic productive cough, rhinosinusitis, fatigue and bi-basal crackles. Exercise or inspiratory muscle training may improve quality of life and exercise endurance in people with bronchiecstasis but without cystic fibrosis. Prolonged-use antibiotics may also be beneficial in some patients.

**Lung cancer.** COPD co-exists with other diseases that share tobacco smoking as a risk factor, such as lung cancer, and so lung cancer is seen as a comorbidity. A recent meta-analysis found a strong inverse relationship between levels of lung function and risk of lung cancer. Patients with COPD are 3-5 times more likely to develop lung cancer than smokers without COPD. Although a common cancer, most GPs will see only 1-2 new cases a year. The NICE lung cancer guideline of 2005 gives helpful advice on symptoms and referral (Table 1). Remember the high risk groups: patients over 50 years of age, smokers, and patients with COPD.

**Summary of NICE guidance on referral for suspected lung cancer**

<table>
<thead>
<tr>
<th>Urgent referral for chest x ray with following symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoptysis or unexplained or persistent, more than 2 weeks</td>
</tr>
<tr>
<td>Cough</td>
</tr>
<tr>
<td>Dyspnoea</td>
</tr>
<tr>
<td>Chest / shoulder pain</td>
</tr>
<tr>
<td>Weight loss</td>
</tr>
<tr>
<td>Chest signs</td>
</tr>
<tr>
<td>Hoarseness</td>
</tr>
<tr>
<td>Finger clubbing</td>
</tr>
<tr>
<td>Supraclavicular or cervical persistent lymphadenopathy</td>
</tr>
<tr>
<td>Features of metastases - brain, bone, liver, skin</td>
</tr>
</tbody>
</table>

Treatment is decided on the basis of disease staging and cancer cell type. Treatment plans should follow NICE guidance.

**Heart**

Conditions relating to the cardiovascular system can be seen as both a true comorbid condition and a systemic manifestation of COPD.

**Coronary heart disease.** Patients with COPD are also at increased risk for coronary heart disease (CHD) and other smoking-related illnesses. Treatment of CHD should follow local treatment guidelines.

**Chest pain.** Chest pain in COPD should always be investigated fully. It is vital to make notes regarding the history of the chest pain e.g. duration, acute or chronic, which side etc. An ECG scan may be helpful in excluding cardiac cause. Other causes of chest pain in patients with COPD can include pleurisy, pneumonia, pneumothorax and pulmonary embolism all of which will require further investigations.

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Chronic heart failure (CHF). COPD and chronic heart failure (CHF) often co-exist and present important diagnostic and therapeutic challenges. Patients with severe COPD or with clinical signs of CHF (e.g., peripheral oedema) and in jugular venous pressure and central cyanosis should be investigated for CHF. CHF can be detected through clinical examination including observations of jugular venous pressure, auscultation, chest x-ray (dilated heart) and possibly pulmonary oedema. The diagnosis can also be confirmed with measurement of elevated levels of beta natriuretic peptide (BNP) and an echocardiogram. It is important to be aware that increases in BNP may also be associated with renal failure, pulmonary embolism, pulmonary hypertension, and chronic hypoxia. CHF in patients with COPD should be treated in accordance with national guidelines.

Pulmonary hypertension and right sided heart failure (cor pulmonale)
The association with heart disease is particularly strong in COPD patients. Hypoxic patients with COPD often develop secondary pulmonary hypertension (i.e., pulmonary artery pressure > 20mmHg). Pulmonary hypertension may be present for years without causing symptoms but in some patients it leads to the development of right sided heart failure. Chronic hypoxia will lead to renal vasoconstriction resulting in renal hypoxia and peripheral oedema. A diagnosis of cor pulmonale should be considered if patients have:

- Peripheral oedema
- Raised venous pressure
- A systolic parasternal heave
- A loud pulmonary second heart sound.

ECG changes or echocardiography should be used to support the diagnosis of right heart sided failure; these tests can exclude other causes of oedema and heart failure. Right sided heart failure can be treated with long-term diuretic therapy and patients should also be referred to long-term oxygen therapy assessment, especially if their oxygen saturations are below 92% on air.

Obstructive sleep apnoea
Patients with COPD may have a concomitant obstructive sleep apnoea (OSA). They may also hypoventilate which will affect their gas exchange. However, not all OSA patients have COPD. Sleep apnoea is a direct consequence of the clinical symptomatology associated with COPD. Continuous positive airway pressure (CPAP) or noninvasive bilevel ventilation (NIPPV) may be recommended in these patients depending on patient history and degree of respiratory failure.

Muscular-skeletal presentation
Peripheral muscle deconditioning and wasting. Everyday activities such as washing and dressing can cause disabling breathlessness in patients with COPD. Often the response to such experiences is activity avoidance and this can lead to a downward deconditioning spiral whereby patients consequently become more breathless and so slowly (through becoming less active) become less fit. The long-term impact of this is muscle deconditioning and wasting. This deconditioning is seen as a consequence of the functional limitations associated with COPD.

Anaemia. Anaemia is often seen in chronic diseases such as COPD. When present in COPD, anaemia can worsen dyspnoea and limit exercise tolerance. HCPs should be aware that anaemia can co-exist with COPD, and should be prepared to assess their patient for anaemia.

Polycythaemia. Patients with COPD may also exhibit polycythaemia which is the body’s attempt to adjust to decreased amounts of blood oxygen by increasing the production of oxygen-carrying red blood cells. While this may be helpful in the short term, overproduction eventually clogs small blood vessels. This increases the risk of heart attack, stroke and other problems. Treatment includes regular venesection, or medicines which prevent the bone marrow from making too much blood. In polycythaemia, the underlying cause should be investigated and treated appropriately. For both anaemia and polycythaemia, a full blood count should be taken on diagnosis and annually to detect any changes from baseline.

Spiral of losing fitness
Breathlessness
Less activity
Muscles becoming unfit
Breathlessness increases
Become less active
Less fit

Adapted with permission from St George’s Healthcare NHS Trust. Physiotherapy Department. Lung disease and physiotherapy

It is important to encourage your patient to try and exercise for even small amounts most days of the week. This can be as simple as walking for ten minutes three times a day. Tell your patient to:

- Dress in comfortable shoes and clothes
- Use their bronchodilator 20-30 minutes before they exercise
- Use oxygen if they have it, while exercising.

Referral for pulmonary rehabilitation should also be considered. Please refer to ‘A basic guide to pulmonary rehabilitation’ for additional information.

Osteoporosis
Osteoporosis often remains undiagnosed in COPD patients, as the focus may usually be on the level of lung function and ability of oxygenation, but not on the loss of bone. Over the years patients are likely to have had courses of oral steroids in addition to high dose inhaled steroids; this in addition to reduced exercise capacity may increase likelihood of osteoporosis. Osteoporosis, however may be equally as disabling as COPD, and this is seen both as a consequence and as a systemic manifestation associated with COPD and its treatment. Osteoporosis is also much more common with decreasing BMI. Patients treated with long-term oral corticosteroid (>12 months) and inhaled high dose steroid therapy should be monitored for the development of osteoporosis and given appropriate prophylaxis. Patients over the age of 65 should be started on prophylactic treatment, without monitoring. Vitamin D supplementation may be considered for all COPD patients as well as making sure they are being exposed to daylight when possible.

Blood and circulation
Most conditions relating to the blood and circulation in COPD patients are related to the consequences of COPD and its clinical course in patients.

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Peripheral vascular disease. Peripheral vascular disease is common in COPD patients as both conditions share smoking as a risk factor. All HCPs should be aware that their COPD patient may be suffering from underlying vascular disease and so should questions their patients on related symptoms e.g.
- Do you feel that something stops you from walking?
- Do you suffer from pain in your legs which then resolves with rest?

If peripheral vascular disease is suspected a referral should be made.

**Systemic Diabetes.** Patients with COPD are often at risk of diabetes (patients with COPD can have a 80% higher risk of diabetes type 2 than patients without COPD). Diabetes in patients with COPD is often allied to the systemic manifestation seen in these conditions. A detailed history will often give an insight into those patients at risk of developing diabetes e.g. family history, ethnicity, corticosteroid use and being overweight. Please refer to the NICE guidelines for the management and treatment of diabetes. Good practice should include annual blood sugar measurements and questioning the patient for any signs and symptoms of diabetes.

**Importance of multidisease management**

High quality care must consider identifying symptoms and disability from the respiratory disease, its systemic effects and co morbidities. Assessment of the patient should include obtaining a thorough patient history and presentation of symptoms as these may give important clues to the existence of other clinical conditions (Table 2). Processes should also be in place to enable access to appropriate treatment pathways.

Table 2. Some diagnostic clues to other clinical conditions associated with COPD patients

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia, lung cancer</td>
<td>Pleuritic chest pain, haemoptysis, finger clubbing</td>
</tr>
<tr>
<td>Right heart failure</td>
<td>Oedema, neck vein distension, hepatojugular reflux, murmurs, coarse crepitations, wheezing, finger clubbing</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td></td>
</tr>
<tr>
<td>Recurrent infections</td>
<td>Fever, crackles, increased fremitus, bronchial breathing</td>
</tr>
<tr>
<td>Stress/ emotional problems</td>
<td>Hyperventilation/dysfunctional breathing</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>Right ventricular heave; murmurs</td>
</tr>
</tbody>
</table>

**What you need to know**

Interest in earlier and effective diagnosis of COPD has led to the awareness of the multiple non-pulmonary clinical issues that often accompany COPD.

These are common in COPD patients and affect many areas of the body including mental health and cardiovascular health.

The optimal treatment for COPD patients must concurrently address symptoms and disability from the respiratory disease and from its extrapulmonary conditions.

There is now a movement to include assessing patients for associated clinical conditions at each COPD review, thereby leading to anticipatory care rather than reactive healthcare.

Where possible, treatment of other diseases should follow national guidance (e.g. NICE) or local treatment guidelines.

**Think about...**

Are you aware of the most common extrapulmonary conditions that may affect your COPD patient?

Are you aware of which conditions have their own NICE guidelines for management?

If there are no NICE guidelines for management, then do you follow local best practice guidance?

**GLOSSARY**

**Chronic heart failure:** where the heart is unable to maintain adequate circulation of blood in the tissues of the body or to pump out the venous blood returned to it by the venous circulation; **Cor pulmonale:** right sided heart failure; **crepitations:** a grating or crackling sound; **cyanosis:** blue colouration of the skin, especially lips and nails, caused by lack of oxygen in the blood; **dyspnoea:** breathlessness; **fremitus:** a sensation felt by a hand placed on a part of the body (as the chest) that vibrates during speech; **haemoptysis:** expectoration of blood from some part of the respiratory tract; **lymphadenopathy:** abnormal enlargement of the lymph nodes; **venesection:** surgical incision into a vein.
References


18. Lung disease and physiotherapy. Available from St Georges Healthcare NHS Trust Physiotherapy Department


