Cough, Sputum and Airway Infection

Dr Lesley Bennett
Respiratory Physician
Royal Perth Hospital
Cough, Sputum and Airway Infection

- Causes of productive cough
- What is mucus?
- What does it do?
- What goes wrong?
- Lung conditions that cause cough and sputum
- What helps?
- Myths and facts about cough
Causes of productive cough

Short term (acute):
• Infection

Long-term (chronic) Productive
• Chronic Obstructive Pulmonary Disease (COPD, chronic bronchitis)
• Bronchiectasis
What goes wrong?

Acute infection normal or abnormal lungs

- Viruses damage the lining of the lungs and make a runnier mucus

- To get rid of this, we cough and sneeze
What is mucus?

- Solid gel layer that acts as an important physical barrier in our bodies.
- Present in nose, sinuses, lungs, internal organs and bowels
- 95% water
- 3% proteins (including mucin and antibodies)
- 1% salt and other substances.
- ‘Goblet Cells’ release ‘Mucin’ droplets which absorb water.
- Mucus forms links, producing a sticky, elastic gel.
What does mucus do?

- The nose produces over 100 millilitres of mucus a day and the lungs produce approximately 50 millilitres daily.
- Tiny hairs in the lung (cilia) beat the mucus up to our throat where we swallow it.
- The amount of mucus and watery liquid is increases to flush away infection, irritants or allergens.
- Proteins in the mucus assist in fighting infection.
What does mucus do?
What does smoking do to mucus?

- Smoking is an irritant so the Goblet cells are stimulated to produce more mucus.
- The hair (cilia) are paralysed by smoking and so the mucus can’t clear.
- This happens repeatedly and the goblet cells permanently enlarge.
- Cough can become ‘chronic’ (longstanding or permanent).
COPD

Normal lungs  COPD

Goblet Cells
In COPD

- Too much mucus
- Cilia stop working
- Increase risk of infection (cilia are part of the defence system)
- More mucus which include chemicals to fight infection that can damage the lungs (inflammation)

**SYMPTOMS OF CHRONIC COUGH AND FREQUENT INFECTIONS**
Bronchiectasis

<table>
<thead>
<tr>
<th>Normal Bronchi</th>
<th>Bronchiectasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper lobe: Cystic Fibrosis Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>Central: Cystic Fibrosis ABPA Congenital Tracheobronchomegaly</td>
<td></td>
</tr>
<tr>
<td>Lower lobe: Childhood Infection Aspirations Immunodeficiency</td>
<td></td>
</tr>
</tbody>
</table>
Causes of bronchiectasis

- Many cases ‘idiopathic’ = don’t know

- Rarer causes:
  - problems with immune system
  - Other diseases that are associated (rheumatoid arthritis)
  - Cystic fibrosis
COPD/Bronchiectasis overlap

- There is an overlap with COPD – in one study 30% of patients with COPD had bronchiectasis
- Seen much better on CT Scan than a chest x-ray
‘Vicious’ cycle of lung damage and infection
What can be done?

- Remove irritant – stop smoking
- Treat infections promptly
- Inhalers to open up the airways
- Use techniques to clear the mucus from the lungs
Treating infections - promptly

- Antibiotics to clear or control infection
- In bronchiectasis – antibiotics need to get through the thick sputum, therefore recommend high doses for minimum of 2 weeks
- Your GP may give you ‘stand-by antibiotics’ and/or steroids (in COPD). Self Management plan.
SELF MANAGEMENT PLAN FOR BRONCHIECTASIS PATIENTS

The doctor and physiotherapists will have talked to you about the importance of prompt treatment for infective episodes. It is therefore important to be aware of symptoms of an exacerbation as follows:

- An increase on the volume of your sputum from your normal day-to-day amount
- A change in colour of your sputum
- Feeling more tired and generally not well
- Your chest feeling constricted or congested
- Evidence of soreness or pain in your chest
- Shortness of breath, and wheeze

If you have more than two of the above symptoms, please take the following action:

- If possible send a sputum sample to your local GP surgery.
- Start your prescribed reserve course of antibiotics.
- If you are not responding to the treatment within three to four days, contact your general practitioner or respiratory physician
- If you are having recurrent infections i.e monthly, we recommend an earlier specialist review.
Clearing mucus from the lungs

- A small group of patients find that inhalers help – but they do not help all patients
Physiotherapy

- Aims are to reduce airway obstruction by improving the clearance of secretions
- To reduce the severity of the infection by clearing infected material
- Variety of techniques according to technique disease severity (active vs passive)
- Exercise
Other tips to reduce cough

- Drink fluids to keep your throat wet; warm beverages like broth or tea bring added relief to an irritated throat
- Suck a cough lozenge, which can soothe an irritated throat
- Massage the chest and throat regions with aromatic rubbing ointments or creams
- Steam helps relax the airways, so increase the air moisture of the room or take a hot steamy shower
- Quit smoking and avoid irritants that can worsen the cough, such as dust, fumes or aerosol products
- Sleep with extra pillows and on your side if you cough at night
Myths about coughs

- Spit or swallow?
- Milk makes mucus thicker
- Green phlegm needs antibiotics
Stress incontinence

- Very common in people with chronic chest conditions.
- What happens - the stomach muscles contract strongly during a cough which increases pressure on the bladder and pelvic floor.
- Don’t be embarrassed to talk to your physiotherapist regarding the ‘knack’ – they may refer you to a specialist physiotherapist.

Involuntary leakage of urine on effort or exertion, coughing and sneezing.