Bronchiectasis: Assessment, management, prevention.

Kyle Perrin
Overview

• Risk factors

• Diagnosis
  – History
  – Examination
  – Investigations

• Approach to management

• Prevention
What is bronchiectasis?

• Irreversible dilation of the bronchial tree caused by destruction of the muscle and elastic tissue

• It is classified as an obstructive lung disease
Prevalence


Acute paediatrics

New Zealand national incidence of bronchiectasis “too high” for a developed country

J Twiss¹,², R Metcalfe², E Edwards¹,², C Byrnes¹,²
Prevalence

• An overall incidence of 3.7 per 100,000 under 15 years
  – NZ European 1.5
  – Maori children 4.8
  – Pacific children 17.8

• 7 times higher than Finland

• The median age at diagnosis was 5.2 years; the majority had symptoms for more than two years

• Mean FEV1 of 77% predicted
Risk factors

• Recurrent chest infections
  – Especially whooping cough

• Foreign body

• Congenital or acquired immune deficiency

• Congenital problems of cilia function
History

• Previous
  – Frequent childhood infections?
  – Other infections? (sinus, skin)

• Current
  – Recurrent chest infections
  – Chronic production of purulent sputum
  – Haemoptysis
  – Wheeze
  – Breathlessness
Examination

• Sometimes finger clubbing

• Hyperinflation (in severe disease)

• Thick/coarse crackles

• Occasional wheeze
Investigations

• Spirometry
  – Obstructive, but may be normal

• CXR and CT scan

• Blood tests (immune deficiency?)

• Sputum test

• Test for CF?
Goals of treatment

• The treatment goals in adults are to

  – Control symptoms

  – Enhance quality of life

  – Reduce exacerbations

  – Maintain pulmonary function
Goals of treatment

- There is clear evidence that patients with bronchiectasis who have more frequent exacerbations have worse quality of life and worse prognosis.
Treatment

1. Education

2. Treatment of the specific underlying cause

3. Airway clearance
   – Physiotherapy and exercise
   – Inhaled therapies
Treatment

4. Airway drug therapy
   - Bronchodilation
   - Anti-inflammatory

5. Antibiotic therapy

6. Surgical management

7. Management of complications
Airway clearance

• All patients with a productive cough should be taught airway clearance by a physiotherapist
  – Active cycle of breathing techniques
  – Postural drainage
  – Positive expiratory pressure (PEP)
  – Acapella

• Duration?
• Frequency?
Inhaled drug therapy

• Mucolytics
  – Pulmozyme (only effective in CF)
  – Mannitol
  – Hypertonic saline

• Bronchodilators

• Inhaled corticosteroids
Long term antibiotics

- Nebulised tobramycin
- Oral azithromycin
Azithromycin for prevention of exacerbations in non-cystic fibrosis bronchiectasis (EMBRACE): a randomised, double-blind, placebo-controlled trial

Conroy Wong, Lata Jayaram, Noel Karalus, Tam Eaton, Cecilia Tong, Hans Hockey, David Milne, Wendy Fergusson, Christine Tuffery, Paul Sexton, Louanne Storey, Toni Ashton
**Figure 2:** Proportion of participants free from event-based exacerbations

Shaded areas indicate 95% CIs. Crosses indicate censoring.

**Number at risk**

<table>
<thead>
<tr>
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<th>Azithromycin group</th>
<th>Placebo group</th>
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<tr>
<td>Number at risk</td>
<td>71</td>
<td>70</td>
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<tr>
<td>Day of study</td>
<td>58</td>
<td>40</td>
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<td></td>
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</table>
Exacerbations

Increased cough + wheeze + breathlessness + systemic upset

Exacerbations requiring antibiotic therapy (if positive in all 3 arms)

- Increased sputum volume or change in viscosity
- Increased sputum purulence
Need for admission

- Unable to cope at home
- Hypoxia or confusion
- Breathlessness with respiratory rate $\geq 25$/min
- Respiratory failure
- Temperature $\geq 38$ C
- Unable to take oral therapy
Antibiotics for exacerbations

• If possible guided by previous sputum results

• Common bacteria include
  – *H influenzae*, *M catarrhalis*, *S aureus* and *S pneumoniae*
  – Some patients become colonised by pseudomonas

• If no sputum culture available
  – Send a sputum sample first!
  – Augmentin or amoxicillin is a reasonable first choice
  – Modify if necessary
Other treatments

• Nutrition

• Vaccinations

• Pulmonary rehabilitation

• Surgery

• Lung transplant
A case
Hannah age 16

- Asthma and eczema since age 3
- Whooping cough infection age 6
- Last 3-4 years had recurrent chest infections and always coughs up green sputum
- Off school a lot
- CT scan confirmed bronchiectasis
Current medications

- Seretide 2 puffs bd
- Lotatadine 10mg od
- Montelucast 10mg od
- Flixonase 2 puffs bd
- Theophyline 250mg od
Social history

• Lives in a private rental house with mum, aunty and 4 other kids
  – No insulation
  – Damp
  – A bit of mold around

• Mum works as a cleaner

• Cant afford to heat the house very often
Prevention of bronchiectasis

How do you avoid it in NZ?
Why is this important?

• Bronchiectasis is a disease of poverty and a marker of social deprivation

• Like rheumatic fever, it is a “ticking time bomb”
Why is this important?

- It often starts in childhood but the worst effects are seen in adulthood
  - Frequent hospital admissions
  - Poor quality of life
  - Early death
Hospitalisations by ethnic group, 2013

- Māori: 66.4
- Pacific: 115.4
- Asian: 41.5
- Non-MPA: 18.1
Mortality by ethnic group

- Maori: 6.19 deaths per 100,000 people per year
- Pacific: 13.64 deaths per 100,000 people per year
- Asian: 3.13 deaths per 100,000 people per year
- Non-MPA (exclude Not stated): 1.57 deaths per 100,000 people per year
Hospitalisations by deprivation, 2013
Why such a concern in NZ? comparative data

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<th>At diagnosis</th>
<th>Australia</th>
<th>Alaska</th>
<th>NZ</th>
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<td>Bilateral disease</td>
<td>15.3%</td>
<td>38%</td>
<td>83%</td>
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<tr>
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<td>50%</td>
<td>57%</td>
<td>87%</td>
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<tr>
<td>Widespread disease</td>
<td></td>
<td></td>
<td>64%</td>
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*Munro K, Current Paeds 2009*
What to look out for?

- Cough – persistent, recurrent, wet
- Recurrent resp infections
- Hospital admissions for LRTI
- Recurrent antibx use
- School absenteeism
- SOB with sport
- Asthma – poorly responsive
- Growth

Don’t wait!
Priorities

• The current approach to treatment of existing bronchiectasis patients has not changed a great deal in decades

• We **must** take steps to reduce the incidence of this condition by addressing the social determinants of health particularly among Maori and Pacifica
Priorities

- Housing
- Income inequality
- Access to primary care
- Health literacy
- Smokefree Aotearoa 2025