What’s Blowing in the Wind? Tuberculosis and Long Term Care
Ruth Anne Appl, TB Control Saskatchewan, Saskatoon
Broadcast live from the 2012 CHICA-Canada Conference

Objectives
• Provide an overview of tuberculosis
• Describe risk factors and presentation
• Describe screening practices
• Describe management of tuberculosis
• Present a case study from long term care

What’s the Concern about TB in Long Term Care/Chronic Care Facilities?
• Large number of residents live in close environment – frequent and prolonged contact
• Residents may be more susceptible due to advancing age and/or impaired immune function

What is Tuberculosis?
• TB is caused by *Mycobacterium tuberculosis*
• Airborne transmission by droplet nuclei from forceful expiration - coughing, sneezing, shouting
• Nuclei can remain suspended in the air for several hours

Pathophysiology
• Bacilli enter the alveoli and are engulfed by macrophages
• Bacilli transported to hilar lymph nodes
• CD4 T-helper lymphocytes are recruited

Granuloma Formation
• A complex immune response is triggered leading to the development of granulomas
Active Disease vs Latent TB Infection

- If the immune system is healthy and the granulomas can contain the bacteria (remain dormant), this results in Latent TB Infection (LTBI)
- If the granuloma cannot contain the bacteria, they escape, replicate and spread occurs leading to active disease

Active Disease vs Latent TB Infection

- 10% lifetime risk of disease in individuals with a healthy immune system
  - 5% - primary disease < 2 years
  - 5% - post primary disease > 2 years

Estimated TB Incidence Rates 2010

<table>
<thead>
<tr>
<th>Highlights</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,577 new active and retreatment cases</td>
<td>4.6/100,000</td>
</tr>
<tr>
<td>25-34 age group comprised 18% of cases</td>
<td>6.0/100,000</td>
</tr>
<tr>
<td>74 and up age group</td>
<td>9.6/100,000</td>
</tr>
</tbody>
</table>

TB Cases Saskatchewan and Canada 2010

Incidence of Active Disease in Canada 2010

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Risk Factors for the Development of Active TB among Persons with LTBI
- Canadian Tuberculosis Standards 6th Edition identifies three categories of risk
  - High
  - Increased
  - Low

High Risk

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Estimated Risk of Active TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>110-170</td>
</tr>
<tr>
<td>HIV</td>
<td>50-110</td>
</tr>
<tr>
<td>Transplantation related to immunosuppressant drugs</td>
<td>20-74</td>
</tr>
<tr>
<td>Silicosis</td>
<td>30</td>
</tr>
<tr>
<td>Chronic Renal Failure - Hemodialysis</td>
<td>10.25</td>
</tr>
<tr>
<td>Carcinoma of Head and Neck</td>
<td>16</td>
</tr>
<tr>
<td>Recent TB infection &lt; 2 years</td>
<td>15</td>
</tr>
<tr>
<td>Fibronodular Disease on Chest X-Ray</td>
<td>6-19</td>
</tr>
</tbody>
</table>

Increased Risk

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Estimated Risk of Active TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment with glucocorticoids</td>
<td>4.9</td>
</tr>
<tr>
<td>Tumor Necrosis factor (TNF) – alpha inhibitors</td>
<td>1.5-4</td>
</tr>
<tr>
<td>Diabetes mellitus (all types)</td>
<td>2.0-3.6</td>
</tr>
<tr>
<td>Underweight ( &lt; 90%)</td>
<td>2.3</td>
</tr>
<tr>
<td>0-4 years of age</td>
<td>2.2-5.0</td>
</tr>
<tr>
<td>Cigarette smoker (1 pack/day)</td>
<td>2.5</td>
</tr>
<tr>
<td>Granuloma on Chest X-Ray</td>
<td>2</td>
</tr>
</tbody>
</table>

Low Risk

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Estimated Risk of Active TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infected person, no known risk factors, normal chest x-ray</td>
<td>1</td>
</tr>
</tbody>
</table>

Determinants of Transmission of Disease
1. Susceptibility of those exposed
2. Contagiousness of the patient
3. Infectivity of the strain
4. Extent of exposure – duration, frequency, intensity
5. Environment – air circulation, ventilation, proximity to the source

Preventing Transmission in Long Term Care
- Residents
  - Baseline chest x-ray on acceptance into LTC
  - Baseline two-step Tuberculin Skin Test not warranted unless the population the institution serves is at high risk i.e. from high incidence country or high incidence aboriginal community, former urban poor, HIV positive

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Residents continued

- Annual or serial TST not necessary
- Assessment for history of TB treatment or contact

Preventing Transmission in Long Term Care

- Health Care Workers and Volunteers
  - TB infection control policies in place
  - Two-step TST at time of hire if TST negative or status unknown
  - Annual screening depends on the occurrence of TST conversion - can be discontinued if conversion rate < 0.5%

Health Care Workers and Volunteers continued

- N95 Respirator masks
- Education of staff
- Report any symptoms suggesting TB

Clinical Presentation of Active Disease

1. Cough – persistent, unremitting, ≥ 3 weeks duration,
2. Fever ≥ 7 days
3. Pneumonia unresponsive to antibiotics

- Symptoms of hemoptysis, night sweats, weight loss, anorexia, fatigue are seen in more advanced stages of disease
- Extra-pulmonary symptoms
- Presentation may be masked by existing co-morbid conditions

Management of Reactivated LTBI

- Referral to TB Control program
- Transfer infectious cases to negative pressure isolation room
- Investigations – specimens, x-ray
- Symptom inquiry, physical assessment
- Chemotherapy by Directly Observed Therapy (DOT) or Directly Observed Prophylaxis (DOP)
- Contact Trace to determine spread

Case Study Presentation

- Gentleman in late 70's admitted to hospital with decreased LOC, possible sepsis, possible GI Bleed (HgB 89), fever, and probable aspiration pneumonia
- Several underlying health issues including COPD and dementia
- Had been in 2 LTC facilities in the previous 14 months

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- Too ill to give history, no family and limited documentation
- Started on antibiotics for aspiration pneumonia
- ID saw and requested sputums for AFB
- Placed in negative pressure isolation
- Chest X-Ray – Bilateral airspace changes, consolidation RUL, right hilar mass

- Chest x-ray 3 years previously - no evidence of disease
- 1 year prior to this admission TST of 25 mm and chest x-ray showed RUL volume loss with airspace changes and pleural thickening. No documentation that sputums sent for AFB
- CT scan 3 days post admission showed dense consolidation RUL with a cavitating mass RUL and pleural thickening

- Sputum results
  1st - smear negative (5 days)
  2nd - 6 AFB in cords (7 days)
  3rd - 3+ (12 days)
- TB Control consulted, TB meds started
- Contact Trace
  - Trace yielded 131 contacts
    - Residents - 20
    - Staff - 111
  - TST status
    - Negatives - 69
    - Positives - 50
    - Unknown - 12

- Patient’s condition worsened he expired 2 weeks later
- TST Conversions -12
  11 were seen in clinic
  1 did not attend
- Prophylaxis - 1
- Active cases - 0
- No children were part of the contact trace

Contact Trace

Contact Trace

Contacts by Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 29</td>
<td>25</td>
</tr>
<tr>
<td>30 to 39</td>
<td>24</td>
</tr>
<tr>
<td>40 to 49</td>
<td>21</td>
</tr>
<tr>
<td>50 to 59</td>
<td>32</td>
</tr>
<tr>
<td>60 to 69</td>
<td>20</td>
</tr>
<tr>
<td>70 +</td>
<td>8</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>131</td>
</tr>
</tbody>
</table>

Outcomes

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Location of Contacts

<table>
<thead>
<tr>
<th>City of Oc</th>
<th>TST Negative</th>
<th>TST Positive</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community 1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Community 2</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Community 3</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Community 4</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Community 5</td>
<td>1</td>
<td>2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Community 6</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Out of province</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Saskatoon</td>
<td>64</td>
<td>47</td>
<td>12</td>
<td>123</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>50</td>
<td>12</td>
<td>131</td>
</tr>
</tbody>
</table>

References


QUESTIONS?

11 July (Free WHO Teleclass – Europe) Patient Involvement in Infection Control – What Does It Mean and How Can We Support It?
Speaker: Claire Kilpatrick, World Health Organisation
Sponsored by WHO First Global Patient Safety Challenge – Clean Care is Safer Care

19 July (Free Teleclass) Top 10 Must-Do’s for the Elimination of Hospital-Associated Infections
Speaker: Dr. William Jarvis, Jason and Jarvis Associates
Teleclass sponsored by GOJO (www.gojo.com)

26 July (Free Teleclass) Pneumonia Prevention – The Vent and Beyond
Speaker: Kathleen M. Vollman, Advancing Nursing LLC
Teleclass sponsored by Sage Products Inc (www.sageproducts.com)

8 August (Free WHO Teleclass – Europe) Processing Medical Devices in Settings With Limited Resources
Speaker: Dr. Naam Damari, Craigavon Area Hospital, Northern Ireland

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