The Non-TB Mycobacteria of Public Health Significance

TB Nurse Conference
December 2009
The Public Health World
Beyond TB…
What do we do when this.....

..... is not TB ?
How do we deal with the other ~ 90 known mycobacterial species?
VA Public Health Law and Regulations

- Tuberculosis, active disease
  - Reportable
  - Required public health actions
- Non-TB mycobacterial infection
  - Not reportable, unless
    - Unusual occurrence of disease of public health concern
    - Outbreak (including but not limited to foodborne, nosocomial, occupational, toxic substance-related, and waterborne)
    - Disease caused by an agent that may have been used as a weapon
Infectious Diseases of Possible Public Health Concern

- Transmissible person to person (serious illness, multiple cases)
- Transmissible animal to person (serious illness, transmission to other people)
- Environmental exposure (serious illness, multiple cases)
  - Illness in healthy person
  - Illness in immunocompromised person
- Potential use as BT agent (serious illness, many cases, panic)
- “Scary” – (rare/newly recognized/unknown potential/no treatment available)
# Mycobacterial Diseases of (Potential) Public Health Concern

<table>
<thead>
<tr>
<th>Category</th>
<th>Organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmissible person to person</td>
<td><em>M. tb</em></td>
</tr>
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<td>Transmissible animal to person</td>
<td><em>M. tb, M. bovis</em></td>
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<td>Environmental exposure</td>
<td></td>
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<td>Illness in healthy person</td>
<td><em>M. avium, M. marinum, M. fortuitum, M. abscessus, M. chelonae</em></td>
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<td>Illness in young or elderly person</td>
<td></td>
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<tr>
<td>Illness in immunocompromised person</td>
<td><em>M. avium, M. kansasii, + many others</em></td>
</tr>
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<td>Potential use as BT agent</td>
<td>MDR TB</td>
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<td>“Scary” – (rare/newly recognized/unknown potential/no treatment available)</td>
<td><em>M. leprae, ?MDR TB</em></td>
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Non-TB Mycobacteria in Virginia

• How frequent?
• Which ones?
• How serious?
  – Morbidity and mortality
  – Potential for outbreaks
  – Obscure/confuse TB diagnosis
How frequent? How significant?

- How frequent relative to TB?
  - CDC and literature
    - 4 suspect TB cases reported
      - 1 confirmed TB
      - 3 other (NTM or other diagnosis)

- Resources diverted from TB control?

- Adverse effect on patient and family?
  - Medication effects
  - Isolation, economic hardship
### NTM Isolates* – DCLS 2009

<table>
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<tr>
<th>NTM Species</th>
<th>%</th>
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<tr>
<td><em>M. avium complex</em></td>
<td>60</td>
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<td><em>M. gordonae</em></td>
<td>13</td>
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<td><em>M. abscessus</em></td>
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</tr>
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<td>4</td>
</tr>
<tr>
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<td>3</td>
</tr>
<tr>
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<tr>
<td>11 Others</td>
<td>Each &lt;2%</td>
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* n = 545 NTM isolates – 1/1/09-9/15/09
Common Characteristics

• All environmental organisms (water or soil)
• All parts of state represented (rural and urban)
• No obvious seasonal peaks
• Clusters/outbreaks rarely recognized
• Patients older than TB case-patients
TB Cases by Age:
VA, 2000-2008

Year

Number of Cases

0-14 15-24 25-44 45-64 65+

2000 49 91 108 31 13
2001 55 75 128 37 11
2002 66 83 114 36 16
2003 62 89 115 47 19
2004 62 83 128 36 20
2005 69 78 142 40 26
2006 55 84 117 51 25
2007 46 76 127 43 17
2008 67 82 103 30 10
TB vs. NTM – by Age - Virginia, 2008-2009
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M. avium

- Found in water, soil, animals
- Pathogenic for pigs, chickens, turkeys, wild birds, some captive species (zoos)
- Transmission from animals to humans and humans to humans not documented
- Water thought to be major vehicle for human infection
  - Aerosols
  - Exposure to re-circulating hot water systems
**M. avium – Common and Challenging**

- Colonization vs. infection
  - Multiple positive cultures
  - X-rays consistent
  - Symptomatic
- “Classic” presentations
  - Apical fibrocavitary lesions; middle age, male, smoker, EtOH use – progressive
  - Nodular and interstitial infiltrates (RML common) w/ bronchiectasis: elderly, female – very slow progression
- Common (and confusing) presentations
  - Superimposed on underlying pulmonary disease (COPD, silicosis, cystic fibrosis, old TB)
  - Colonization vs. infection difficult to determine
  - May have risk factors for TB
  - Difficult to R/O active TB
M. avium

• Less common presentations
  – Extra-pulmonary disease
    • M. avium lymphadenitis in children
  – Disseminated infection
    • HIV, other severely immunocompromised

• Very uncommon presentation
  – Hypersensitivity pneumonitis
  – Associated with contaminated hot tubs
M. gordonae

• Environmental – freshwater, water pipes, faucets, ice
• Rarely a pathogen unless patient severely immunocompromised
• Cause of “pseudo-outbreaks”
  – Contaminated reagents in laboratory
  – Tap water
**M.abscessus** (and **M.cheloni**)

- Common in Southeastern US
- Occasionally cause pulmonary disease
- Cause skin, bone and soft tissue infection
  - Accidental trauma or surgical procedures
  - Corneal infections
  - Abscesses at injection sites
  - Nosocomial infections (HAI)
- DCLS isolates are from younger patients than **M.avium**
**M. fortuitum**

- Similar to *M. abscessus/M. chelonae*
- Skin and soft tissue infections
- Associated with contaminated footbaths in nail salons
**M.marinum**

- Infection follows skin/soft tissue injury with exposure to fresh or salt water (swimming pool granuloma or fish tank granuloma)
- Hand most often affected
- Treatment = antimicrobial agents +/- surgery
- Grows best at 30-33 degrees – tell lab
- Virginia “hot spots” are Northern Neck, Eastern Shore, and Henrico County
- No outbreaks, ? Clusters, ? Public health intervention possible (chlorination of pools, early dx and rx)
Summary

- NTM not usually of major public health interest/concern
- Interesting and challenging organisms and illnesses
- Responsible for significant morbidity/mortality – especially in elderly, immunocompromised, and those with underlying pulmonary disease
- No human to human transmission, but clusters from common source do occur
- Some NTM infections may be preventable (footbath, hot tub, swimming pool and fish tank maintenance; early dx and rx)
References


• Nosocomial Infections Due to Nontuberculous Mycobacteria: M.S. Phillips et al. Clinical Infectious Diseases 2001;33:1363-74

• Mycobacterial Aerosols and Respiratory Disease: J.O. Falkinham. Emerging Infectious Diseases 2003;9:763-767
Recent References

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