Multi-Drug Resistant Tuberculosis Case Study

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Disclosures

• None
Objectives

• Review a *Mycobacterium tuberculosis* (TB) contact investigation and the role of local public health
• Present treatment of multi-drug resistant (MDR) TB and potential side effects
• Introduce and discuss DRESS Syndrome
• Identify barriers and lessons learned from working with a MDR TB client
Client Background

• Hmong gentleman > 65 years old
• Born in Laos
• History of COPD and 20+ year smoker
• Completed 1 yr. INH treated for LTBI in 1996
• Previous hospitalization October 2014
  —Diagnosed with community-acquired pneumonia
  —BAL completed, multiple cultures and fungal studies came back inconclusive
• Chronic cough
Client Background

• Presented to hospital on 9/25/15
  — Productive cough
  — Fever
  — Shortness of breath

• CXR showed right upper lobe cavitary lesion

• Sputum collected 9/29/15

• Public health notified of positive AFB 10/1/15, positive PCR 10/2/15
Multidrug-Resistant (MDR) TB

• Resistance to the 2 most common TB medications used for treatment (INH & Rifampin)
• Fewer treatment options available
• Treatment options may be less effective
• Typically requires more medications (4-6) which increases potential for side effects
• Typically requires longer course of treatment (2 yrs. After culture conversion)
Health Department Response

• Implement Public Health Interventions
  – Identify close contacts and high risk individuals
    • Close contact is a person who has shared the same air space in a household or other enclosed environment for a prolonged period of time (days or weeks, not minutes or hours) with a person with suspected or confirmed TB disease
    • On average, 20-40% of close contacts of someone who has infectious TB disease becomes infected
Health Department Response

• Implement Public Health Interventions
  – Timeline for Investigation
    • Identify contacts 3 months prior to diagnosis
    • Close contacts first priority
    • Children under age 5
    • Immune deficiencies
      – HIV
      – Prednisone (15mg or greater for 4 weeks)
      – Chemotherapy
    • Talk to contacts about their exposure
Mayo’s Response for MDR Contacts

• Identify close contacts and high risk individuals
  – Test for TB Infection and evaluate for clinical symptoms consistent with TB
  – Treat those with LTBI?
    • Option 1: Treatment with drug(s) for which the organism is still sensitive
    • Option 2: Clinical monitoring for 2 years without treatment
Mayo’s Response for MDR Contacts

• Prophylactic treatment for children under 5
  – A decision would have to be made whether to pursue window prophylaxis and with what medication

• Identify additional contacts, those spending hours of close contact
  – Test, evaluate and treat according to recommendations (previous slide)
Mayo’s Response for MDR Contacts

• Mayo’s additional recommendations for LTBI contacts regardless of the decision to treat or the treatment option selected, it is important to:
  – Follow those with presumed latent MDR-TB infection for a minimum of 2 years following exposure
  – Educate patients about the signs and symptoms of TB in case they progress to active disease
Contact Investigation

• 95 Personal Contacts
  – Active MDR Case Identified
  – Two conversions
    • LTBI treatment started

• 8 jurisdictions (5 States)

• 42 Healthcare Workers Exposed
  – No conversions
# Contact Investigation

## INTERJURISDICTIONAL TUBERCULOSIS NOTIFICATION

Client Information is confidential under Wisconsin Statute 146.82 (1)

### REFERRING JURISDICTION

<table>
<thead>
<tr>
<th>City</th>
<th>County</th>
<th>State</th>
<th>Date Sent</th>
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</thead>
</table>

**Contact Person – Name**

**Telephone Number (Include area code)**

**Fax Number (Include area code)**

### REFERRAL CATEGORY

- Verified case. State reporting to CDC
- RVCT Number (attach RVCT)
- Not reported
- Suspect case
- Close contact
- Reactor (LTBI)
- Convertor (LTBI)
- Source case investigation
- A/B Classified Immigrant

### PATIENT INFORMATION

<table>
<thead>
<tr>
<th>Patient Name (Last, First, Middle Initial)</th>
<th>Patient is also known as (Alias, Nickname, etc.)</th>
<th>Gender</th>
<th>Date of Birth</th>
<th>New Address (Street, Apartment Number, City, State and Zip Code)</th>
<th>New Telephone Number</th>
<th>Date of Expected Arrival</th>
<th>Name - Emergency Contact and Telephone Number</th>
<th>Relationship to Patient</th>
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</thead>
</table>

| Name - New Health Provider (If known provide Name, Address and Telephone Number) |
Patient Medication Regimen

• Started Medication on 10/9/2015
  – Amikacin 15mg/kg IV Q24 hours M-F
  – Cycloserine 250mg PO a.m., 500mg PO p.m.
  – Ethionamide 250mg PO a.m., 500mg PO p.m.
  – Linezolid 600mg PO daily
  – Pyrazinamide 1250mg PO daily
  – Moxifloxacin 400mg PO daily
  – Vitamin B6 100mg PO daily

**Ethionamide D/C’d 12/10/15**
Patient Medication Regimen

• All TB Medications stopped on 1/20/2016
• Slow reintroduction started on 2/21/2016 at UW Hospital
  – Weekly to Biweekly introduction of one medication at a time
• New Medication Regimen as of 3/2/2016
  – Amikacin and Cycloserine D/C’d
  – Bedaquiline started
# Patient Medication Regimen

**DRUG-OGRAM**

**Length of Treatment:**
24 months post-culture conversion

<table>
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<tr>
<th>Date</th>
<th>Start 10/29/15</th>
<th>11/1/15</th>
<th>11/11/15</th>
<th>12/22/15</th>
<th>1/15/16</th>
<th>1/20/16</th>
<th>1/21/16</th>
<th>Re-start 2/2/2016</th>
<th>2/10/16</th>
<th>2/17/16</th>
<th>3/2/16</th>
<th>3/5/16</th>
<th>4/17/16</th>
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<td><strong>Wt.</strong></td>
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<td><strong>Isoniazid (INH)</strong></td>
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<td><strong>Rifampin (RIF)</strong></td>
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<td><strong>Ethambutol (EMB)</strong></td>
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<td>HELD</td>
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<td><strong>Pyrazinamide (PZA)</strong></td>
<td>1250 mg Daily</td>
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<td><strong>Amikacin (AK)</strong></td>
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<td>10 mg/kg IV M-F</td>
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<td>10 mg/kg IV M-F</td>
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<td><strong>Ethionamide (ETA)</strong></td>
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<td>250 mg AM 500 mg PM</td>
<td>HELD</td>
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<td><strong>Cycloserine (CS)</strong></td>
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<td>250 mg AM 500 mg PM</td>
<td>250 mg AM 500 mg PM</td>
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<td><strong>Rifabutin (RFB)</strong></td>
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<td>HELD</td>
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<td><strong>Bedaciline (BDQ)</strong></td>
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<td>HELD</td>
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<tr>
<td><strong>Vit B6</strong></td>
<td>50 mg daily</td>
<td>50 mg daily</td>
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<tr>
<td><strong>Prednisone</strong></td>
<td>5mg/day</td>
<td>5mg/day</td>
<td>75mg/day</td>
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Medication Side Effects

- Diarrhea
- Rash
- Hearing loss
- Depression
- Thrush
- Photosensitivity
DRESS Syndrome

• Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)
  — Occurs 2-8 weeks after starting offending medication
  — Severe rash
  — Fever
  — Hypereosinophilia
  — Internal organ involvement
  — Estimated mortality of up to 10%
  — Genetic predisposition for those of Asian decent
    • Increased risk for DRESS
DRESS Syndrome

Medications associated with DRESS
• #1 Anticonvulsants
• #2 Allopurinol
• Antibiotics and antivirals

Management
• Stop the offending medication
• Avoid introducing new medications
• Systemic corticosteroid treatment
• Supportive treatment
DRESS Syndrome

• Severe body rash that involved mouth, throat and cornea.
• Treatment with high doses of Prednisone led to immunosuppressed state & opportunistic infections like thrush, CMV and pseudomonas
• Inability to eat/drink and progressive weight loss
• Failure to thrive
DRESS Syndrome
Patient Outcome

- Admitted to hospital 4/14/16
  - Placed back in isolation
  - TPN started
- Respiratory distress and bi-pap started on 5/8
- POA activated 5/12
- Died on 5/14
- Cause of death: Aspergillus pneumonia, MDR TB and Pseudomonas pneumonia
Timeline
October 2015-May 2016

- 1 Oct: [CATEGORY NAME]
- 1 Nov: [CATEGORY NAME]
- 1 Dec: WCHD STARTS DOT AT CLIENTS HOME
- 1 Jan: [CATEGORY NAME], INCRESSING RASH, MOUTH SORES
- 1 Feb: [CATEGORY NAME], CLIENT ADMITTED TO TC
- 1 Mar: REINTRODUCE TB MEDS
- 1 Apr: [CATEGORY NAME], CLIENT TO ER
- 1 May: [CATEGORY NAME], CLIENT DIED, CLIENT HOME, OUT OF ISOLATION, CLIENT ADMITTED TO TC, CHANGE IN CHEST X-RAY
What Went Well

• Early testing in 2014 done by ID physician
• Theda Care at Home
  – TB overview provided
  – Weekly conferences
• Hospitalist at Theda Care Regional - Neenah
  – Advocated and provided options for patient
  – Asked public health important questions
• Nursing staff at Theda Care Regional – Neenah
• No conversions among healthcare workers
Challenges

- Initial notification of suspect TB
- Communication with patient
  - HOH
  - Language
  - Culture
  - Unable to read
- Coordination of care
  - Drug regimen
  - Point contact person
  - Weekly meeting with all care providers
Challenges

• Lack of family support
  – POA living in Alaska
• Evaluation and appropriate level of care at handoffs
  – Provider office visits
  – ER/Admission process
  – Lack of options for isolation
  – Delayed discharge
  – Multiple readmissions
  – PT/OT evaluations and orders
Lessons Learned

• Healthy respect for TB, meds and their side effects
• Reporting suspect TB
• Education
  – Floor staff, IC, home health agencies, etc.
  – MDRs may require longer hospitalization
  – Increased LTBI rates
  – Update policies and procedures
  – PAPR training
• Availability of negative pressure rooms
Lessons Learned

• Social Worker involvement
• Communication
  – Point Person for hospital
  – Weekly conferences with all care givers and family
  – In person interpreter
• Stress test for hospital and health department
• Stock up on needed supplies
• Consider Incident Command
Recommended Resources

• **Drug Resistant TB- A Survival Guide for Clinicians.** Curry International TB center

• **Center for Disease Control**
  – Core Curriculum on Tuberculosis: What the Clinician Should Know
Resources

• Center for Disease Control
  – Guidelines for Preventing the Transmission of M. tuberculosis in Health-Care Settings, 2005
    • http://www.cdc.gov/tb/publications/slidesets/infectionguidelines/default.htm
  – Self-Study Modules on Tuberculosis
    • http://www.cdc.gov/tb/education/ssmodules/pdfs/module5.pdf

• WI Dept of Health Services
  – Wisconsin Tuberculosis Program
    • https://www.dhs.wisconsin.gov/tb/overview.htm

• World Health Organization
  – Tuberculosis
    • http://www.who.int/tb/en/