AFB Identification
The Clinician's Perspective

Barbara J Seaworth M.D.
Medical Director
Heartland National TB Center

THE UNIVERSITY OF TEXAS HEALTH CENTER AT TYLER
HEARTLand
NATIONAL TB CENTER
A PARTNERSHIP OF UT HEALTH CENTER AND TCID

Objectives

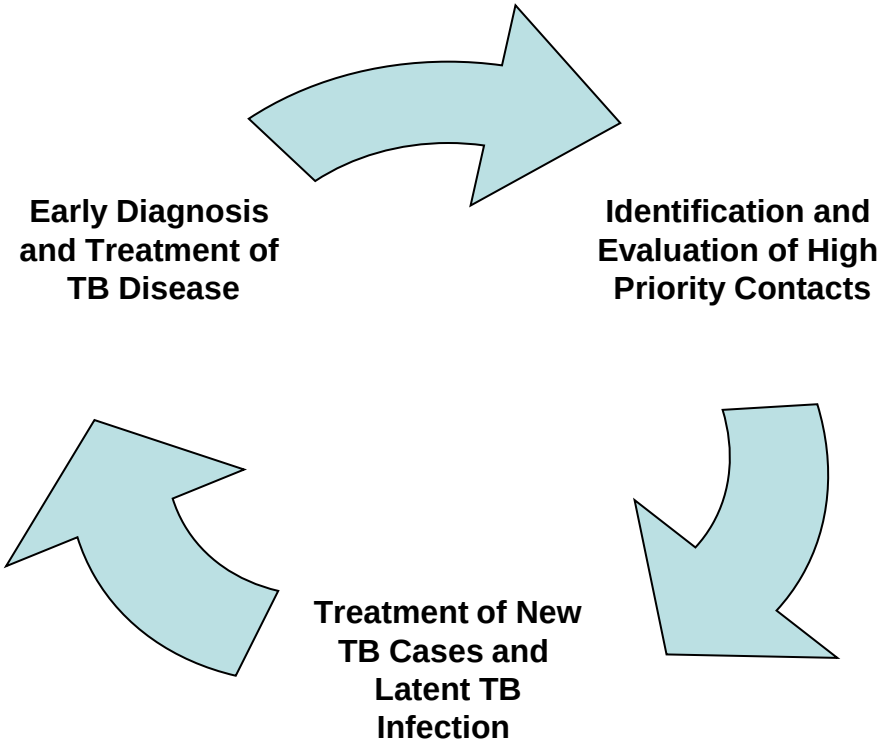
- Identify how a clinician uses the AFB smear and NAA results
- Describe the chain of events initiated with a report of:
  - Positive AFB smear, Positive NAA for M TB
  - Positive AFB smear, Negative NAA for M TB
- Discuss what a clinician needs from the lab when a patient has an NTM isolated

AFB + Smear

- **NAA + MTB**
  - Validates TB Diagnosis
  - Treatment always Started
  - Respiratory Isolation
  - Report of case to health department
    - Directly Observed Therapy
    - Contact Investigation starts within 7 days

- **NAA – for MTB**
  - If strong suspicion of TB,
    - Talk to Lab
    - Repeat 2nd NAA
    - Evaluate for inhibitors
  - If second NAA – usually excludes a diagnosis of pulmonary TB
  - Continue to evaluate

TB Control In U.S.
Stopping Transmission



When specimen is
AFB + but
NAA – for M TB

Diagnosis not TB
No Contact Investigation
No TB Treatment

Refer Outside of
Public Health Practice

Identify which NTM is present
and
whether this is usually a pathogen

Is this NTM causing disease in my patient?

Non Tuberculous Mycobacteria

- > 140 known species
- 40 species have caused human disease
- A single positive culture usually does not make a diagnosis of NTM disease
- TB increases the risk of subsequent NTM
  - Especially those patients with lung destruction as a result of TB

How often is NTM Significant?

- Study in Oregon matched micro data and clinical patient information
  - 933 patients with one or more NTM
  - 527/933 (56%) met case definition for disease
    - **Cassidy CID 2009**

And you thought dealing with us was overwhelming when the lab grew M TB -

NOW WE REALLY NEED YOU!

Does My Patient Have NTM Disease?

- **It depends on the bug**
  - Only a few are usually pathogens in normal host
    - M *kansasii,*, M *abscessus*, in U.S. (one + culture usually = disease)
    - M *malmoense*, M *zulgai, M xenopi (one + culture usually = disease)*
    - M *avium* complex often important
  - Some are rarely important
    - M *gordonae*
    - M *simiae* (except maybe in San Antonio Texas if repeated positive cultures)
  - Some may be associated with very poor prognosis
    - M *abscessus* – medical cure not realistic, needs surgery, 20% die
- **It depends on the bacterial load**

Does My Patient Have NTM Disease?

- **It depends on the patient**
  - Clinical picture: symptoms and radiographs
  - Risk factors,
    - M *fortuitum* (one positive culture in those with GI reflux may be significant)
    - HIV infected with low CD4 count - more likely to be disease
- **It depends on site of specimen: sputum, tissue, blood**
    - MAC from blood in patient with AIDS
    - M *marinum* from hand lesion in patient with fish tank
- **It depends on progression of disease over time**
    - May take months or years to figure out

Diagnostic Criteria for NTM Pulmonary Disease

- Compatible clinical presentation based on symptoms, chest X-ray or CT scan and **exclusion of other diagnosis**
- Collection of at least **3 AFB +** sputum and/or Bronchoalveolar lavage (BAL) specimens
- **One + culture** from sputum/ BAL that is either heavily (≥ 2 +) smear + or heavily (≥ 2+) culture positive

OR

- **One + culture** from sputum/ BAL associated with multiple AFB smear + specimens or multiple + cultures (≥ 3) over 1 year
- Lung biopsy demonstrating granulomatous inflammation which is culture positive for an NTM

ATS/IDSA Statement, 2007

Case Study

- Young Asian female with chronic cough, weight loss (87 lbs) and low grade fever
  - Abnormal chest x-ray
  - Sputum multiple AFB smears and cultures
    - MAC
    - Treated: clarithromycin, ethambutol, ciprofloxacin
    - Continues to be chronically ill
  - 6 months later multiple cultures + M TB
    - Rapid molecular tests show MDR, validated by susceptibilities
    - Patient improving on TB treatment, still some MAC in sputum

Case Study

- Healthy 30 year old female
  - Culture grew M TB, starts standard TB therapy
  - Worsens clinically and chest x-ray much worse
  - Culture now is repeatedly + M *fortuitum*
- CT scan shows large intrathoracic lymph nodes
  - Spiral CT: bronchial obstruction due to compression
    - Bronchoscopy suctioned out large amount of mucous
    - Patient given steroids to shrink nodes
    - Marked clinical improvement
    - ID physician orders treatment for NTM anyway……

Is Isolation of an NTM Significant in a Patient with Current M TB Disease?

- Usually Not
- Oregon 141 TB cases 2005-2006
  - 20/141 (14%) grew NTM
    - 5/20 (25%) had 2 + cultures
    - These cases met ATS/IDSA criteria for NTM disease "***except" for exclusion of other diagnosis***
  - First isolation median of 71 days after TB culture +
  - 8/20 (40%) positive in the first 31 days
  - NTM more frequent in those with cavitary lesions and U.S. born individuals
  - F/U: over 3 years – no further isolation of NTM

Kendall Int J TB Lung Dis. May, 2010

MTB and NTM in Same Culture

- Study in Japan
  - registered TB with NTM as a complication in 15/1207 (1.2%)
    - Shigeto Kekkaku. 1995 (Japanese)
- Hospital cohort of TB patients, many HIV+
  - 11% grew MAI
    - Epstein, Chest 1997

What Do We Need?

- Identify organism to species level
  - To help with diagnosis
  - To help with treatment
  - To help with prognosis
- Guidance on bacterial load
- Recommendations for where to send the organism if ID not done in state lab

Regional Training and Medical Consultation Centers (RTMCCs) Areas of Coverage