AFB Identification
The Clinician’s Perspective

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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 2<sup>nd</sup> NAA
    • Evaluate for inhibitors
  – If second NAA – usually excludes a diagnosis of pulmonary TB
  – Continue to evaluate
TB Control In U.S.
Stopping Transmission

- Early Diagnosis and Treatment of TB Disease
- Identification and Evaluation of High Priority Contacts
- Treatment of New TB Cases and Latent TB Infection
- 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 \textit{kansasii}, M \textit{abscessus}, in U.S. (one + culture usually = disease)
    • M \textit{malmoense}, M \textit{zulgai}, M \textit{xenopi} (one + culture usually = disease)
    • M \textit{avium} complex often important
  – Some are rarely important
    • M \textit{gordonae}
    • M \textit{simiae} (except maybe in San Antonio Texas if repeated positive cultures)
  – Some may be associated with very poor prognosis
    • M \textit{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

Legend
Area of Coverage  * Center Location
Region 1  Blue  San Francisco, CA
Region 2  Red  San Antonio, TX
Region 3  Pale Yellow  Newark, NJ
Region 4  Green  Gainesville, FL

THE UNIVERSITY OF TEXAS HEALTH CENTER AT TYLER
HEARTland
NATIONAL TB CENTER
A PARTNERSHIP OF UT HEALTH CENTER AND TCDH