Atypical Mycobacteria & Deep Fungal Infections from Texas

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• I have no conflicts of interest to disclose

• All patients have given their permission to discuss their cases

Atypical Mycobacteria Infections

• Mycobacterial infections not caused by M. tuberculosis or M. leprae
  • Group of > 100 acid fast bacteria - facultative saprophytes
• Mycobacteria are prevalent in the environment
  • All habitats
    • Water
    • Soil
    • Animals
    • Food
• Increasingly frequent cause of cutaneous infections
• Especially in immunocompromised patients
  • More common with multiple etiologies of immunosuppression
  • Double or Triple Jeopardy

Atypical Mycobacteria Clinical Presentation

• May depend on infecting organism and immune status of the patient
  • Papules
  • Plaques
  • Nodules
  • Abscesses
  • Ulcers
• Broden differentials appropriately in immunocompromised patients

Case 1 – The Curious Case of the Complicated Cytoplasm

History

• 42 yo Caucasian female presented for asymptomatic pink scar-like lesions on her arms (>R) x several months
• PMH significant for severe asthma on prednisone 40mg daily since 2012 and omalizumab and common variable immunodeficiency on monthly IVIG
• She also suffers from diabetes mellitus with a HbA1c > 7 on treatment with insulin
Clinical Photos and Histopathology
Histopathology

Erythema Induratum of Bazin –Like Ulceration on the Leg

Treatment Course

- AFB cultures from skin biopsy demonstrated mycobacterium chelonea
  - Skin biopsy demonstrated suppurative granulomatous inflammation with acid fast bacilli
- Infectious disease was consulted
  - Pt was started on minocycline 100mg BID, clarithromycin 500mg BID, and Linezolid
  - Sensitivity results demonstrated resistance and therapy was changed to IV amikacin and tigecycline
- Patient unable to be weaned from prednisone due to severe asthma
Treatment Course

- Pt admitted 1 month later with septic shock secondary to atypical pneumonia not improving on vancomycin and meropenem
- Mycobacteria detected on bronchoalveolar lavage
- Culture grew Mycobacterium chelonae
  - S to clarithromycin, linezolid, tigecycline
  - R to doxycycline, moxifloxacin
- Antibiotics switched to clarithromycin, meropenam and linezolid with resolution of pneumonia

Mycobacterium chelonae Infection

- Rapid growing atypical mycobacteria
- Isolated from environment
  - (soil, plants, animals)– tap water is a major source
- Difficult to eradicate
- Resistant to common disinfectants
- No person-person spread reported

- Most common etiologic agent of disseminated cutaneous disease
  - (in association with iatrogenic immunosuppression or leukemia)
- Pulmonary disease as seen in our patient has not been reported in the literature
- Classically presents as multiple tender, erythematous, draining nodules
- Atypically presents as cellulitis, abscess, osteomyelitis, ulcers, sinus tracts

- No specified guidelines or randomized controlled trials on therapeutic regimens
- Typically sensitive to clarithromycin, fluoroquinolones, linezolid, clofazimine, doxycycline, tigecycline, imipenem, amikacin, tobramycin
- Antimicrobial susceptibilities should guide therapy
- Monotherapy not recommended as it leads to resistance
**Mycobacterium chelonae Infection**

- Limited cutaneous disease: oral agents x 2 for minimum 4 months
- Disseminated/severe cutaneous disease: parenteral agent x 2 followed by oral agents for 6-12 months
- Surgical treatment may be needed

**Our patient**

- Patient relapsed again 3 months later
- AFB culture showed *M. chelonae*
  - R to ciprofloxacin, clarithromycin, doxycycline
  - S to linezolid, tigecycline, clofazamine
- Patient underwent excisions of new nodules under advisement from infectious disease physician
  - Currently on amikacin and tigecycline and preparing to start clofazamine

**Case 2: A Catastrophic Case of Cosmetic Tourism**

- 57 y/o woman
- “Boils” arising on the abdomen
- Liposuction 1 yr ago
  - In Qatar
- Post-op infection
  - 1-2 wks
- Pustules
  - Abscesses -> draining sinuses in the subsequent year
PMH/ PSH

PMH
- Diabetes mellitus, HbA1C > 9
- Depression
- Anemia

PSH
- C sections
- Breast reduction 2008
- Abdominoplasty 2009
- Liposuction 2012

Physical Exam
- Afebrile
- Uncomfortable – wincing in pain when lying flat
- Abdomen:
  - Firm, tender to palpation, woody induration
  - Hyperpigmented, indented linear scars
  - Red, tender, edematous, fluctuant plaque LLQ

Previous Work-Up
- Extensive w/u in Quatar, negative per pt
- Records lost by the airline
- Biopsies, cultures all negative
- Antibiotics with no improvement

Further Work-Up
- Skin biopsy
  - Fibrofatty tissue with necrotizing granulomatous inflammation
  - Chronic inflammation and granulations tissue
  - Acid fast organisms identified on fite stains

Further Work-Up
- CT Abdomen / Pelvis
  - Multiple small fluid collections present within the anterior abdominal wall beneath the thickened dermis
  - No intraperitoneal extension
- CXR
  - Normal

Further Work-Up
- Abscess aspirate culture
  - Mycobacterium fortuitum – by sequence identification
  - Susceptible to Linezolid, Amikacin, Ciprofloxacin
  - Resistant to Clarithromycin, Minocycline, Cefoxitin
Treatment

- Pt was started on
  - Linezolid 600 mg PO daily
  - Cipro 750 mg PO BID
  - Bactrim DS PO BID
- Abscess aspiration PRN
- Gradual but significant improvement

Mycobacterium fortuitum

- Nontuberculous mycobacterium (NTM)
- Rapid grower
  - Doubling time 2 hours
  - Colonies visible in 5 days
  - vs M. Tuberculosis
    - Doubling time 18 hours
    - Colonies visible in 3-6 weeks
- Natural and processed water sources
- Sewage and soil

Mycobacterium fortuitum

- Local cutaneous disease
- Osteomyelitis
- Joint infections
- Isolated lymphadenitis
- Endocarditis
- NTM lung disease
- Ocular disease (eg, keratitis, corneal ulcers)
- Disseminated disease - immunosuppressed

Mycobacterium fortuitum

- Surgical site infections
  - Cardiothoracic surgery
- Wound contamination - colonized tap water
  - What happened in this case
- Infections of implanted devices (catheters)
- Injection-site abscesses
- Pseudoepidemics
  - Contaminated endoscopes

History

- A lovely 67 year old abuelita who LOVES to garden
- Sustained a fall with abrasion injury to her left foot in her beloved garden two months prior to presentation
- Made a poultice from one of her favorite garden plants and water from the hose – continued to garden
  - Evening Primrose (Oenothera rosea) or Hierba del golpe
  - Used in Mexican folk medicine to treat bruises and skin inflammation

Case 3: The Unfortunately Constant Gardener
History

• PMH:
  • Systemic lupus erythematosus
  • Frequent prednisone for flares of arthritis
  • Type II diabetes with a HbA1c of 9.2

• Presented to clinic with numerous nodulo-ulcerative lesions on her left leg with drainage and moderate tenderness

Work up

• Skin biopsy demonstrated suppurative granulomatous dermatitis
• Negative for AFB on immunostains
• Tissue sent for PCR and came back as Mycobacterium lentiflavum
• Patient started on oral antibiotic regimen of Clarithromycin and Rifampin with improvement

Take home points:
Atypical Mycobacteria – Histology

• Warn your pathologist of your concerns
• May be non-specific dermal or subcutaneous histiocytic inflammation
• Abscesses
• Tuberculoid or sarcoidal granulomas
• Rheumatoid-like nodules

Atypical Mycobacteria Diagnosis

• Tissue cultures can be instrumental to establish the diagnosis
• Repeat cultures may be needed
• Polymerase chain reaction analysis
  • May be performed on fresh or paraffin embedded tissue samples
  • May increase sensitivity and specificity of diagnosis

Atypical Mycobacterial Treatment

• Antimicrobial treatment may be initiated empirically to avoid progression
  • Ideal therapy is tailored to the results of culture data
• Multi-drug regimens may be needed to avoid antimicrobial resistance
• Therapy lasts many months to greater than one-year in duration
• Surgical intervention also may be employed

Stay vigilant

• A high index of suspicion is required for immunocompromised patients
• Especially if multiple etiologies of immunosuppression

Bonus Case

• 4 month old baby from Lamesa, Texas presents with a lump on her left little finger. There was a history of a hair tourniquet earlier in the year.
Differential Diagnosis

A. North American Blastomycosis
B. Pyogenic granuloma
C. Coccidioidomycosis
D. Foreign body granuloma
E. Histoplasmosis
Primary Cutaneous Coccidioidomycosis

- Identification of organism on routine histology (on a Friday afternoon, a true “oh my goodness!” moment)
- Patient was referred urgently to pediatric infectious disease
- Coccidioides complement fixation antibody was positive with a titer of 1:32
- Coccidioides antibody screen was positive
- Patient was started on 6mg/kg of fluconazole and is improving