Non Tuberculous Mycobacterium - A Vexing Problem

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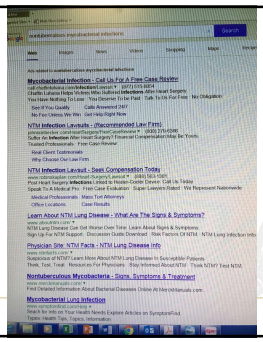

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Our Series and Experiences

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NTM are opportunistic bacteria found in soil and water

Number of infections is increasing – 2.6% per year

Broad range of clinical manifestations.

Most common – a pulmonary disease.

Immunocompetent hosts

Extrapulmonary Manifestations 25%

Most common skin and soft tissue Infections.

Bone and Joint less often.

Due to an increased immunosuppression: Disseminated disease

Prior case series prove this to be extremely difficult to treat.

MSK – Commonly in hand and spine

Our Series:
All cases of NTM infection treated at University of Colorado hospital and National Jewish hospital over a six year period.

Aim:
Clinical characteristics and outcomes

Retrospective study 2009-2015

Managed combined by UCH Orthopedics and NJH Infectious Disease

Our Cases: all non spinal
IRB approval

Number 14 participants

- 9 Male
- 5 Females
- 7 on immunosuppressive therapy

Location:

- 6 knees, 2 hips, 1 thigh
- 1 hand, 1 foot, 1 elbow
- 2 with disseminated disease

Precipitating causes

- Prior Surgery – 10 cases
  - Trauma (including pedicure), 3 cases
  - Steroid injection, 1 case

Interval from onset of symptoms to diagnosis was 5 months median

ESR
CPR } Median raised

WBC normal

ESR mean 38
CRP mean 30
WBC 7.4

All 14 participants had specimens taken for culture.
8 positive at time of debridment.

Prior to definitive treatment 10 of 14 underwent unsuccessful surgeries including

- Debridement
- Synovectomy
- TKA
- Explant of prosthesis

Explant with radical debridement was done in all patients.

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Classification of mycobacterial species causing human disease

M. tuberculosis complex	Slowly growing nontuberculous mycobacteria
M. tuberculosis	**Photochromogens**
M. bovis	*M. kansasii*
M. africanum	*M. marinum*
M. microti	**Scotochromogens**
M. canetti	*M. gordonae*
M. leprae	*M. scrofulaceum*
Rapidly growing nontuberculous mycobacteria	**Nonchromogens**
M. fortuitum complex	*M. avium* complex
M. fortuitum	*M. avium*
M. peregrinum	*M. intracellulare*
M. porcinum	*M. terrae* complex
M. chelonae	*M. ulcerans*
M. abscessus	*M. xenopi*
M. abscessus	*M. simiae*
M. bolletii (previously *M. massiliense*)	*M. malmoense*
M. smegmatis	*M. szulgai*
M. mucogenicum	*M. asiaticum*
	M. haemophilum

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Microbiology:

Rapid growers
M abscessus
M fortuitum

Slow growers
Mintracellulare
MAC
Gordonae
Marinum

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Due to an increased immunosuppression: Disseminated disease

All patients were operated at UCH

- 5 pts – surgical debridement
- 1 pt – synovectomy
- 5 pts – explant ⬆radical debridement
- 1 pt – multiple debridements, including claviculectomy synovectomy, fasciectomy, debridement of foot and ankle
- 1 pt – amputate forearm
- 1 pt - hemipelvictomy

How do we culture and biopsy to make a positive diagnosis

- ✓ Aspiration fluid (open) for
- ✓ Total WBC count
- ✓ Diff WBC count – look for monocytes!!
- ✓ Culture fluid for AFB and fungus as well
- ✓ Tissue Biopsy
- ✓ Permanent histology – granulomas
- ✓ Culture for AFB and Fungus

Antimicrobial treatment
All patients according to sensitivities

7 pts receive four different agents
5 pts receive five agents
Median duration: 14 months – slow growing
6 months – rapidly growing

Outcomes

- After surgical intervention
- Follow up
- 2 years to 8 years
- Only 2 patients relapsed
- One patient (TKA) was amputated

Lessons Learned

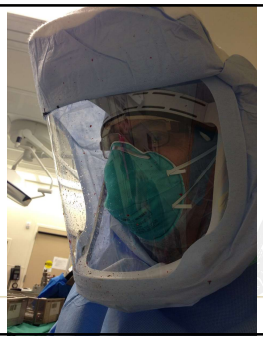
a) A persistent infection: culture for AFB fungus
b) Unexpected infection: culture for AFB fungus
c) Always send tissue for histology as well
   What you culture you do a histology on
   What you send to pathology you culture
d) Always send fluid and tissue
e) Debridement – radical
   Similar to Sarcoma
f) Rare but relentless disease – if possible send to experts

Lessons Learned continued

g) Prolonged antibiotic treatment
h) Infections happen in immune competent hosts
i) A negative culture after treatment with a draining sinus still equals failure of treatment

A staged arthroplasty revision was not considered due to his comorbidities. Instead, he underwent extensive incision and drainage (I&D) of the joint and surrounding tissues, with percutaneous drain placement into the fluid collections. On discharge, he was continued on antimycobacterials for chronic suppression. After 4 months of therapy with ethambutol, clarithromycin, and rifampin, he continued to have positive AFB smears from the surgical site and percutaneous drains. After several months of declining quality of life, he was placed on hospice and died 6 months after initial presentation.

Protect yourself!!!



Case studies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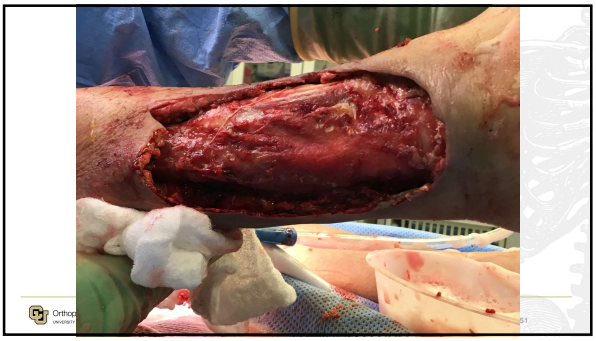

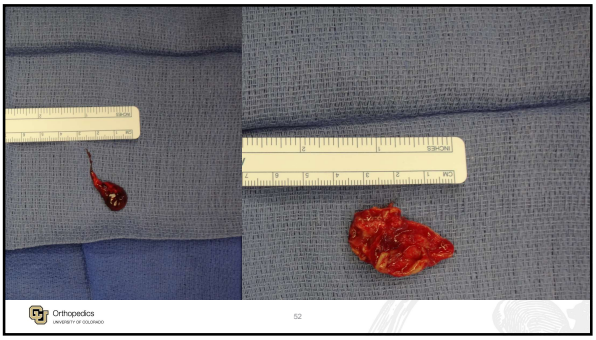
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75 mm
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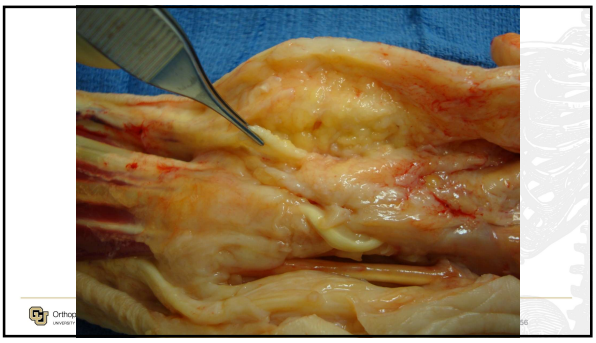

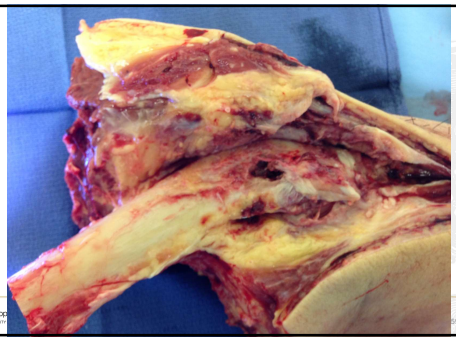

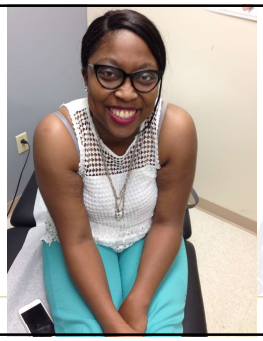

Inside out drain system

Questions?

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