Nontuberculous Mycobacteria Disease

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Infections Due to NTM

- Currently there are more than 120 species of NTM
- ≥ 50% are considered to be potential sources of disease.
- Ubiquitously found in the environment(soil, water, food, and house dust).
- Defects in lung structure & immune response
- Glucocorticosteroid, immunosuppressive therapy.
- Immunocompetent patients usually consists of localized skin & soft tissue infections.
- NTM infections cause little mortality

NTM Species:

- M. avium Complex (MAC)
- M. kansasii
- M. abscessus
- M. chelonae
- M. fortuitum
- M. genavense
- M. gordonae
- M. haemophilum
- M. immunogenum
- M. malmoense
- M. marinum
- M. mucogenicum
- M. nonchromogenicum
- M. scrofulaceum
- M. simiae
- M. smegmatis
- M. szulgai
- M. terrae complex
- M. ulcerans
- M. xenopi

Clinical Presentation

- Pulmonary Disease
- Hypersensitivity pneumonitis
- Lymphadenitis
- Localized Cutaneous & Soft Tissue Infections
- Infection of Tendon Sheaths, Bones, Joints
- Disseminated Disease
- Catheter-Related Infections
- Miscellaneous Infections

Pulmonary Disease

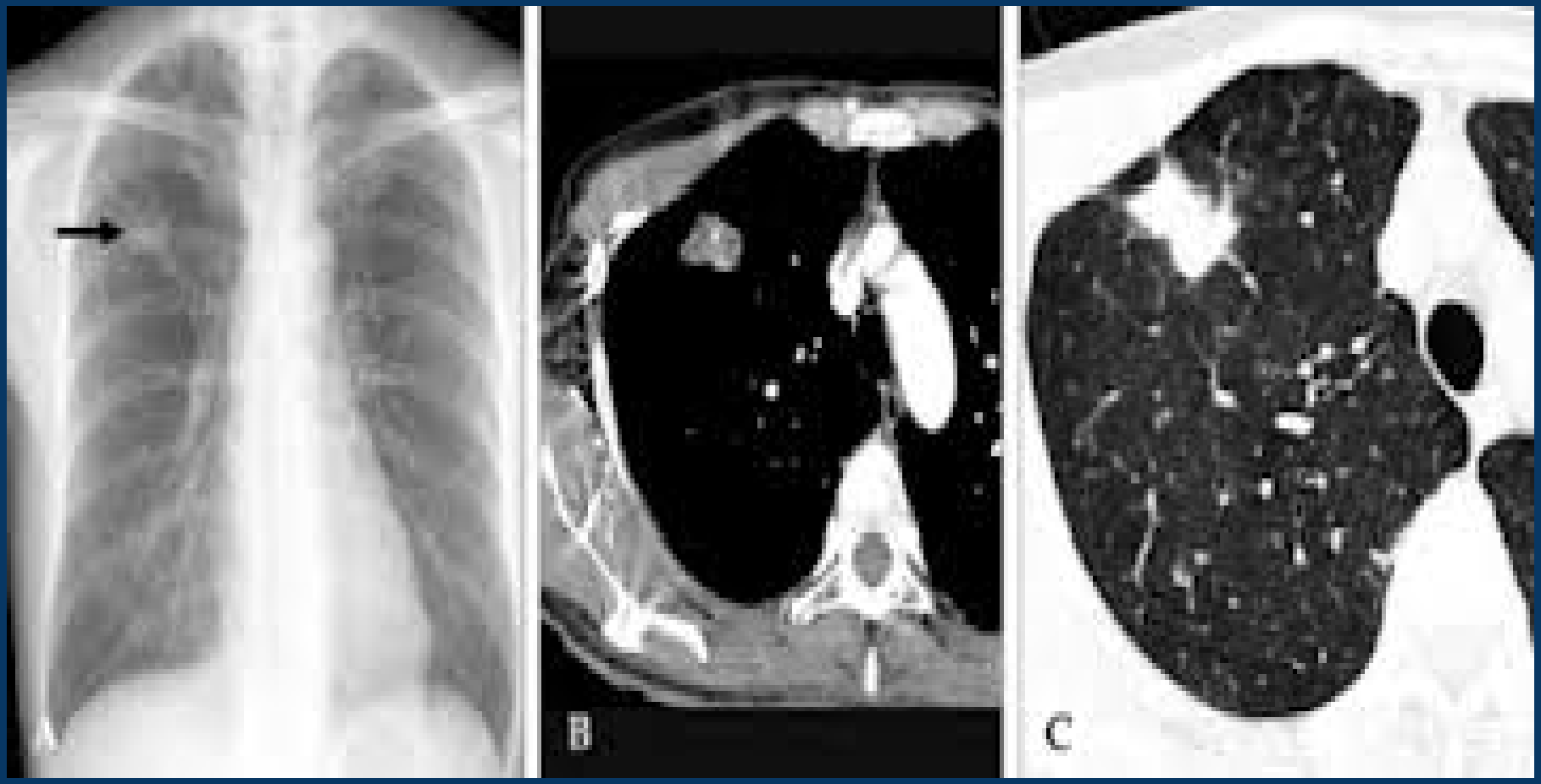
❖ Predisposing Conditions

- Bronchiectasis, cancer, silicosis
- Heavy smoking & alcohol consumption
- Inherited defects in the interferon (IFN)-γ
- HIV/AIDS
- Immunosuppressive therapy
- Glucocorticosteroid therapy
- Monoclonal antibody therapy

Pulmonary Disease

- A 55 years old man admitted with cough & purulent sputum, fatigue, night sweats for 5 months.
- Hx → Heavy smoking for > 35 years
- P/E → emphysematos lung disease.
- Lab Test→ Normal
- CXR→
- Chest CT Scan→

Pulmonary Disease



Pulmonary Disease

- Tuberculin Skin test → Negative
- Sputum Smear → +ve for AFB x 3 times
- Sputum Cultures → +ve for MAC x 3 times
- Treatment:

✓Clarithromycin, 500 mg q12h +

✓Ethambutol, 1200 mg +

✓Rifampin→ 600 mg

- Optimal duration therapy?

Pulmonary Disease (Diagnosis)

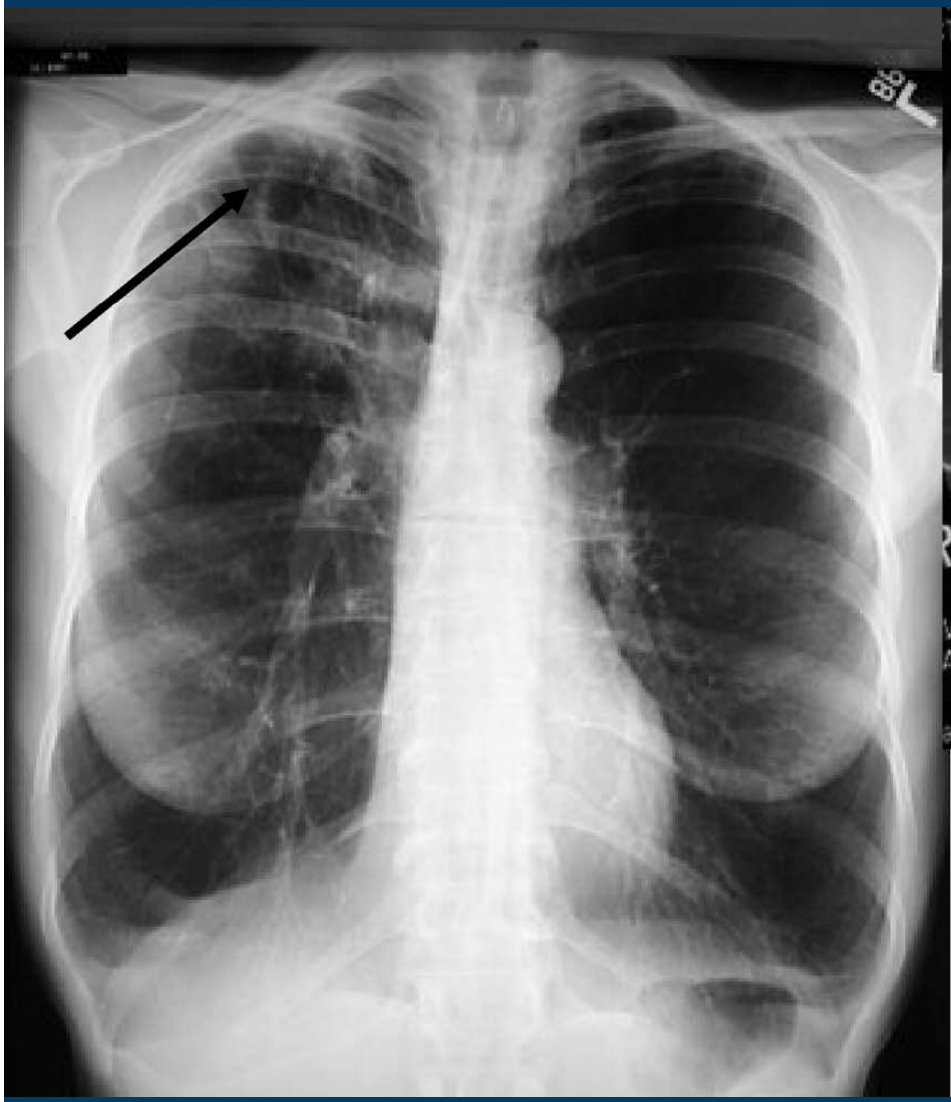
- The ATS & IDSA clinical case definition for pulmonary MAC disease:
- Patients must be symptomatic
- Abnormalities on CXR or CT scan **&**
- One of the following features:

✓(1) two positive MAC sputum cultures; **or**

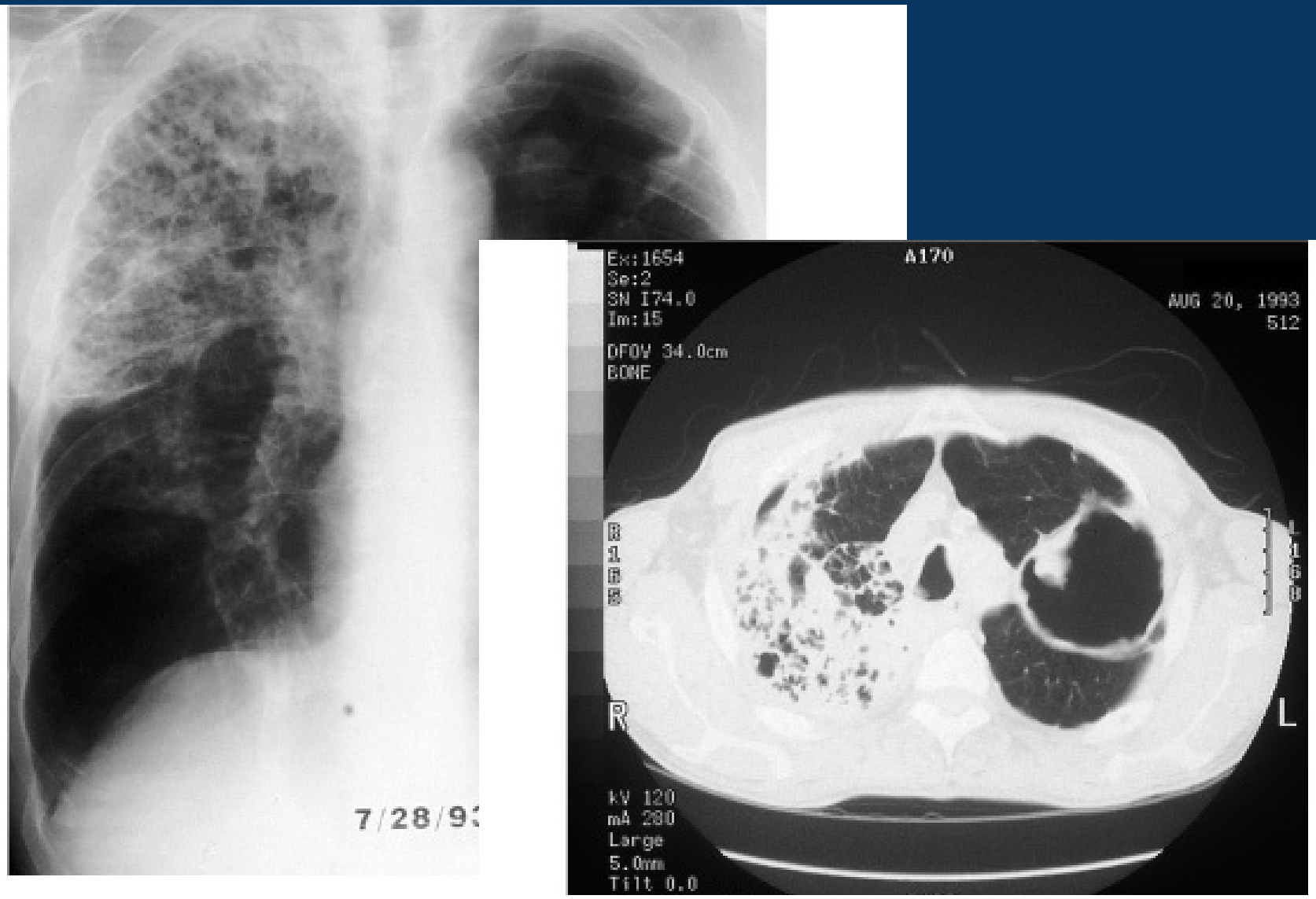
✓(2) BAL positive culture for MAC; **or**

✓(3) Acid-fast bacilli or granulomas, and positive MAC culture from a histopathologic specimen.

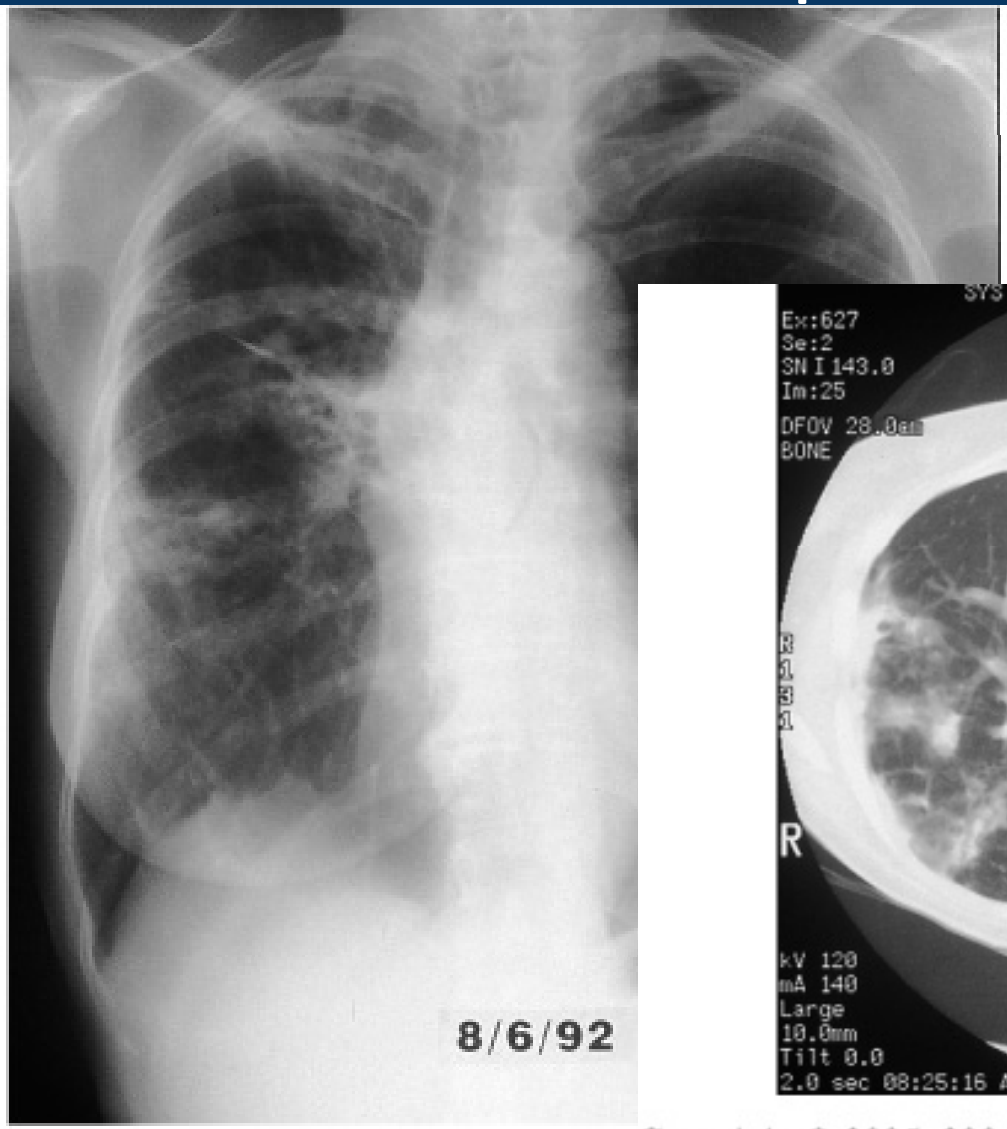
Mycobacterium avium complex of the fibrocavitary type in a 52-year-old woman with COPD



A 76-year-old man with cavitary MAC disease in the left upper lobe & infiltration in right upper lobe



A 67-year-old woman with right side bronchiectasis & MAC pulmonary disease



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Preauricular unilateral MAC lymphadenopathy from 5-year-old gril with normal immunity.

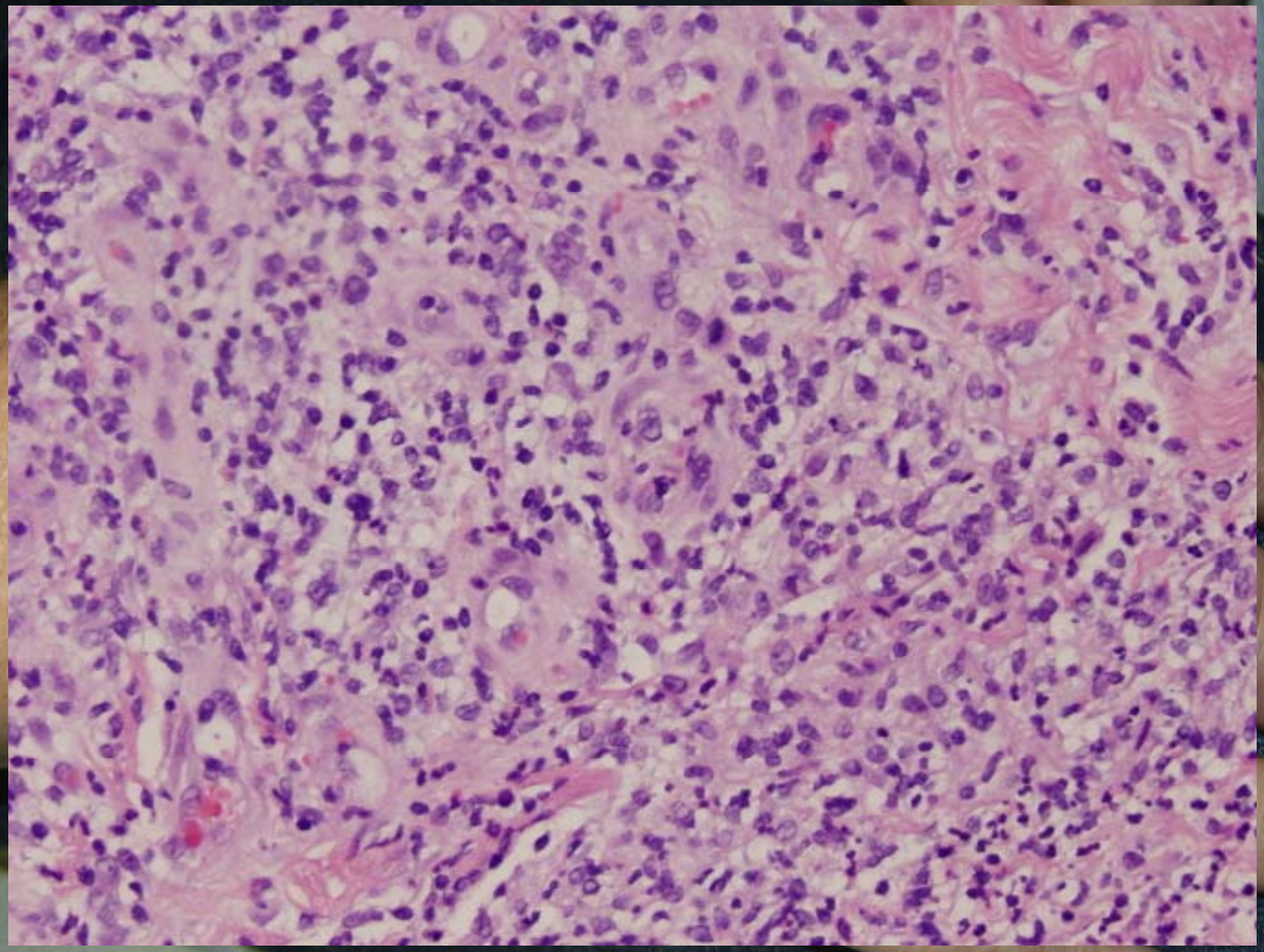
Unilateral cervical MAC lymphadenopathy from 5-year-old girl with normal immunity.

Localized Cutaneous & Soft Tissue Infections

- A 54-year-old man presented with a nodule on the right hand.
- A splinter entered the skin and he developed erythema over the next five days near his injury.
- He developed nodules over the following two weeks.
- The nodules extended up his wrist and forearm.
- The nodules were erythematous and tender.
- He owned a fish aquarium.

Localized Cutaneous & Soft Tissue Infections

- A skin biopsy was obtained and revealed granulomatous inflammation with microabscess formation
- An acid-fast stain was positive
- Fungal culture was negative.
- The results of the initial culture directed diagnosis toward Mycobacterium species, more specifically, either M.marinum



Localized Cutaneous & Soft Tissue Infections

- Fish-handlers and fish tank hobbyists are at the highest risk of developing infection, although there are documented outbreaks from swimming pools, lakes, and oceans
- Treatment:

✓Clarithromycin 500 mg/q12h or

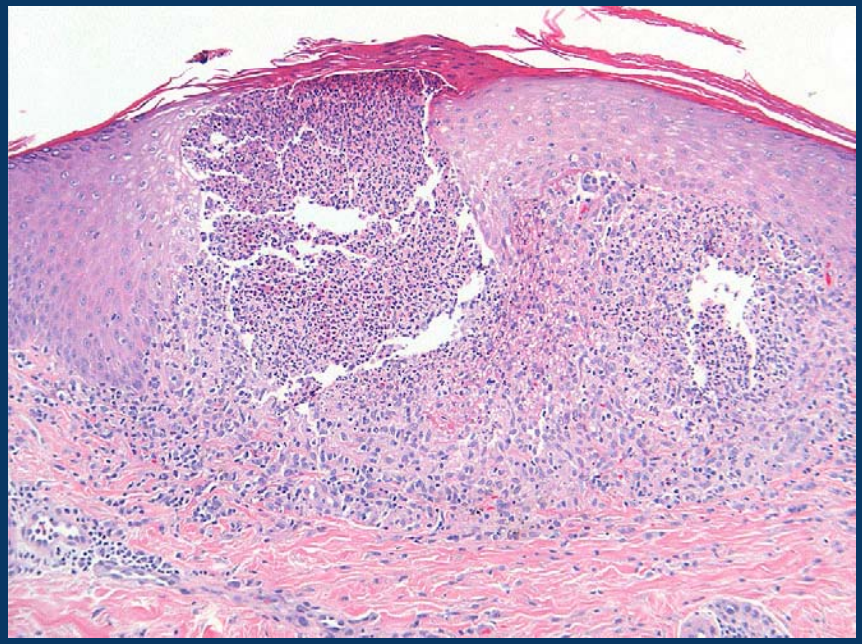
✓Minocycline 100 mg/q12h or

✓Rifampin 600 mg + Ethambutol 1200 mg /daily

Localized Cutaneous & Soft Tissue Infections

- A 29-year-old woman from Oregon presented with a 2-week history of itchy, violaceous, flat-topped, 2–3-mm papules on her right forearm that developed 2 weeks after tattoo placement
- The papules were first limited to the black and gray areas of the tattoo.

Localized Cutaneous & Soft Tissue Infections



Cutaneous infection with Mycobacterium chelonae

A 25-year-old woman with AML & chemotherapy presented with pain, erythema & pus from her catheter. She has developed catheter-related infections.

- Smear → AFB
- Culture →
  - ✓M.fortuitum
- Appropriate Rx:
  - ✓Catheter removal
  - ✓Antibiotic therapy

Disseminated Disease

- A 29-year-old woman with AIDS (CD4 count of 8 cells/uL) presented with three weeks history of weakness, non-bloody, non-mucoid diarrhea and esophageal candidiasis.
- Diarrhea with abdominal cramp but no nausea, vomiting.
- Weight loss, non productive cough & anorexia
- AIDS was diagnosed two years prior to admission
- Hx → PJP & Oropharyngeal candidiasis.
- No prophylactic treatment.

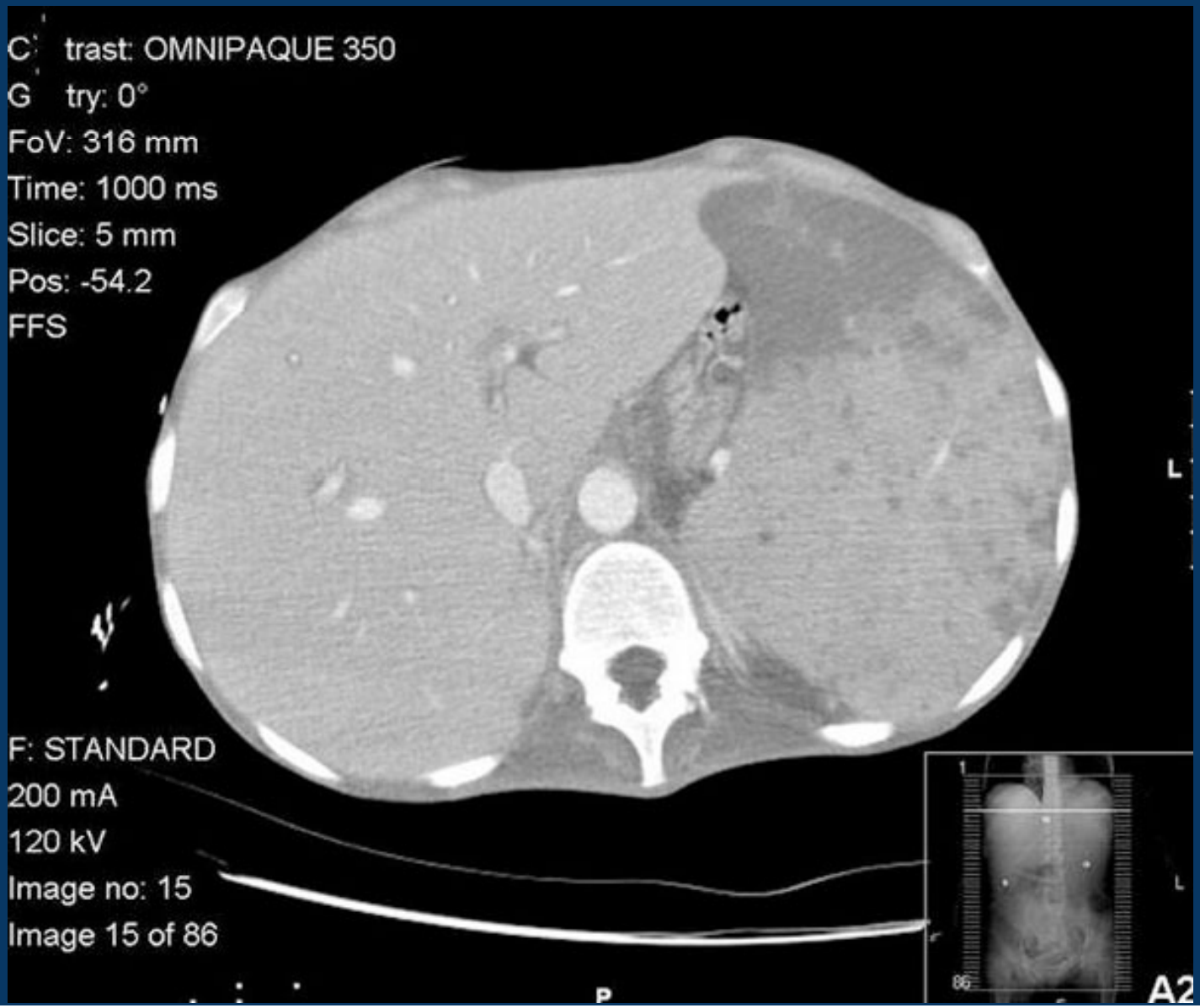
Disseminated Disease

- P/E→ Chronically ill, emaciated
- BP =115/59 mmHg , PR = 129, RR = 24, T = 38
- O2 sat in room air was 99%.
- Pallor, extensive oral thrush and massive hepato-splenomegaly (spleen was 8 cm from subcostal margin and liver was 6 cm).
- Rectal examination was normal.

Disseminated Disease

- WBC = 6,000 PMN= 92%, lymph= 4.5%
- Hb = 7 g/dL, Hct= 20%, retic count = 4.39%,
- Plt = 209,000/uL
- Ferritin = 617 ng/ml,
- Serum chemistry was normal.
- AST +26 U/L, ALT = 16 U/L,
- Alkaline phosphatase + 662 U/L(300U/L)
- Bilirubin 0.2/0.8 mg/dL,

Abdominal CT scan with IV contrast → hepatomegaly & enlarged spleen with multiple hypo dense lesions.



Disseminated Disease

- B/C nine days later → +ve for MAC
- Standard treatment for disseminated MAC:
  - ✓Clarithromycin 500 mg q12h +
  - ✓Ethambutol 15 mg/kg/d +
  - ✓Rifabutin 300 mg/d
- Antiretroviral Therapy
- MAC prophylaxis