

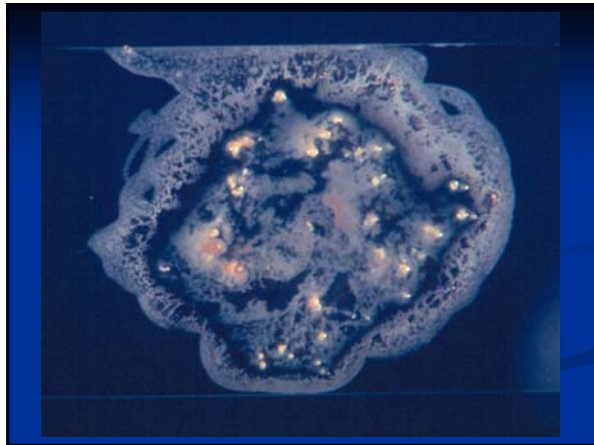
Actinomycosis and Nocardiosis

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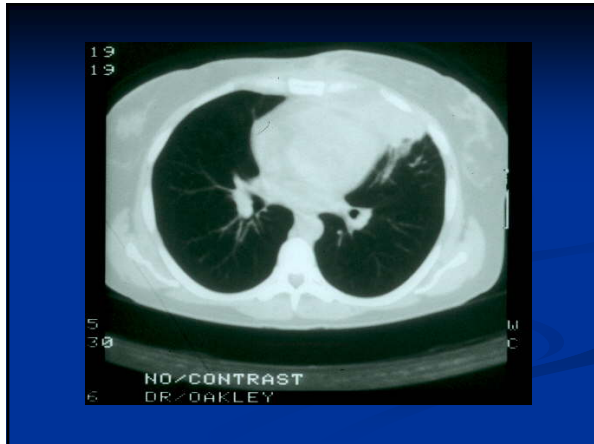
Case

A 53 yr WF from a W. Virginia presented with a draining sinus over her right lower parasternal area of six weeks duration. She had lost about 15 pounds of weight, chronic dry cough and low grade fever. She had felt a little better with two ten-day courses of Keflex but the drainage had never stopped. Chest xray and CT showed a contiguous infiltrate in the right middle lobe.

- She had been unemployed, lived on a farm, took care of horses, chickens and dogs. She had a history of alcohol and tobacco abuse. No sick contacts.
- Physical examination was otherwise normal. CBC showed a WBC of 12,500 and a hematocrit of 32%. Pus from the draining sinus is shown on the next slide.







Which of the following is the most likely cause of this pneumonia?

- A. *Rhodococcus equi*
- B. *Actinomyces meyeri*
- C. *Eikenella corrodens*
- D. *Staphylococcus aureus*
- E. *Aggregatibacter (Actinobaccillus) actinomycetemcomitans*

Empyema necessitatis

- Definition: infection extending from lung across pleura and eventually leading to draining skin lesion. "To necessitate" is an old word meaning "to drain itself."
- Causes:
 - *Actinomycosis* (not very ill)
 - *Tuberculosis* (chronically very ill)
 - *Staphylococcus aureus* (subacutely very ill)

- Answer: Actinomyces meyeri

Presence of sulfur granules in a draining sinus is seen only with actinomycosis and mycetoma. Mycetoma is inoculation infection of subcutaneous tissue.

Actinomycosis is unusual in its ability to cause an empyema that extends through the chest wall.

Aggregatibacter (Actinobacillus) actinomycetemcomitans is a Gm neg coccobacillus that often occurs in actino lesions and is a cause of SBE (HACEK)

Rhodococcus equi: subacute pneumonia, usually immunosuppressed. Cavities

Eikenella corrodens: anaerobe in lung abscess, bites, SBE (HACEK)

Actinomycosis: definition

Subacute to chronic

Suppurative and granulomatous; local abscess, suppuration, fibrosis, sinuses

Contiguous; does not respect tissue planes

Oral/cervicofacial, thoracic, abdominal, pelvic, CNS

Actinomycosis: epidemiology

<100 cases/yr US (underreported)

Male 3:1; no reservoir; no human to human

All age groups, most "middle" age

Actinomyces: microbiology

Actinomyces, Propionibacterium, Bifidobacterium
Actinomyces sp=30; 8 human disease (A. israelii)
Filamentous, branching, Gram-positive, pleomorphic,
non-spore forming, non acid fast, anaerobic
or microaerophilic bacilli
Polymicrobial: Actinobacillus, Aggregatibacter,
Bacteroides, Fusobacterium, staph, strep, gnrs etc.

Actinomyces: cervicofacial

Most common form; "lumpy jaw"
Usually odontogenic
Painless painful/mass, induration, pus, drainage,
bluish or red, 25% sulfur granules, fever
Contiguous spread to bone, neck, tongue etc
DDX: TB, fungi, nocardia, abscess, neoplasm



Actinomyces: abdominal

Chronic; weeks to years after breach in GI mucosa (surgery, trauma, diverticulitis, Crohn's...)

Most common ileocecal, mass ("wooden"), sinuses

As with all forms: leukocytosis, anemia



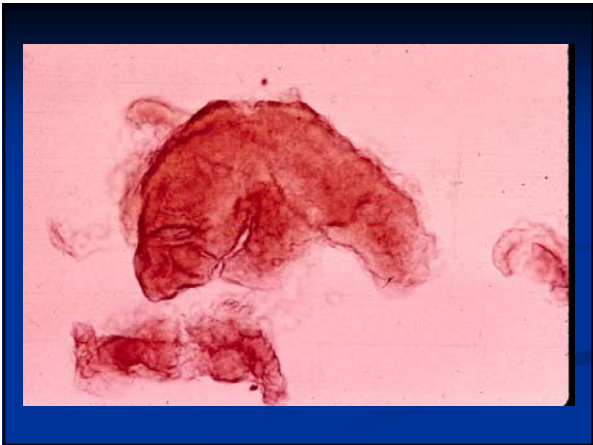
Actinomyces: diagnosis

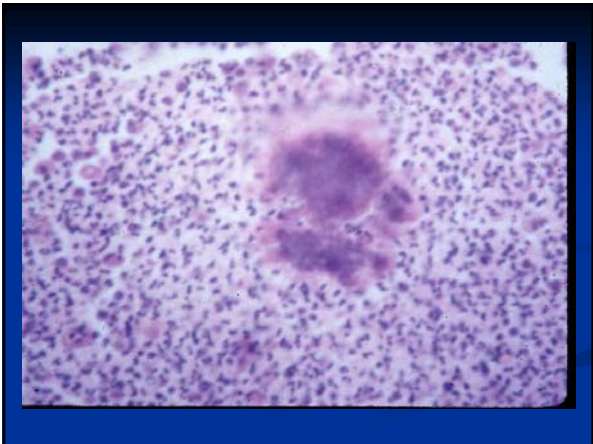
XR, CT, MRI-nondiagnostic, useful to guide sampling and response to Rx

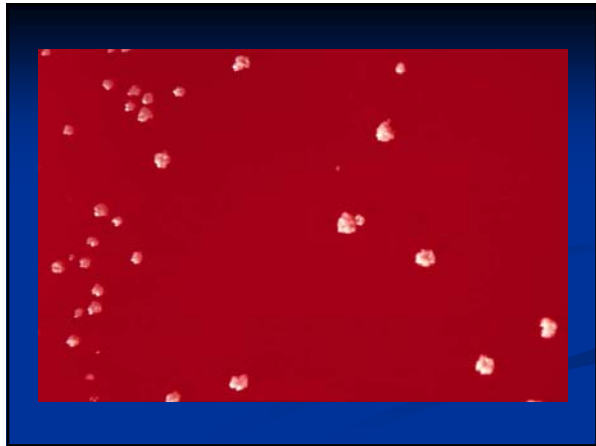
Specimens: drainage, needle aspirate, bx
Gram-positive branching, filamentous, non acid fast

Pathology of granules, culture

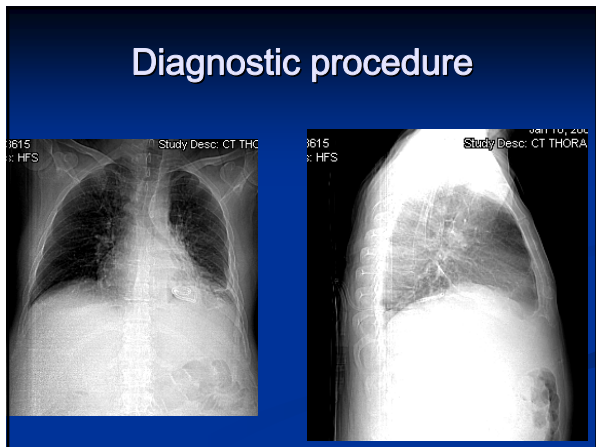








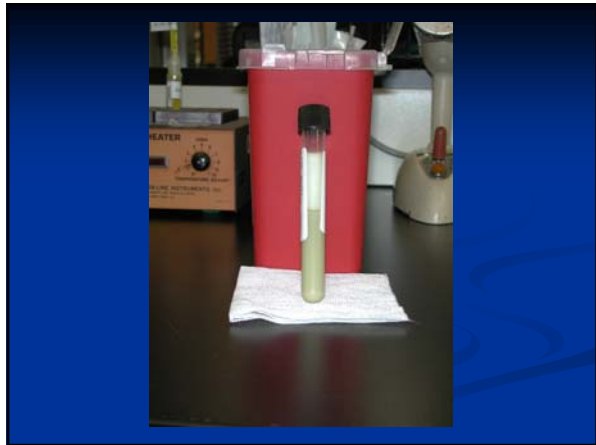


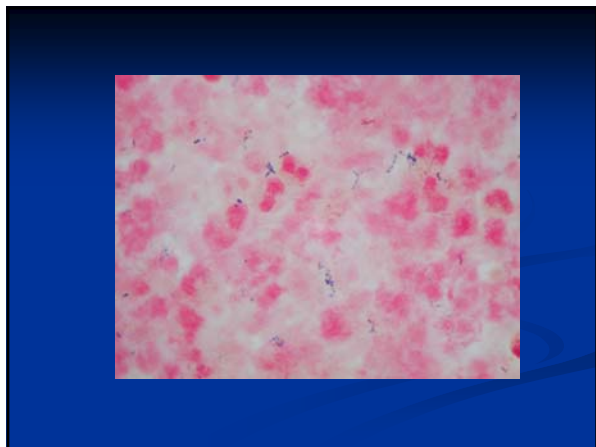


3 days post insertion of pigtail catheter

Initial CT scan

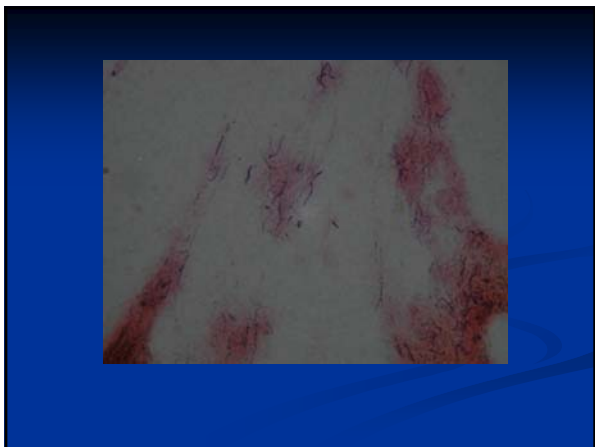


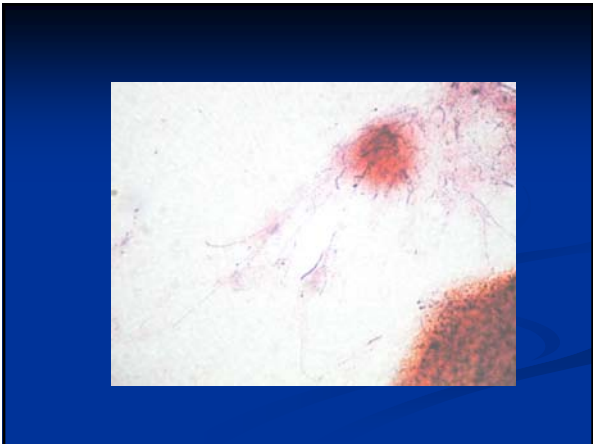












**Actinomyces: treatment
(6-12 months)**

Penicillin 18-24 million units/d i.v. x 2-6 weeks,
then...amoxicillin or amox-clav; tetracyclines,
macrolides, cephalosporins, quinolones etc.
NOT MTZ
Rx other pathogens present (esp. abdominal form)
Surgery; remove IUD

■ A 32 yr female with SLE and high dose prednisone therapy was admitted for community acquired pneumonia after outpatient treatment with levofloxacin for a week had failed. Gram stain of sputum showed branching Gram positive rods. The most likely organism is:

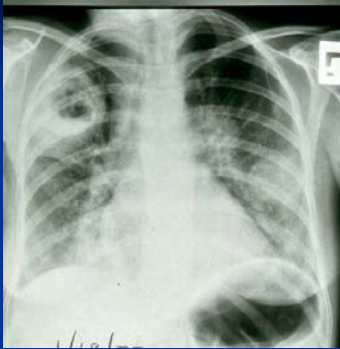
- a. weakly acid fast
- b. anaerobic
- c. sporulating
- d. microaerophilic

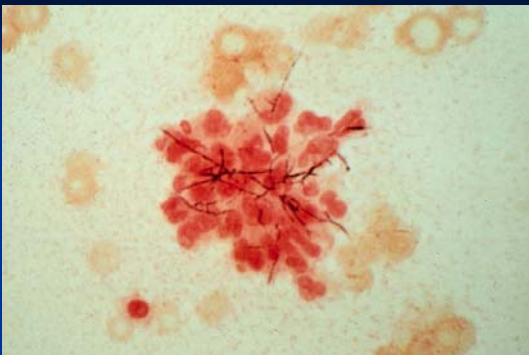
Answer: acid fast bacillus

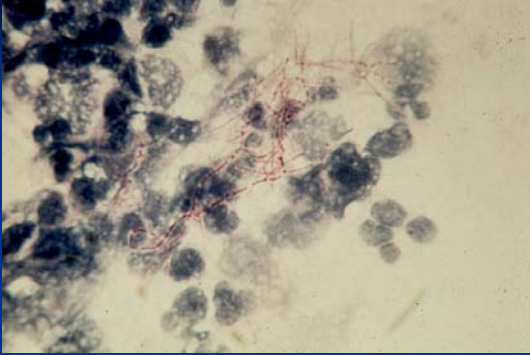
Nocardia are strictly aerobic Gram positive bacilli that stain weakly acid fast in clinical specimens but lose acid fastness with culture

Actinomyces are branching anaerobic or microaerophilic Gram positive bacilli but this pneumonia is too acute for actinomycosis

None of the sporulating Gram positive bacilli would show branching in sputum.







Nocardiosis: definition

Infections caused by Nocardia sp.
Lung, skin, CNS, rarely disseminated
Immunocompromised (> 2/3)

Nocardiosis: epidemiology

Soil, ubiquitous, 0.4/100,000 (1000 x immunocompromised)
BM or SOT, steroids, AIDS, anti-TNF, Cushings, CGD, dysgammaglobulinemia, pulmonary alveolar proteinosis
No predisposing condition < 1/3

Nocardiosis: microbiology

DNA: DNA hybridization-and gene sequencing
N. asteroides is not most common: N. nova complex,
N. abscessus, N. farcinica, N. transvalensis
complex, N. brasiliensis etc
Superoxide dismutase, cord factor

Nocardiosis: clinical

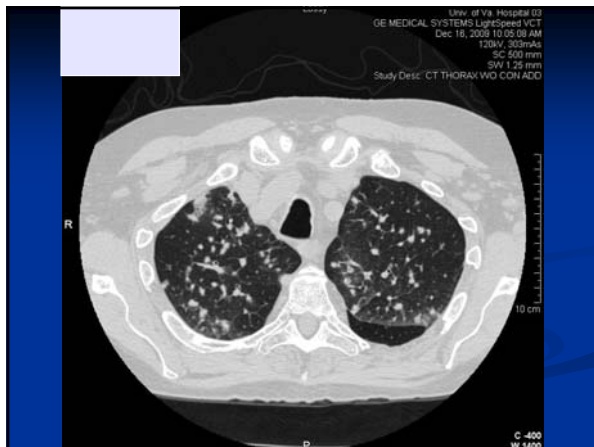
Always consider in immunocompromised host; esp.
failure to respond to conventional Abx
Pulmonary (2/3): subacute, infiltrate, effusion, nodules,
cavity skin (inoculation or disseminated)
CNS (5%): multiloculated brain abscess(es),
meningitis
Note: TMP-SMX often not protective

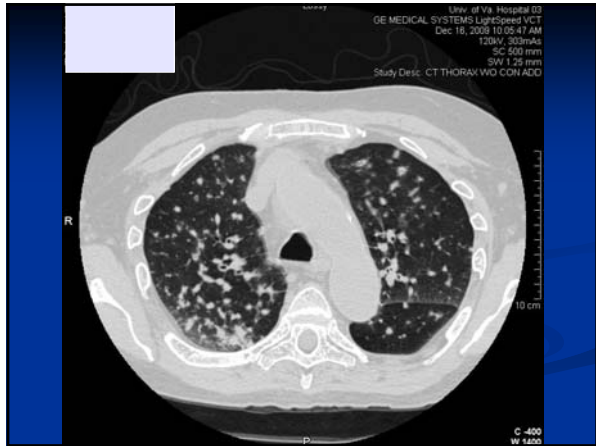




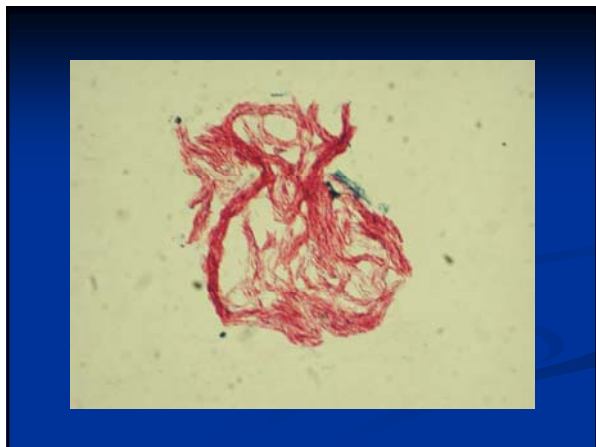
Nocardiosis: diagnosis

XR,CT, MRI: nondiagnostic, aid sampling and response to Rx
Specimens: aspirates, bx
Gram-positive branching, filamentous, beaded,
modified acid fast
Culture, 16S ribosomal RNA sequencing









Nocardiosis: treatment (6-12 +months)

Acute, disseminated, life threatening, lung
and brain: TMP-SMX 1 DS tid (or i.v.)
plus ceftriaxone 2g bid +/- amikacin or
imipenem

Consolidation: TMP-SMX, moxifloxacin,
minocycline, amox-clav, linezolid

Surgery e.g. brain or s.c. abscess
