HAEMOPHILUS & THE HACEKGROUP OF ORGANISMS

Suggestions on what to do with tiny gram negative coccobacilli

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Haemophilus

- Clinical presentations----adults

 - Meningitis---Post upper respiratory infection
 Cellulitis in the buccal and periorbital region
- Underlying medical conditions
 - Pulmonary disease, HIV, alcoholism, pregnancy &

Haemophilus cont

- - Manifestations maybe nonspecific and may include:

 Bacteremia
 Sepsis
 Meningitis

 - Underlying conditions
 Premature birth, premature membrane rupture, low birth weight

Characteristics of Haemophilus

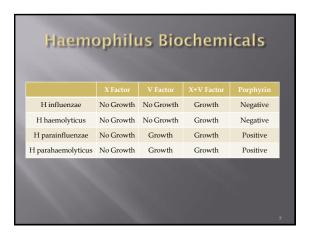
- Small, pleomorphic gram-negative coccobacilli
- Positive for cytochrome oxidase
- No growth on MacConkey or Sheep blood
- Growth in culture requires exogenous hemin (X factor) and/or nicotinamide adenine dinucleotide (NAD) (V factor)
- Media of choice----Chocolate
 - Can use BA with hemolytic organism--Satellitism

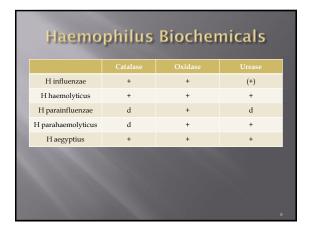
Characteristics of Haemophilus

- Growth of Haemophilus on chocolate agar in the presence of 5-10% CO₂ (capnophilia)
- Commercial chocolate agar is a synthetic 'mix" of NAD, hemoglobin, vitamins (cobalamin, thiamine hydrochloride), minerals (iron, magnesium), cysteine, glutamine, and glucose

Common Species of Haemophilus

- Haemophilus influenzae
- Haemophilus parainfluenzae
- Haemophilus aphrophilus
- Haemophilus ducreyi





HACEK Organisms

- Haemophilus species
- Actinobacillus actinomyetemcomitas
- Cardiobacterium hominis
- Eikenella corrodens
- Kingella species

Clinical

- Have an enhanced capacity to produce endocardial infections (IE)
 - Approximately 3% of native valve endocarditis
- Most common cause of gram negative endocarditis in non drug users
- Also associated with
 - Periodontal infections, Bacteremia, Abcesses, Peritonitis, Otitis media, Conjunctivitis, Septic arthritis, Osteomye.itis, UTI, Brain abcess
 - Infections frequently associated with dental procedure

Haemophilus IE

- Cause up to 1 % of IE
- Of these:
 - 40% due to H. aphrophilus, followed by H. parainfluenzae,
 - H. influenzae rarely causes IE despite the frequency of it being associated with bacterimia
- Up to 10% of cases of IE include a second pathogen
 - Either a Streptococcus viridans or Staphylococcus

Actinobacillus Clinical

- Frequently associated with localized juvenile periodontitis
 - Manifestation of early-onset periodontitis (EOP)
- Also associated with gingivitis
 - Can mimic clinical picture of Actinomycetes
- IE infections
 - 86% have underlying heart disease
 - 25% have infection of prosthetic valve (aortic)
 - Arterial embolism occurs in 43% of cases

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Eikenella Clinical

- Usually associated with mixed bacterial infections
- Cellulitis from human bites or clenched-fist injuries
- Also associated with osteomylitis and various pulmonary infections (empyema, pneumonia)
- Soft tissue infections and endocarditis in drug abusers
 - Most patients have underlying valve lesions

Kingella Clinical

- Frequently associated with diseases in children
 - Osteomylitis & septic arthritis in young children
 - Bacteremia in infants
 - IE in school aged children and adults
 Vary rapid progress is characteristic
 - Rarest of the HACEK organisms causing infection

Haemophilus Hints

- New Name: Haemophilus aphrophilus is Aggregatibacter aphrophilus
 - Also includes H. paraphrophilus
- Short Gram bacillus that may for filaments
- Require 5-10% CO₂
- Growth maybe enhanced by heamin but X factor not absolute requirement, V variable
- Colonies opaque, granular & yellow
- Catalase & Urease Neg, Oxidase --variable

Actinobacillus Hints

- New name: Aggregatibacter actinomycetamcomitans
- Short gram negative coccobacillus, may stain irregularly, cells arranged, singly & in pairs
- Does not require X or V factors
- Microaerophilic, optimal temp 37⁰ C
- Colonies firm, star shaped, rough and pitting
- Slime maybe produced, colonies sticky
- Catalase & Oxidase Pos, Urease Neg
- Floating colonies in TSB

Cardiobacterium Hints

- Two species: hominis & valvarum
- Pleomorphic or straight rods with round ends, may give rosette clusters
- May find some of these cells are gram +
- Growth on BA poor, does not require X or V factors. May require X initially
 - Very small colonies, need humidity & 5% CO₂
 - Optimal temp----30 to 37°C
- Colonies smooth, opaque, butyrous
- Oxidase---Pos, Catalase & Urease---Neg

Eikenella Hints

- Monospecies: corrodens
- Straight, unbranched, non-spore forming
- May take several days to grow, bleach odor
- Flat colonies maybe surrounded by spreading
 - Pitting common, yellow color in older cultures
 - Non hemolytic but slight greening maybe seen
 - Ontimal temperature 35-370 C
 - Twitching "motility" maybe seer
- Oxidase---Pos, Catalase & urease--- Neg

Kingella hints

- Straight rods with rounded or square end
- Two colony types: Neither requiring X or V
 - Spreading corroding

 - Zone of beta hemolysis
- Optimal temperature---33-370 C
- Oxidase --Pos, Catalase & Urease-- Neg

"crossed cigars"	visible on clear ag 00X magnification;	; may show	light grow	th on Mac(configuration like fusion (supplemented Conkey agar dole detected by xylen

References

- Identification of Haemophilus species and HACEK group of organisms. NHS, National Standard Method. BSOP ID 12
- E-medicine.medscape. Com/article/218158-
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