St Joseph's Health Centre Emergency Department Positive Blood Culture Algorithm



Two sets showing growth of same organism? **HIGH RISK: Unlikely Contaminant** Does the Gram stain show: • Gram negative organism? Return to ED ASAP • Gram positive cocci in pairs / chains (e.g. strep)? YES Repeat blood cultures * Staph Aureus identified GIM Consult / Admit Yeast identified OR **Begin Antibiotics** Is the patient high risk? Immunocompromised ** **Consider ID Consult** Age < 3 months NO **MEDIUM RISK:** Any Risk Factors for Poor Outcome? **Needs Reassessment** IV drug use **YES** History / suspicion of endocarditis Return to ED Internal hardware (e.g. valves, pacer, joints) Repeat blood cultures * Central line / Picc line / Hemodialysis line Look for alternative source **Consider Antibiotics** GIM consult / Admit Phone the Patient for Verbal Reassessment Watch and Wait at home for YES • Is the patient clinically unwell? speciation Does patient have any risk factors? (see above) Advise re: another phone call when species identification is

LOW RISK: Watch and Wait

- Consider waiting for species identification (see page 2)
- Provide return to ED instructions
- Advise re: another phone call when species identification is back
- Case remains OPEN until species identification

- * Repeat Blood Cultures: 2 sets from 2 peripheral sites
 If possible endocarditis: 3 sets (3rd set > 1 hour later)
- ** Immunocompromised:
 - HIV
 - Active chemotherapy
 - Active immunosuppressant therapy
 - Uncontrolled DM

Note: ALL patients with positive blood cultures are called for notification of the results and verbal reassessment.

Blood culture Gram Stain Interpretation - Very Simplified

Gram positive cocci in clusters = staph

- staph aureus (true infection high risk)
- coag neg staph (most common contaminant)

Gram positive cocci in chains = strep

• consider ALL strep true infection, although *viridans* and group C and D step are sometimes contaminants

Gram positive bacilli

- variable risk
- common contaminants: Bacillus species (except B. anthracis)

Corynebacterium species (except C. jeikeium)

Gram negative

- consider ALL Gram Negative organisms true infection (high risk)
- Anaerobes: are not separately classified in the preliminary gram stain

Mycobacterium

will often look like a gram pos bacilli in the prelim gram stain

Yeast

always consider as true infection (high risk)

Species Identification: Eight Common Contaminants

Three are gram positive cocci in clusters

- 1) Coagulase-negative Staphylococcus species (except S. lugdunesis)
- 2) Micrococcus spp.
- 3) Aerococcus spp.

Five are **gram positive baccili**:

- 4) Bacillus spp. (except B. anthracis)
- 5) Corynebacterium spp. (except C. jeikeium)
- 6) Propionibacterium spp.
- 7) Rhodococcus spp.
- 8) Paenibacillus spp.

COAGULASE-NEGATIVE STAPHYLOCOCCUS:

• There are 29 species of coagulase-negative staphylococcus (eg: *S. epidermis, S. saprophyticus, S. hominis, S. lugdunensis*). They are a common contaminant that are challenging to assess. They are the most commonly grown bug and account for as many as 40% of positive blood cultures. Most of the time this represents skin contamination, but 5-15% of the time this represents REAL BACTEREMIA, especially in the right clinical context. Patients at risk include those with internal hardware (prosthetic valves, pacemakers, intravascular catheters, prosthetic joints or other foreign bodies) those at risk of endocarditis (eg iv drug users) and immunocompromised hosts. The exception to this is *S. lugdunensis*, which appears capable of causing more invasive infections, including NATIVE VALVE ENDOCARDITIS.