Blood Cultures

Traditional Indications

Possibility of sepsis:
Clinical signs: Fever (>38°C), rigors, tachycardia & hypotension
In established infections: to establish ID & sensitivity
Unexplained ↑WCC
Febrile children w/o focus
Confusion in elderly
Immunocompromised with new organ failure

More directed recommendations

Bacterial cause suspected
No other more direct specimen (CSF, urine, joint aspirate) available
In-patient treatment likely

Problems

Take >24hrs usually to report
Low yield ~10%
High contamination rate 5-10%
Majority don't affect Mx – ~0% in pneumonia
Potential errors – contamination (at collection, in lab), sufficient sample or number of cultures, culturing method, interpretation

How to take blood cultures

- Aseptic techniques, prep skin 2-3x with alcohol/iodine, allow to dry, wear gloves
- The commonest contaminants include coagulase neg staph (epidermidis), Corynebacterium spp., Propionibacterium spp.and Bacillus spp.
- Volume is critical. Need at least 10mL (child 3ml) adult blood – ideally double this.
- Anaerobic culture bottle very low true yield unless intra-abdominal or pelvic infection.
- Do not change needle before inoculating culture bottle – doesn't reduce contamination rate (~3%) and risk of needlestick. Vacutainer collection allows direct inoculation.
- Multiple cultures from multiple sites over several hours increases the yield.
- Best taken at time of fever spike (actually bacteraemia peaks before spike)

Blood culture processing

- Automatic systems are available e.g. positive growth releases CO2 which is then detected
- If growth detected the bottles are subcultured and a Gram stain performed.
- Further tests that may be performed directly on the blood culture to hasten identification include streptococcus grouping, coagulase testing, antigen tests for pneumococcus and Neisseria etc. Modern methods such as Vitek® have helped speed up identification of organisms and can be performed directly from culture broths.

Specific diseases

Pneumonia – not indicated as change Mx in <0.2% cases
UTI –Indicated in urinary obstruction, sev. renal disease but not cystitis, simple pyelonephritis.
Urine culture for uncomplicated adult F UTI only a little better – 5% change Mx.
Cellulitis – Rarely indicated