Ep 27 GPC Bacteremia – Dr Lionel Lum

Clinical significance of microbiological cultures growing GPC 1:19

- In chains – streptococcus (wide range of strep incuding strep bovis), enterococcus (E faecalis, E faecium) in gut/ urinary/ IE
- In clusters – MSSA or MRSA, CONS (staph lugdunensis*, staph epidermidis)

*can also be quite pathogenic and cause disseminated infection, behaving like MSSA/MRSA
**CONS that do not clear and if presence of prosthesis (line/PICC), cannot be treated like contaminant, need to treat as pathogenic

What to do on call? 4:36

- Depending on the clinical source of infection
    - If gut, enterococcus is one of the considerations, consider to add on vancomycin (augmentin is okay as it can also cover enterococcus, while ceftriaxone does not cover)
    - If skin source, consider penicillin based
- Number of culture positivity also affects our decision to treat – if persistent, then even if CONS may need to consider pathogenic especially in presence of prosthesis

Urine cultures 7:27

- Most common in obs and gynae – pregnant ladies
- Staph saprophyticus
- Enterococcus – can also cause prostatitis
- Staph aureus
    - If it is noted, do a blood culture corresponding, as it can signify a bacteremia
    - Could be real: renal abscess, prostatitis, not to be taken lightly!

Respiratory cultures 9:07

In general, need to pair with gram smear, if multiple organisms, tend to not treat it too seriously. But ultimately need to look at clinical features (increased O2 requirements, increased sputum production, CXR findings that suggest infection)

- Strep viridans etc are oral mucosa organisms – so may be just colonizer
- Strep pneumoniae in respiratory culture is significant, especially in those with hyposplenism
- Staph aureus can also cause necrotizing pneumonia, usually in context of post viral infections

Evaluation of staph aureus bacteremia 11:29

What are common sources of infection or seeding?

- Skin and soft tissues – eczema, acupuncture, trauma, cellulitis, pyomyositis (can be quite difficult to identify the site of seeding)
- Prosthesis – valves, pacemaker leads, dialysis lines, PICC, AVG, stents
- Joints/ spine/ bone/ psoas
- Visceral abscesses – kidneys, prostate, spleen, brain
- Endovascular – valves, mycotic aneurysm

Some may be clinically apparent, some hard to tell

What investigations? 14:25

- Blood cultures
- Guided by clinical symptoms (eg spine, joints, IE) and if there is persistent bacteremia
- Up to 15% have endocarditis -> TTE 5-7 days after bacteremia onset
- TTE -> TOE? (invasive, cost, logistics)
    - Persistent fever/ bacteremia (?paravalvular abscess)
    - High suspicion of IE (embolic, vascular events)
    - Community acquired with no clear source +/- preexisting valvular disease/ previous IE/ IVDU
    - Prosthesis
- Clearance cultures – recommend Q24-48H until clearance post starting tx

Persistent bacteremia (after 48-72h of appropriate treatment and adequate source control): 30 days mortality doubles

- Means high bacterial burden (have yet to address source control, endovascular infection burden)
- Complicated bacteremia will require longer duration of treatment

When is infectious diseases consult required? 20:48

- ID consult – reduces 90 day mortality, reduce relapse, lower readmission rates -> possible reasons could be more aggressive in source control, optimize dosing of antibiotics and choice

Treatment of choice for MSSA 21:51

- Cloxacillin, flucloxacillin (OPAT) *gold standard
    - Dosing: should be higher 2g Q4H if endovascular infection
    - Adverse effects – interstitial nephritis, phlebitis
    - No need to renal adjust for cloxacillin, but flucloxacillin requires renal adjustment
- Cefazolin – not inferior
    - Inoculum effect – traditionally thought that MIC for staph aureus increases with cefazolin but has been debunked
    - Well tolerated
    - No CNS penetration
    - Renal adjustment needed
    - Post HD, more practical dosing
- Others: gentamicin, rifampicin (synergy) – not routine
    - Rifampicin may be added on if having septic joint infections/ prosthetics
- Augmentin, piptazo are not ideal
    - In the event where there is concomitant infections including HAP, giving short course escalation to piptazo is acceptable but should go back to clox/ cefazolin as soon as possible
- Vancomycin is also inferior – risk of relapse, persistence

Treatment of choice for MRSA 26:03

- Vancomycin
    - To achieve initial therapeutic levels fast – load 25-30mg/kg then 15-20mg/kg 12H
    - Therapeutic monitoring – aim 15-20, but depends on AUC/MIC (AUC/MIC > 400)

Duration of treatment 27:23

- Uncomplicated 2/52 from last negative cultures
- Complicated (site dependent) at least 4/52
    - Persistent bacteremia
    - IE, metastatic complications
    - Prosthesis
    - Lack of source control

Decision for extension to 6/52 depends on degree of source control

Oral antibiotics 29:10

Discuss with ID specialist

- Right sided IE (cipro + rif vs IV)
- POET trial for endocarditis
    - IV 10 days, then dicloxacillin and fusidic acid or dicloxacillin or rifampicin
- SABATO trial (early oral switch)
    - Still recruiting: specific subgroup
    - Healthcare acquisition, no prosthesis, no IE or metastatic complications, cleared cultures after 72h, stable
- Specific subgroup that can do this, but please only do after discussion with ID

What is the clinical significance of streptococcus infection? 32:20

Streptococcus	Sites of infection
Group A strep (*S pyogenes*)	Skin and soft tissue, bone and joint, throat
Group B strep (*S agalactiae*)	Gastrointestinal, genitourinary, skin, bone and joint, CNS (ST283)
S dysgalactiae	Skin and soft tissue, bone and joint
S pneumoniae	Sinopulmonary, meningeal, bone and joint
S viridans	Gastrointestinal, IE
S gallolyticus subsp gallolyticus	Gastrointestinal, IE

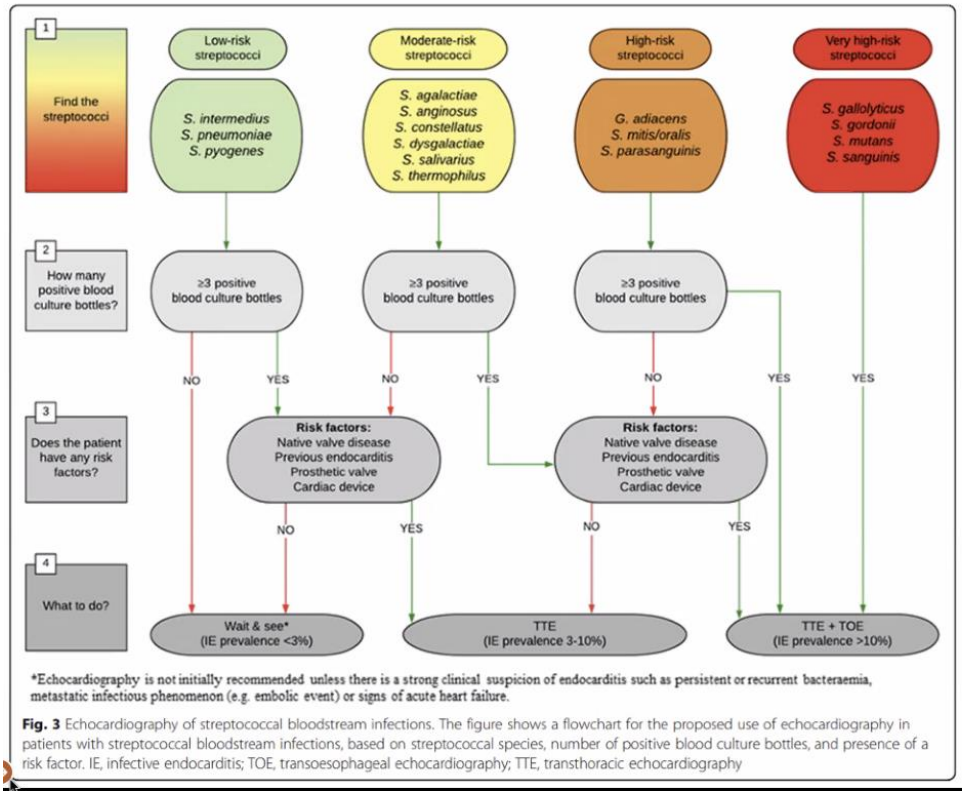

Fig. 3 Echocardiography of streptococcal bloodstream infections. The figure shows a flowchart for the proposed use of echocardiography in patients with streptococcal bloodstream infections, based on streptococcal species, number of positive blood culture bottles, and presence of a risk factor. IE, infective endocarditis; TOE, transoesophageal echocardiography; TTE, transthoracic echocardiography

Chamat-Hedemand et al. BMC Infectious Diseases (2021) 21:689

How to we approach antibiotic choice and duration in streptococcus bacteremia? 36:48

- Pencillin usually first line (if sensitive), ceftriaxone second line
- Clinically directed
    - Depending on source/ site of infection – affects duration
    - Whether sensitive, so will need to look at minimum inhibitory concentration

What if allergic to penicillin? 40:05

- Depending on extent of allergy – to probe about what kind of allergy, can challenge with cephalosporins (<1-2% cross reactivity) or even penicillin challenge under close watch
- If type 1 reaction/ anaphylaxis, then to hold challenge in penicillin class, can consider other classes such as vancomycin

Take home points 41:45

1. Staph aureus is never a contaminant – never treat it likely
2. Decide whether complicated vs not, has implication on treatment duration and management (in terms of source control)
3. Strep bacteremia depends on type of strep and the site of infection, which can affect the duration and choice, treatment is dependent on patient's trajectory and clinical response