



September 24, 2019

## Agenda

- Peter Bulger: *Enterococcal Infections*
- Case Discussions
- Open Discussion

# Enterococcal Infections

## OBJECTIVES:

- Review epidemiology and resistance patterns of Enterococci
- A brief word on prevention
- Review treatment of Enterococcal UTI and bacteremia
- Discuss the difficult problem of Enterococcal endocarditis: diagnosis and treatment



# Genus: *Enterococcus*

- Some of the oldest members of our gut flora
  - Found in GI tract of most humans, animals and insects
- Previously Group D Strep until 1984
- Two main pathogenic species
  - *E. faecalis*
  - *E. faecium*<sup>1</sup>

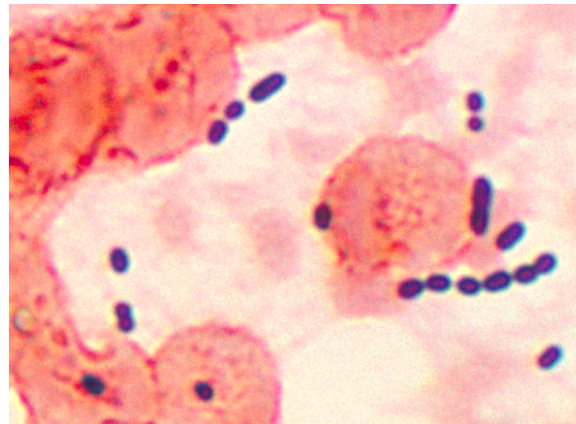


Image credit: Wikipedia



# Which is which?

## **E. faecalis**

- More prevalent (76%)
- More likely to cause endocarditis
- Usually ampicillin sensitive
- Vancomycin resistance less common

## **E. faecium**

- Less prevalent (24%)
- Less likely to cause endocarditis
- Usually ampicillin resistant
- Make up most (75%) of the VRE isolates<sup>1,7</sup>



# Why Talk About Enterococcus?

- Common pathogens with high mortality
- Major cause of nosocomial infections



# Why Talk About Enterococcus?

- **Highly resistant!**
  - High-level: cephalosporins, clindamycin, TMP-SMX, semi-synthetic penicillins
  - Aminoglycosides only used in combination
  - Decreased susceptibility to penicillin, ampicillin
  - Vanc-resistant Enterococci (VRE)<sup>1</sup>



# Sites of Infection

- UTI – most common
  - Rare cause of uncomplicated cystitis
- Bacteremia sometimes leading to endocarditis
- Others
  - Meningitis
  - Polymicrobial – wounds, peritonitis, intraabdominal abscess<sup>1,7</sup>



Image credit: retroscope.eu



# Prevention

- Transmission:
  - Lasts 60 minutes on hands
  - 4 months on surfaces!
- Stewardship is critical
  - Most infections occur when normal flora are wiped out by antibiotics and Enterococci can proliferate/spread<sup>1</sup>



Image credit: Walmart.com





# Enterococcal UTI

- Step 1: Remove the catheter!
- Cystitis:
  - Nitrofurantoin 100mg PO BID
  - Fosfomycin 3g PO x1
  - Amoxicillin 1g PO q12h
- Complicated UTI:
  - Ampicillin 1-2g q4-6h (even for *E. faecium*)
  - Vancomycin also acceptable if sensitive
  - If resistant to both of the above, use linezolid or daptomycin<sup>3,4</sup>



# Enterococcal Bacteremia

- 1<sup>st</sup> choice: Ampicillin 2g IV q4h
- 2<sup>nd</sup> choice: Vancomycin
- 3<sup>rd</sup> choice: Daptomycin 10-12 mg/kg/day\*
  - Alternative: Linezolid 600mg IV/PO BID
- Treat uncomplicated infections for 5-7 days?



Image source: theverge.com



# When to Expect Endocarditis

- Older
- Male patient
- Left-sided disease
- Presents with subacute heart failure
- More commonly *E. faecalis*<sup>7</sup>

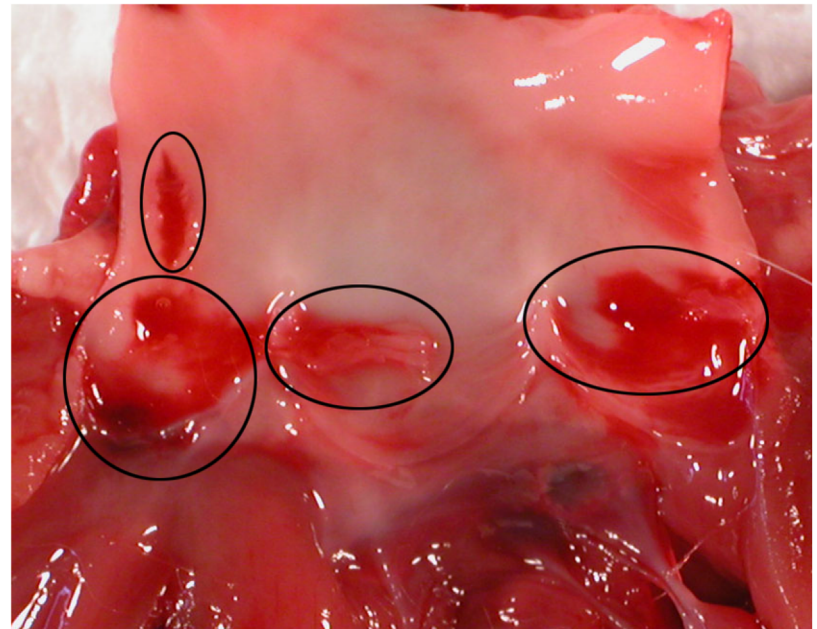


Image source: researchgate.net



# NOVA Score

Variable	Points	Odds Ratio (95% Confidence Interval)
Number of positive blood cultures (N)	5	9.9 (2.2–40.6)
Unknown origin of bacteremia (O)	4	7.7 (2.5–23.8)
Prior valve disease (V)	2	3.7 (1.6–8.7)
Auscultation of a heart murmur (A)	1	1.8 (.77–4.3)
Total	12	

Score <4 has 95% NPV = no TEE needed

Score 4 or greater = TEE recommended<sup>5</sup>



# Enterococcal Endocarditis



- Consider ID consult or transfer
- Important to use combination therapy for synergistic bactericidal effect
  - Test for Ampicillin, Penicillin, Gentamicin, Streptomycin and Vancomycin sensitivity
- First choice: Ampicillin 2g IV q4h + CTX 2g IV q12h
  - Alternative: Amp + Gentamicin 1mg/kg IV q8h
- Amp-resistant: Vanc + Gentamicin
- VRE: Daptomycin 10-12 mg/kg IV q24h + Amp<sup>8</sup>



# Association with Colon Cancer

- Retrospective cohort analysis of 154 patients with *E. faecalis* endocarditis
- 61 patients with unknown source had colonoscopies
- 31 had colorectal neoplasms<sup>6</sup>



Image source: nps.org.au



# Take Home Points

- Enterococci are some of our most resistant bacteria
- E. faecalis are often ampicillin sensitive
- E. faecium are usually amp resistant and are more likely to be vancomycin resistant as well
- Resistance is less of a concern for Enterococcal UTI
- For bacteremia use amp, vanc or high-dose dapto
- For endocarditis, combination therapy is critical and ID consultation can be very helpful



# References

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