



Treating bacteremia: Not just about blood culture clearance

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INTRODUCTION

Enterococcus species are commonly found in the gastrointestinal tract and can cause a variety of human infections. *Enterococcus faecalis* contains specific virulence factors, including adhesins, which allow for attachment to host tissues, including cardiac tissue, as well as biofilm formation. Knowledge of the pathogenesis of *Enterococcus faecalis* infections is crucial to ensure appropriate workup and management and avoid morbidity from the underdiagnosis and undertreatment of what is increasingly realized as one of the most common causes of infective endocarditis in cases of bacteremia.

CASE OVERVIEW

HPI:

A 68 year old man presented for evaluation after an unwitnessed fall while getting out of bed. He denies prodromal symptoms or loss of consciousness, states he lost his balance then called EMS after resting on the ground for several minutes. He reports fatigue, generalized weakness, and mild right foot discomfort, otherwise complete review of systems is negative.

PMH:

- Type 2 diabetes, insulin-dependent
- Hypertension
- Hyperlipidemia
- Osteoarthritis
- Obstructive sleep apnea

Vitals: Afebrile, BP 151/70, HR 106, RR 26, SpO2 90% on RA

Physical Exam:

General: fatigued-appearing, slightly disheveled older man
 HEENT: unremarkable except for dry mucous membranes
 CV: tachycardia, regular rhythm, no murmur
 Abd: soft, obese, nontender in all quadrants
 Ext: trace bilateral lower extremity edema, dried blood on dorsum of right toes without surrounding erythema or swelling
 Skin: warm, no rashes, no peripheral stigmata of endocarditis
 Neuro: alert and oriented, no focal strength or sensory deficits

CLINICAL COURSE

Hospital Day 1

- Labs: WBC 18, Cr 2.8, UA: WBC 82, RBC 17, leuk est +, nitrites -, bacteria +
- Urine and blood cultures (2/2) positive for *Enterococcus faecalis*
- Imaging: CT abd - 5 mm left proximal ureteral stone with mild hydronephrosis
- Started on vancomycin and ceftriaxone

Hospital Day 2

- Repeat blood cultures: *E faecalis* (2/2), *Staphylococcus epidermidis* (1/2)
- Continued vancomycin and ceftriaxone
- Left ureteral stent placed
- Infectious disease consulted. *Staphylococcus epidermidis* felt to be contaminant.

Hospital Days 3-4

- Antibiotics narrowed to Ampicillin
- Transthoracic ECHO:
 - LV and RV size and function are normal
 - No obvious valvular vegetations or unexplained regurgitant jets noted, however windows limited
- Blood culture clearance on day 4 of treatment

Is the workup done?

- What is the prevalence of endocarditis in *E faecalis* bacteremia?
- What is the pre-test probability of endocarditis for this patient?
- What is the sensitivity of TTE for diagnosis of endocarditis?

Outcome

- Transesophageal ECHO:
 - Mobile echodensity associated with the atrial aspect of the mitral scallop, trace mitral regurg; tiny filamentous echodensities of aortic cusp tips, Lambl's excrescence vs small vegetation
- Final treatment plan: Penicillin and Ceftriaxone, duration 6 weeks from blood culture clearance to treat *E faecalis* left-sided endocarditis

DISCUSSION

Prevalence of endocarditis in *E faecalis* bacteremia ranges from 6-26%^{1,2,3,4} This is higher than most other gram-positive organisms and should frame the baseline risk of endocarditis in a person with *E faecalis* bacteremia.⁴

Methods to estimate pre-test probability:

1. **Specific risk factors:** prosthetic heart valve, community acquisition, ≥ 3 positive blood cultures, unknown origin of infection, monomicrobial bacteremia, immunosuppression
 $1-2 = \text{intermediate-risk}$, $\geq 3 = \text{high-risk}$ (see figure)²
2. **NOVA score:**³
 ≥ 3 positive blood cultures (5 pts), unknown origin of infection (4 pts), valve disease (2 pts), murmur (1 pt)
 $\geq 4 \text{ points} = 100\% \text{ sensitive}, 29\% \text{ specific}$
3. **DENOVA score:**⁴
 Symptom duration >7 days, embolization, ≥ 2 positive cultures, origin of infection unknown, valve disease, murmur
 $\geq 3 \text{ items} = 100\% \text{ sensitive}, 83\% \text{ specific}$

- If pre-test probability is moderate to high, a negative or indeterminate TTE is insufficient to rule out endocarditis.
- A multidisciplinary team is essential for optimal management of cases with high suspicion for or confirmed endocarditis.

E faecalis endocarditis rate in *E faecalis* bacteremia¹

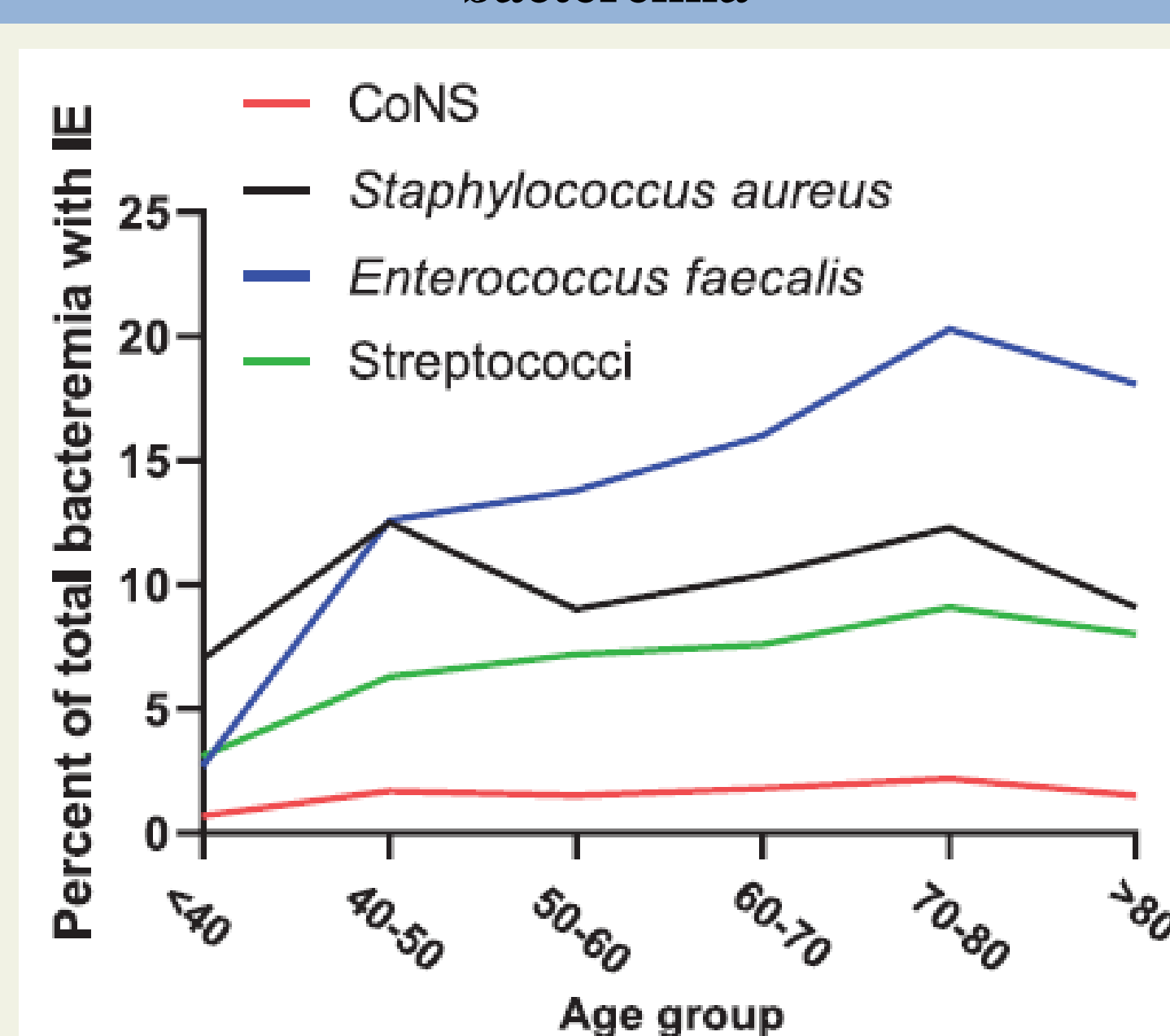
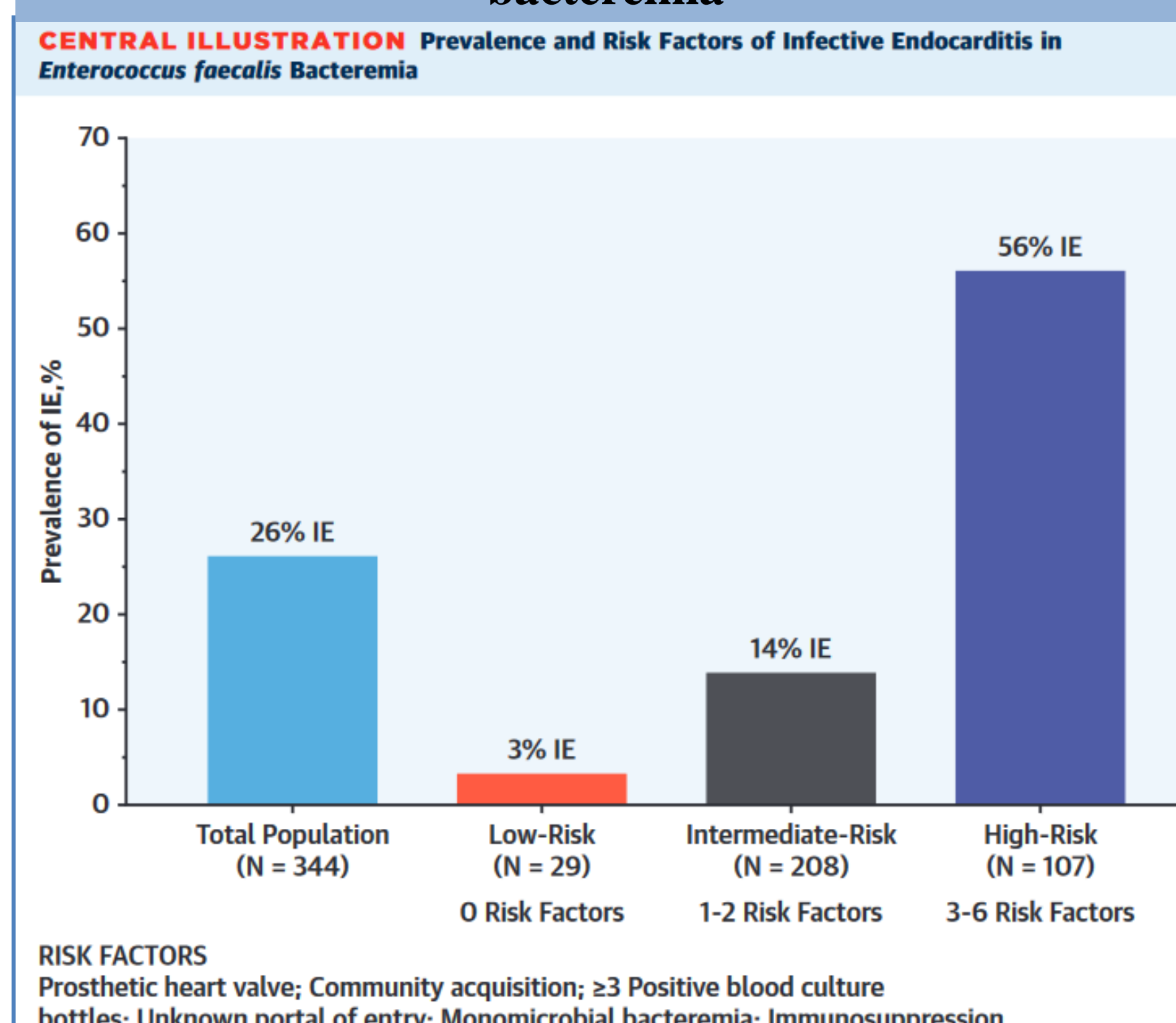


Figure 2 Percentage of total blood stream infections with infective endocarditis is shown. CoNS, coagulase negative staphylococci; IE, infective endocarditis.

Risk factors to predict endocarditis in *E faecalis* bacteremia²



RISK FACTORS Prosthetic heart valve; Community acquisition; ≥ 3 Positive blood culture bottles; Unknown portal of entry; Monomicrobial bacteremia; Immunosuppression.

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