Prevalence of infective endocarditis in streptococcal bloodstream infections is dependent on streptococcal species

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Background: Streptococci frequently cause infective endocarditis (IE), yet the prevalence of IE in patients with bloodstream infections (BSIs) caused by different streptococcal species is unknown.

Purpose: To investigate the prevalence of IE in BSIs with different streptococcal species.

Methods: We included all patients with streptococcal BSIs, from 2008 to 2017, in a population-based setup. Based on microbiological identification of phylogenetic relationship, streptococcal species were classified into eight main groups: Anginosus, Bovis, Mitis, Mutans, Salivarius, Pyogenic, S. pneumoniae, and "other streptococci". Using nationwide registries, we determined the prevalence of IE at streptococcal group level and at species level. In a multivariable logistic regression analysis, we investigated the risk of IE according to streptococcal species with S. pneumoniae as reference and adjusted for age, sex, ≥3 positive blood culture (BC) bottles, native valve disease, prosthetic valve, previous IE, and cardiac device.

Results: In 6,506 cases with streptococcal BSIs (mean age 68.1 years (SD 16.2), 52.8% men), the IE prevalence was 7.1% (95% CI: 6.5–7.8%). For the most common streptococcal species (>5% of BSIs), the IE prevalence was: S. pneumoniae 1.2% (95% CI: 0.8–1.6%), S. dysgalactiae 6.4% (95% CI: 4.9–8.2%), S. pyogenes 1.9% (95% CI: 0.9–3.3%), S. agalactiae 9.1% (95% CI: 6.6–12.1%), S. anginosus 4.8% (95% CI: 3.0–7.3%), and S. mitis/oralis 19.4% (95% CI: 15.6–23.5%) (Figure 1). For moderately common streptococcal species (1–5% of BSIs), the IE prevalence was: S. gallolyticus 30.2% (95% CI: 24.3–36.7%), S. salivarius 5.8% (95% CI: 2.9–10.1%), S. sanguinis 34.6% (95% CI: 26.6–43.3%), S. parasanguinis 10.3% (95% CI: 5.2–17.7), and S. gordonii 44.2% (95% CI: 34.0–54.8%). For uncommon streptococcal species (0.1–1% of BSIs), the highest IE prevalence was in S. mutans with 47.9% (95% CI: 33.3–62.8%). In a multivariable adjusted analysis using S. pneumoniae as a reference, we identified that all species except S. pyogenes were associated with a significantly higher IE risk (Figure 1). The highest associated IE risk was found in S. mutans (OR 81.3, 95% CI: 37.6–176), S. gordonii (OR 80.8, 95% CI: 43.9–149), S. sanguinis (OR 59.1, 95% CI: 32.6–107), S. gallolyticus (OR 31.0, 95% CI: 18.8–51.1), and S. mitis/oralis (OR 31.6, 95% CI: 19.8–50.5) (Figure 1).

Conclusion: The prevalence of IE in streptococcal BSIs is highly species dependent with the lowest IE prevalence observed in S. pneumoniae and S. pyogenes BSIs, whereas S. mutans, S. gordonii, S. sanguinis, S. gallolyticus and S. mitis/oralis had the highest IE prevalence and the highest associated IE risk after adjusting for IE risk factors.

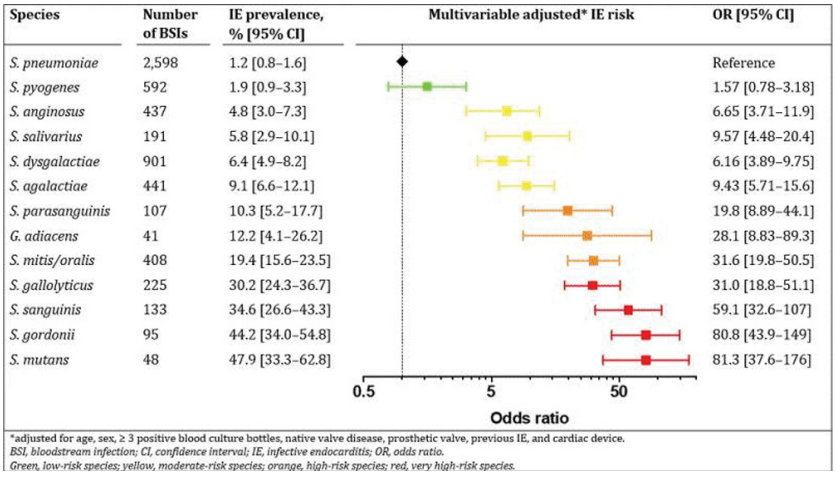

Figure 1. Risk of IE in streptococcal BSIs