

Streptococcus gallolyticus Bacteremia: Experience from a Tertiary Center in South India

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ABSTRACT

Introduction: *Streptococcus gallolyticus* is an important cause of bacteremia and infective endocarditis in adults. Studies from other parts of the world has shown a strong association between *S. gallolyticus* bacteremia and colonic neoplasia. The profile of *S. gallolyticus* bacteremia is understudied in Indian population.

Materials and methods: We retrospectively analyzed the data of 16 patients with *S. gallolyticus* bacteremia obtained from microbiology registry. BacT/ALERT positive samples were inoculated into blood agar, chocolate agar, and MacConkey agar. Organisms were identified by the VITEK 2 microbial identification system, and susceptibility was done by the microbroth dilution method as per Clinical and Laboratory Standards Institute (CLSI) M100 guidelines. Clinical details were obtained from electronic medical records.

Results: Majority of our isolates were *S. gallolyticus* subspecies *pasteurianus*. Total 16 patients had *S. gallolyticus* isolated from blood over a 1 year period. The median age was 58 years (IQR: 46.5–66). Eleven were males; type II diabetes mellitus and chronic liver disease were the common comorbidities observed in our patients. None of our patients had underlying infective endocarditis or colonic malignancy. Penicillin sensitivity was 81.2% while all the isolates were susceptible to ceftriaxone. Ampicillin resistance was seen in only one of the isolates. In-hospital mortality was 12.5%.

Conclusion: *Streptococcus gallolyticus* subsp. *pasteurianus* is the commonest subspecies of *S. gallolyticus* isolated in our population. Unlike previous studies, colonic neoplasia and infective endocarditis were rare in our patients. Type II diabetes mellitus and chronic liver disease were the commonest risk factors identified in patients with *S. gallolyticus* bacteremia.

Keywords: Bacteremia, Endocarditis, *Streptococcus bovis*, *Streptococcus gallolyticus*.

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INTRODUCTION

Streptococcus gallolyticus is an important cause of bacteremia and infective endocarditis in adults. Previous studies have reported a strong association of *S. gallolyticus* bacteremia with colonic neoplasia and chronic liver disease.^{1,2} There is a dearth of data regarding the clinical profile of *S. gallolyticus* bacteremia in Indian population. We therefore retrospectively analyzed the data of patients with *S. gallolyticus* bacteremia admitted to Kerala Institute of Medical sciences, Thiruvananthapuram, which is a tertiary care hospital in the state of Kerala, South India, over a period of 1 year.

MATERIALS AND METHODS

Our objective was to study the clinical and microbiological profiles of patients presenting with *S. gallolyticus* bacteremia. Patients with *S. gallolyticus* bacteremia over a period of 1 year (March 2019–April 2020) were identified from microbiology registry retrospectively. Two sets of blood cultures (two each in aerobic and anaerobic blood culture bottles) drawn from two different venipuncture sites were sent for all the patients according to the institutional protocol. For bacterial identification, BacT/ALERT positive samples were inoculated into blood agar, chocolate agar, and MacConkey agar. Organisms were identified by the VITEK 2 microbial identification system, and susceptibility was done by the microbroth dilution method as per Clinical and Laboratory Standards Institute (CLSI) M100 guidelines. Clinical and laboratory characteristics of the patients were retrieved from the electronic medical record.

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RESULTS

Total 16 patients had *S. gallolyticus* isolated from blood over a 1 year period. The median age was 58 years (IQR: 46.5–66). Eleven were males. Ten patients (62.5%) had underlying type II diabetes mellitus. Eight of them (50%) had underlying chronic liver disease. One each had underlying chronic liver disease, congestive cardiac failure, and chronic obstructive pulmonary disease.

Fever was a presenting manifestation in nine patients. Four patients had abdominal pain. One patient each had axillary abscess, cellulitis, meningitis, and spontaneous bacterial peritonitis. However, *S. gallolyticus* was not isolated from any tissue other than

blood in these patients. None of the patients had vegetations suggestive of infective endocarditis in echocardiogram. However, all the patients underwent only transthoracic echocardiogram and not transesophageal echocardiogram. For evaluation of an underlying colonic disease, both contrast CT abdomen and colonoscopy were done in two patients, while colonoscopy alone was done in seven patients and CT abdomen alone in rest of the seven patients. Colonoscopy identified colitis in one patient and a colonic polyp in another patient. Colonoscopy and CT abdomen in other patients did not show any evidence of colonic pathology.

Fifteen of the isolates were belonging to the *pasteurianus* subspecies (*S. bovis* biotype II.2), while one isolate was identified as *S. gallolyticus* subsp. *gallolyticus* (*S. bovis* biotype I). Thirteen of the total sixteen isolates were sensitive to penicillin, while two showed intermediate sensitivity and one isolate was resistant to penicillin (Fig. 1). Ampicillin resistance was seen in only one of the isolates, while all the isolates were uniformly sensitive to ceftriaxone. Nine isolates were resistant to erythromycin, two isolates were intermediate sensitive, and five were sensitive. Clindamycin resistance was seen in four isolates, three were intermediate sensitive, and rest nine isolates were sensitive to clindamycin.

Nine of our patients received ceftriaxone as the initial antibiotic, while four received a beta-lactam/beta-lactamase inhibitor combination, and three patients received a carbapenem. In one patient each who were receiving beta-lactam/beta-lactamase combination and meropenem, de-escalation to ceftriaxone was done after culture reports. Total 2 of the 16 patients expired in-hospital (mortality: 12.5%).

DISCUSSION

Streptococcus gallolyticus bacteremia and endocarditis typically occur in older individuals compared to other bacteria causing these clinical syndrome.^{3,4} Similar to previous studies, most of our patients were from an older age group (median age: 58 years). Similar to our study, a male preponderance has been noted in various previous studies.^{3,5}

Streptococcus gallolyticus infection has a strong association with colonic malignancy. The association between bacteremia and colonic malignancy is more for *S. bovis* biotype I (*S. gallolyticus* subsp. *gallolyticus*) when compared to *S. bovis* biotype II.¹ None of our patients had underlying colonic malignancy diagnosed. This

may be due to the fact that most of our patients had bacteremia due to *S. bovis* biotype II.2 (*S. gallolyticus* subsp. *pasteurianus*). It should also be noted that many of the patients described did not undergo a colonoscopy, possibly leading to an underestimation of underlying colonic malignancy. One patient each had colitis and colonic polyp. The association of *S. gallolyticus* bacteremia with these colonic lesions is also well described in the literature.⁶

Total 62.5% of our patients had underlying type II diabetes mellitus. Diabetes mellitus has been identified as a risk factor for *S. gallolyticus* bacteremia.⁷ Total 50% of our patients had underlying chronic liver disease. This association has also been well established in previous studies. Chronic liver disease is more associated with *S. bovis* biotype I when compared to *S. bovis* biotype II.

The association between *S. bovis* bacteremia and infective endocarditis is also more for *S. bovis* biotype I when compared to *S. bovis* biotype II.^{1,3} None of our patients had infective endocarditis as assessed by transthoracic echocardiogram. This may be because a majority of our patients had bacteremia due to *S. gallolyticus* subsp. *pasteurianus* (*S. bovis* biotype II.2). The low sensitivity of transthoracic echocardiogram in identifying vegetations may also have contributed to this finding.

Streptococcus gallolyticus is typically sensitive to penicillin and cephalosporins.⁸ However, variable rates of resistance have been described against macrolides, clindamycin, fluoroquinolones, and co-trimoxazole. Our study also showed a high degree of resistance against erythromycin and clindamycin.

Our study provides insights on the clinical and microbiological profile of *S. gallolyticus* bacteremia in Indian patients. However, our retrospective study is limited by the small size and may not be generalizable to the entire population. Studies with larger sample size and better design are required to understand the profile of this clinical entity better.

CONCLUSION

Streptococcus gallolyticus subsp. *pasteurianus* is the commonest subspecies of *S. gallolyticus* isolated in our population. Unlike previous studies, colonic neoplasia and infective endocarditis were rare in our patients. Type II diabetes mellitus and chronic liver disease were the commonest risk factors identified in patients with *S. gallolyticus* bacteremia.

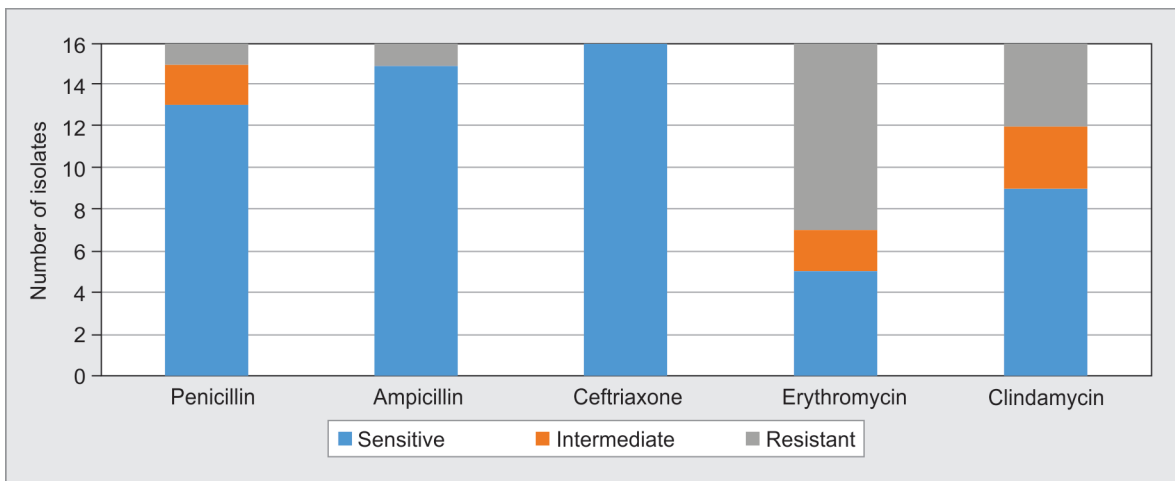


Fig. 1: Antibiotic susceptibility of the *S. gallolyticus* isolates

HIGHLIGHTS

Streptococcus gallolyticus should be considered as a differential diagnosis in chronic liver disease patients presenting with features of bacteremia/sepsis. These patients can be critically ill and prompt initiation of appropriate antibiotics is important in improving outcomes.

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