Introduction

Streptococci as a group remain an important cause of infective endocarditis (IE). With improvements in diagnostic technology, causative pathogens are now more easily identified to the species level. The purpose of this study was to determine the relative frequencies of different streptococci that cause IE.

Methods

- Adult patients with streptococcal IE (definite IE by Duke Criteria) admitted to the hospital from July 1, 2007 to December 31, 2014, were identified from the Cleveland Clinic Infective Endocarditis Registry. The first episode of streptococcal IE per patient was included.
- Results of blood culture, valve culture, and valve sequencing (University of Washington) were examined to determine the streptococcal species.
- The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology. Streptococci were identified to the species level. The purpose of this study was to describe the distribution of streptococcal species causing IE.

Results

There were a total of 294 episodes of streptococcal IE during the study period, of which 208 (68%) were native valve IE. The mean (± SD) patient age was 58 ± 14 years; 73% (216) were men. The overall distribution of streptococci was as follows: mitis group 99 (61%), bovis group 21 (13%), anginosus group 15 (9%), salivarius group 2 (1%). Of the 50 pyogenic streptococci, 39 (78%) were S. agalactiae and 8 (16%) were S. dysgalactiae. Of the 17 nutritionally variant streptococci, 9 (53%) were Granulicatella spp., the remaining 8 (47%) were Abiotrophia spp.

Conclusions

Viridans group streptococci accounted for 224 episodes of IE (76% of all streptococcal IE). Sixty-three (21%) of the viridans group streptococci were not identified further. The frequency distribution of the remaining 161 viridans group streptococci causing IE (Figure 2).

Viridans group streptococci

- Mitis group streptococci are by far the far the most common viridans group streptococci causing IE. Mitis group streptococci accounted for 224 episodes of IE (76% of all streptococcal IE). Sixty-three (21%) of the viridans group streptococci were not identified further. The frequency distribution of the remaining 161 viridans group streptococci causing IE (Figure 2).

Pyogenic streptococci

- Pyogenic streptococci were the causative pathogens in 52 episodes of IE (17% of streptococcal IE)
- Pyogenic streptococci were the causative pathogens in 52 episodes of IE (17% of streptococcal IE)
- Pyogenic streptococci were the causative pathogens in 52 episodes of IE (17% of streptococcal IE)

Clinical feature1

<table>
<thead>
<tr>
<th>Clinical feature</th>
<th>Viridans</th>
<th>Pyogenic</th>
<th>Other</th>
<th>p-value2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age on admission</td>
<td>57 (19)</td>
<td>62 (12)</td>
<td>58 (11)</td>
<td>0.15</td>
</tr>
<tr>
<td>Male sex</td>
<td>170 (76)</td>
<td>29 (12)</td>
<td>17 (8)</td>
<td>0.02</td>
</tr>
<tr>
<td>Valves affected</td>
<td>0.64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AV</td>
<td>99 (44)</td>
<td>23 (46)</td>
<td>6 (12)</td>
<td></td>
</tr>
<tr>
<td>MV</td>
<td>75 (34)</td>
<td>19 (38)</td>
<td>8 (16)</td>
<td></td>
</tr>
<tr>
<td>AV + MV</td>
<td>45 (20)</td>
<td>8 (16)</td>
<td>6 (12)</td>
<td></td>
</tr>
<tr>
<td>Right sided</td>
<td>5 (2)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Invasive disease</td>
<td>71 (32)</td>
<td>24 (48)</td>
<td>9 (19)</td>
<td>0.06</td>
</tr>
<tr>
<td>Surgically treated</td>
<td>188 (84)</td>
<td>37 (74)</td>
<td>19 (39)</td>
<td>0.08</td>
</tr>
</tbody>
</table>

1Expressed as mean (standard deviation) for continuous variables, and count (percentage for categorical variables.
2ANOVA for continuous variables and chi square test for categorical variables.

Abbreviations: PVE, prosthetic valve endocarditis; AV, aortic valve; MV, mitral valve.

Conclusions

Viridans group streptococci are the cause in 76% of cases of streptococcal IE. Mitis group streptococci are by far the most common viridans group streptococci causing IE. Pyogenic streptococci accounted for almost 20% of IE caused by pyogenic streptococci.

Table 1. Associations of selected clinical features with streptococcal group

So Lim Kim, BA1, Steven M. Gordon, MD2, Nabin K. Shrestha, MD, MPH2

1Case Western Reserve University School of Medicine, and 2Department of Infectious Diseases
Cleveland Clinic, Cleveland, OH, USA

Nabin K. Shrestha, MD
9500 Euclid Avenue / G-21, Cleveland, OH 44195
Tel: 216-444-1687
Fax: 216-444-8446
Email: shrestn@ccf.org

Presentation no. 1112

Distribution of Streptococcal Species Causing Infective Endocarditis

Abstract

Background: Streptococci as a group remain an important cause of infective endocarditis (IE). With improvements in diagnostic technology, causative pathogens are now more easily identified to the species level. The purpose of this study was to describe the distribution of streptococcal species causing IE.

Methods: Adult patients with definite IE (Duke Criteria) admitted to the hospital from July 1, 2007 to December 31, 2014, were identified from the Cleveland Clinic Infective Endocarditis Registry. The first episode of streptococcal IE per patient was included.

Results: A total of 294 patients had ≥ 1 episodes of streptococcal IE during the study period of which 68% (200) were native valve IE. The mean (± SD) patient age was 58 ± 14 years; 216 (73%) were in men. The numbers of valves affected were as follows: aortic 122 (41%), mitral 99 (34%), and all others 16 (6%). One hundred four episodes of IE (35%) had invasive disease. Two hundred forty-four (83%) were treated surgically.

Results of blood culture, valve culture, and valve sequencing (University of Washington) were examined to determine the streptococcal species.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology. Streptococci were identified to the species level. The purpose of this study was to describe the distribution of streptococcal species causing IE.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

The streptococci were grouped according to the Bergey’s Manual of Systematic Bacteriology.

Figure 1. Frequency distribution of streptococcal groups causing IE

Figure 2. Frequency distribution of viridans group streptococci causing IE

Figure 3. Frequency distribution of pyogenic streptococci causing IE