Correspondence

Oral Cavity Staphylococci Are a Potential Source of Prosthetic Joint Infection

To the Editor—Recently in Clinical Infectious Diseases, Berbari et al [1] provided the results of a study devised to assess the risk of prosthetic joint infection resulting from temporally related dental procedures and the role of antibiotic prophylaxis. They reported that 339 patients developed a prosthetic hip or knee infection. Upon culture, staphylococci were the most commonly encountered infecting organisms (Staphylococcus aureus in 95 cases [28%] and coagulase-negative staphylococci in 101 cases [30%]), and only 35 cases (10.3%) were caused by flora of potential oral or dental origin. The study’s design limited the definition of potential oral/dental flora to β-hemolytic streptococci, Peptostreptococcus species, Actinomyces species, viridans group streptococci, Abiotrophia and Granulicatella species, and Gemella species.

This construct may be flawed because it underestimates the significance of staphylococcal bacteria in the oral cavity. Their origin (eg, skin, nasal tract, gastrointestinal tract) may be in question, but it is known that some staphylococci are transiently resident in the oral cavity and that adherence mechanisms permit a portion of them to be retained in the periodontal pocket. Furthermore, because of microulceration of the sulcular and pocket lining epithelium and proximity to the bloodstream, bacteremias are quite possible, as is the resultant infection of a prosthetic joint. Specifically, older (aged ≥70 years), healthy (eg, no history of diabetes), non-denture-wearing individuals have been shown to have a higher isolation frequency (P < .05) and proportion (P = .056) of staphylococci from their unstimulated whole saliva than younger persons [2].

Elderly institutionalized individuals also exhibit significantly greater concentrations of staphylococci in their saliva than age-matched home-dwelling persons [3]. The wearing of partial dentures increases the proportion of staphylococci in the saliva of older individuals [4]. Individuals (mean age, 59 years) with rheumatoid arthritis and concomitant xerostomia who require long-term immunosuppressive steroid therapy exhibit a high prevalence of S. aureus (often resistant to penicillin) on the tongue and in the oropharynx [5]. Thus, elderly persons and those with rheumatoid arthritis—the 2 groups of individuals who very frequently require joint replacement—often harbor staphylococci in their oral cavity.

For individuals with signs of chronic or acute dental infections, the presence of staphylococci species is even more significant. Among young healthy individuals (age, 32–59 years; mean age, 45 years) with periodontitis and evidence of both S. aureus and Staphylococcus epidermidis in their subgingival sulci, the penicillin-resistant S. epidermidis is the predominant organism [6]. Individuals with failing dental implants (≥3 exposed threads, bleeding on probing, and/or suppuration and radiographic evidence of bone loss) on occasion (17%) demonstrate S. epidermidis in subgingival/peri-implant sulci [7]. Studies using molecular technology indicate that the virulence factors (FGBP genes) associated with S. aureus and S. epidermidis are present in some aseptically opened pulp chambers of nonvital teeth that have neither coronal leakage around restoration margins nor sinus tracts [8]. Consistent with these findings is a letter to the British Medical Journal from a group of endodontists and an oral microbiologist who report cases in which staphylococci were the sole and major isolate from aseptically opened root canals [9]. Some patients with intraoral acute dentoalveolar infections have evidence of S. aureus upon culture [10]. Similarly, individuals with odontogenic infections resulting in swelling of the face or neck and requiring extraoral drainage after rigorous preoperative antimicrobial skin preparation to avoid contamination of bacterial cultures many times demonstrate a polymicrobial milieu with significant presence of both S. aureus and coagulase-negative staphylococci [11].

The above-noted citations lead me to conclude that the research design developed by Berbari et al [1] to define potential oral/dental flora was too restrictive and that prosthetic joint infections developing within 30 days of dental treatment and culturing of Staphylococcus species could also have possibly been ascribed to that intervention.

Acknowledgments

Potential conflicts of interest. A.H.F.: no conflicts.

Arthur H. Friedlander
UCLA Dental School, Director of Quality Assurance, Hospital Dental Service, UCLA Medical Center, and VA Greater Los Angeles Healthcare System, Los Angeles, California

References

Elie Berbari, Larry M. Baddour, Alan Carr, and Douglas Osmon
Mayo Clinic, Rochester, Minnesota

References

Reprints or correspondence: Dr Elie Berbari, Associate Professor of Medicine, Section of Orthopedic Infectious Diseases, Mayo Clinic College of Medicine, 200 First St SW, Rochester, MN (berbari.elie@mayo.edu).

Clinical Infectious Diseases 2010;50(12):1683
© 2010 by the Infectious Diseases Society of America. All rights reserved. 1058-4838/2010/5012-0023$15.00 DOI: 10.1086/653004

Long-Term Outcomes in Patients with Early Lyme Disease: More False Hope?

To the Editor—In their recent article, Kowalski et al [1] conclude that when patients are treated for early Lyme disease with short-course antibiotic therapy, treatment failure is “exceedingly rare.” Unfortunately, the design of their study ignores prominent signs of inadequate treatment of infection with Borrelia burgdorferi, the spirochetal agent of Lyme disease.

The study included 2 parts: a medical record review of 607 patients with definite or probable early Lyme disease and a survey questionnaire about persistent symptoms in these patients. Treatment failure was defined as a persistent erythema migrans rash or hard signs of progressive B. burgdorferi infection, such as arthritis, meningitis, facial palsy, or radiculopathy, despite administration of antibiotic therapy. The authors state that at 2 years after diagnosis the “treatment failure–free” rate was 98.9%–99.2%. This conclusion is misleading for at least 2 reasons. First, only 299 of the 607 patients responded to the follow-up survey questionnaire. Thus, by intent-to-treat analysis the treatment failure–free rate was no more than 49% at 4.5 years of follow-up, even with the restrictive definition of disease used.

Second, the definition of treatment failure is too stringent and fails to consider more common symptoms of Lyme disease, such as musculoskeletal pain, fatigue, insomnia, and neurocognitive dysfunction [2–6]. This problem is underscored by the results of the survey questionnaire, which found that at 4.5 years after diagnosis 41%–53% of patients had frequent musculoskeletal pain, 36%–38% had neuropathic symptoms, 26%–32% had excessive fatigue, 37%–38% had insomnia, and 13%–28% had neurocognitive dysfunction (Table 1). Thus, a significant number

Table 1. Clinical Complaints in Patients with Early Lyme Disease 4.5 Years after Diagnosis

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Definite Lyme disease (n = 209)</th>
<th>Probable Lyme disease (n = 90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent joint pain</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td>Frequent muscle aches</td>
<td>41</td>
<td>46</td>
</tr>
<tr>
<td>Numbness/tingling/burning</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>Difficulty with coordination</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Seizures</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Excessive fatigue</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>Depression</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Difficulty concentrating</td>
<td>19</td>
<td>28</td>
</tr>
<tr>
<td>Mood swings</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>Insomnia</td>
<td>37</td>
<td>38</td>
</tr>
</tbody>
</table>

NOTE. Data are the percentage of patients with the indicated symptom and are based on Table 4 in Kowalski et al [1].

Reply to Friedlander

On behalf of the Mayo prosthetic joint infection study group, we thank Dr Friedlander for highlighting the need to appreciate which organisms constitute “dental flora” [1]. We acknowledge that staphylococci can colonize the oral cavity. It is one of the primary reasons that prompted our team to analyze dental risk factors in the cohort of patients with prosthetic joint infection, which were due to staphylococcal species in 58% of the episodes [2]. We also performed a subset analysis of 35 episodes of prosthetic joint infection that were due to organisms traditionally recognized as part of the oral flora. In both analyses, the risk of prosthetic joint infection following dental procedures was not increased.

Acknowledgments
Potential conflicts of interest. All authors: no conflicts.