Study on Prevalence of *Staphylococcus* Species in the Oral Mucosal and Periodontal Lesions with Screening for Methicillin Resistance.

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**ABSTRACT**

The aim of the study is to detect the prevalence of *Staphylococcus* species (spp.) in the oral cavity and to screen for methicillin resistance in *Staphylococcus* spp. isolated from the oral cavity. The present study was done in a tertiary care hospital from South India. A total of 80 oral swabs, 40 swabs were from oral mucosal lesions and the other 40 swabs were collected from healthy subjects. The samples were plated on appropriate media using standard bacteriological techniques and antimicrobial susceptibility tests were performed. Overall, from subjects with oral cavity lesions *Staphylococcus* spp. were isolated from 50%, out of which 40% were *S. aureus* and 60% were coagulase negative *Staphylococcus* (CoNS). 12.5% of *S. aureus* from oral cavity lesions was methicillin resistant (MRSA). It was found that Staphylococci were isolated from oral cavity of 40% of healthy subjects, of which 25% were *S. aureus* and 75% were CoNS. However, none were methicillin resistant. This study demonstrates that MRSA was isolated from lesions of the oral cavity. Hence, for appropriate therapeutic regimen, an applicable knowledge on the antibiotic susceptibility pattern is vital.

**Keywords:** *S. aureus*, CoNS, MRSA

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INTRODUCTION

Staphylococcus spp. are considered as transient colonizers of the mouth, the emergence of antibiotic resistance is a serious growing problem implicated in infections of the oral cavity [1]. There is a possibility that higher carrier rates may lead to bacteremia in compromised patients [2]. This study is undertaken to determine whether the oral cavity was a common reservoir of Staphylococcus spp. in individuals, both in health and disease which predisposes to invasive staphylococcal infection [2].

MATERIALS AND METHODS

A total of 80 samples (oral swabs) were collected from dental OPD and wards of a tertiary care hospital, during November 2013- April 2014. Of the 80 samples, 40 swabs included were from oral mucosal lesions; dento-alveolar abscess; gingival abscess and dental caries. The other 40 swabs were collected from healthy subjects. The samples were plated on appropriate media using standard bacteriological techniques and antimicrobial susceptibility tests were performed. Screening for methicillin resistance was performed using oxacillin disc (6 µg) for S. aureus and cefoxitin disc (30µg) for CoNS.

RESULTS

Overall, 20 (50%) Staphylococcus spp. were isolated from subjects with oral cavity lesions, of them 8 (40%) were S. aureus and 12 (60%) were coagulase negative Staphylococcus (CoNS). A total of 16 (40%) Staphylococci spp. were isolated from oral cavity of healthy subjects, of which 4 (25%) were S. aureus and 12 (75%) were CoNS (Figure 1). Of the 8 (40%) isolates of S. aureus from oral cavity lesions, 1 (12.5%) was methicillin resistant (MRSA). However, of the 4 (25%) S. aureus isolates from healthy individuals, none were methicillin resistant. The CoNS isolated from subjects with oral cavity lesions as well as from oral cavity of healthy subjects were found to be methicillin sensitive (Table 1).

Figure 1: Prevalence of Staphylococcus species from oral cavity (from lesions and healthy subjects)

Figure 2: Growth of Staphylococcus species on Mannitol Salt Agar
Table 1: Methicillin susceptibility of Staphylococcus species from oral cavity (from lesions and healthy subjects)

<table>
<thead>
<tr>
<th>Methicillin susceptibility</th>
<th>Isolates</th>
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<tr>
<td></td>
<td>Oral cavity Lesions</td>
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<tr>
<td></td>
<td>S. aureus</td>
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<tr>
<td>Methicillin resistant</td>
<td>1 (12.5%)</td>
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<tr>
<td>Methicillin susceptible</td>
<td>7(87.5%)</td>
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DISCUSSION

This study highlights the association of Staphylococcus spp. in the oral cavity. As Staphylococcus spp. are transient colonizers of the oral cavity, the pathogenic role of S. aureus is difficult to establish. Of interest in this study was the isolation of S. aureus from cases of dental abscess as most of the oral cavity lesions are associated with anaerobes [1]. S. aureus is uncommonly associated with acute dental abscess [3, 4]. It also causes oral mucosal lesions [5, 6], jaw cysts [7] denture induced stomatitis infrequently [8, 9]. It is more commonly isolated from angular cheilitis particularly in association with Streptococcus pyogenes and Candida albicans [10].

S. aureus produces a variety of exotoxins which could contribute to the pathogenicity. It was found that exfoliative toxin was produced by 19% and enterotoxin was produced by 40% of S. aureus isolated from oral cavity [11]. Various risk factors have been implicated in Staphylococcal oral cavity lesions. Reduced salivary flow rate, decreased secretory IgA and lysozyme, heavy colonization by toxin producing S. aureus may lead to breakdown of mucosal barrier thereby causing oral lesions [12].


MRSA in the oral cavity acts as a reservoir for re-infection in other body sites and horizontal transmission to contacts [16]. A study showed that colonization rate in oral cavity was 19% in hospitalized elderly age group and 20% in the nares [17]. Hence it is time for taking vigilant measures to eradicate MRSA carriage from the patients and healthy contacts who harbor this organism [18]. Also, there is increase in incidence of methicillin resistance among CoNS. It is mediated by mecA gene. Therefore, cefoxitin disc is used for screening Oxacillin resistance in CoNS [19]. It is found that eradication of MRSA from the oral cavity is difficult. However, with appropriate control measures such as mupirocin combined with chlorhexidine has been found to be effective [20]. Thus further studies are essential to establish Staphylococcus spp. as a transient colonizer or potential source of infection.

CONCLUSION

This study demonstrates that Staphylococcus spp can be frequently isolated than previously recognized, from the oral cavity of individuals both in health and disease. MRSA was isolated from lesions of the oral cavity. Hence, judicious use of antibiotics and regular oral surveillance cultures should be considered in such patients.

REFERENCES