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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 ceftaxime 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)

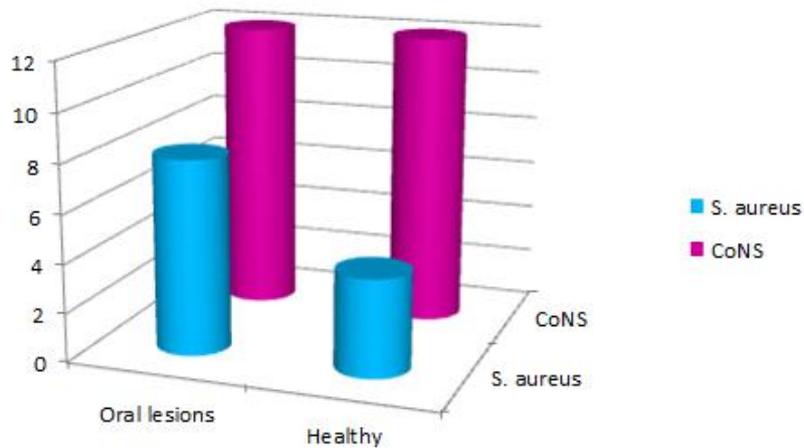


Figure 2: Growth of *Staphylococcus* species on Mannitol Salt Agar

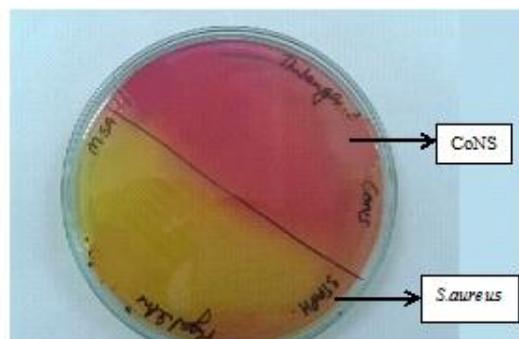


Table 1: Methicillin susceptibility of *Staphylococcus* species from oral cavity (from lesions and healthy subjects)

Methicillin susceptibility	Isolates			
	Oral cavity Lesions		Healthy subjects	
	<i>S. aureus</i>	CoNS	<i>S. aureus</i>	CoNS
Methicillin resistant	1 (12.5%)	0	0	0
Methicillin susceptible	7(87.5%)	12(100%)	4(100%)	12(100%)

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].

Bacteremia and septicaemia caused by *S. aureus* and CoNS is more commonly observed in immunocompromised patients. Endocarditis following tooth-extraction caused by *S. lugdunensis* [13] bacteremia in a bone-marrow transplant patient caused by *S. epidermidis* [14] acute septic arthritis involving the native and prosthetic joint caused by *S. aureus* [15] are some of the examples of oral Staphylococci acting as the cradle of systemic infections.

MRSA in the oral cavity aids 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.

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