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Prevalence Of Mrsa Strains From Post Operative Oral Infection

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ABSTRACT

Methicillin-resistant Staphylococcus aureus is a group of Gram-positive bacteria that are genetically distinct from other strains of Staphylococcus aureus. Postoperative MRSA infection can occur as surgical site infections (SSI), chest infections, or bloodstream infections (bacteraemia). MRSA is usually spread in the community by contact with infected people or things that are carrying the bacteria. Fifteen (15) swabs were taken from the post operative patients in the oral and maxillofacial surgery. The swabs were sent to the department of microbiology. These swabs were plated in nutrient agar, blood agar and mannitol salt agar. Bacterial morphology was identified by colony morphology and gram staining. Staphylococcus aureus species were identified from other staphylococcus species through coagulase tests. 15 swabs were collected out of which 8 swabs contained staphylococcal species. Out of 8 swabs 3 swabs contained staphylococcus aureus. Staphylococcus aureus were isolated from other staphylococcal species using coagulase tests. No MRSA was found. Patients who have a history of chemotherapy, immunosuppression, or recent hospital exposure prior to their surgery are at higher risk of developing MRSA-specific SSI and may benefit from prophylactic antibiotic therapy with appropriate coverage. Additionally, patients who develop MRSA SSIs are likely to have an extended postoperative inpatient stay.

Keywords: Methicillin, *Staphylococcus aureus*, Gram-positive, MRSA, immunosuppression

INTRODUCTION

Staphylococcus aureus has long been recognized as one of the most important bacteria that cause disease in humans. It is the leading cause of skin and soft tissue infections such as abscesses (boils), furuncles, and cellulitis [1]. S. aureus is commonly found in the environment (soil, water and air) and is also found in the nose and on the skin of humans [2]. S. aureus is a Gram-positive, non-spore-forming spherical bacterium that belongs to the Staphylococcus genus [3]. Most commonly, Staphylococcus aureus bacteria cause skin infection [4]. This can produce boils, blisters, and redness on your skin. These infections can be anywhere on your body, including your face, often around your mouth and nose.

Methicillin-resistant Staphylococcus aureus (MRSA) is a cause of staph infection that is difficult to treat because of resistance to some antibiotics [5]. MRSA is usually spread in the community by contact with infected people or things that are carrying the bacteria. This includes through contact with a contaminated wound or by sharing personal items, such as towels or razors, that have touched infected skin [6]. MRSA is a common and potentially serious infection that has developed resistance to several types of antibiotics [7]. These include methicillin and related antibiotics, such as penicillin, vancomycin, and oxacillin. This resistance makes MRSA difficult to treat. Methicillin is an antibiotic that is related to penicillin. It was once effective against Staphylococci (staph), a type of bacteria [8]. Over time, staph bacteria have developed a resistance to penicillin-related antibiotics, including methicillin. These resistant bacteria are called methicillin-resistant staphylococcus aureus, or MRSA [9]. Although doctors can no longer use methicillin to treat MRSA, this does not mean that the infection is untreatable. Some antibiotics are effective in treating it.

Vancomycin, a glycopeptide that has been in clinical use for over 50 years, remains the cornerstone of the treatment of drug-resistant Gram-positive infections [10]. However, there are serious concerns about this agent's decreasing susceptibility among S. aureus. Furthermore, vancomycin is a slow bactericidal agent, which may contribute to clinical failures in the treatment of bacteremia and endocarditis. My study mainly focuses on the prevalence of MRSA in post operative oral infections.

MATERIALS AND METHODS

This study was conducted in Saveetha Dental college and hospitals, Chennai. Fifteen (15) swabs were taken from the post operative patients in the oral and maxillofacial surgery. The swabs were sent to the department of microbiology. These swabs were plated in nutrient agar, blood agar and mannitol salt agar. Bacterial morphology was identified by colony morphology and gram staining. Staphylococcus aureus species were identified from other

staphylococcus species through coagulase tests. There are two types of coagulase test: tube coagulase test and 1. Slide coagulase test 2. Slide Test

Slide coagulase test

1. Two separate drops of saline were placed on a slide.
2. Using a sterile inoculating loop, one or two colonies of the organism was emulsified in one drop to make a thick suspension of bacteria.
3. A Loopful of plasma was added to both the suspension and saline drop and mixed gently.
4. Immediate coarse clumping of the mixture was noted within 10-15 seconds. MRSA can be separated from staphylococcus aureus by cloxacillin medium

Tube coagulase test

1. Plasma was diluted in a ratio of 1:10 with saline.
2. Two test tubes were taken and 0.5 ml of diluted plasma was added to each.
3. A tube was inoculated with bacterial colonies to make a cloudy suspension. Alternatively, about 5 drops of thick broth was added to the cultures.
4. Both the tubes were incubated at 35^{o}C for 1 to 4 hours in a water bath.
5. Afterward, both tubes were examined for presence or absence of clots.

RESULTS

Fifteen samples were isolated from post operative oral infections. Out of which staphylococcus species were identified in eight (8) samples. *Staphylococcus aureus* were identified in 3 colonies. No methicillin resistant staphylococcus aureus (MRSA) was found.

Number of fresh swabs	15
Number of collected swabs	15
Number of swabs with staphylococcal species	8
Number of swabs with *S.aureus*	3
Number of swabs with MRSA	0

DISCUSSION

As compared to 15 swabs taken, only 8 swabs contained staphylococcal species. These were identified by colony morphology and staining. Staphylococcus aureus were identified from non-staphylococcal species by coagulase test. Only 3 *staphylococcus aureus* were identified [11]. MRSA could be identified by cloxacillin medium. No mrsa was found [12]. As incidence rate ratios, negative binomial regression was used to predict the risk of first S. aureus infections within 180 days of the index surgery (IRR) [7]. This method accounts for each patient's time from first infection. For major types of surgery, independent regressions were carried out. Patients were classified by the category of the index surgery for an additional regression that included all surgeries: CV, orthopaedic, or GI [13]. We identified potential predictors of S. aureus infections following surgeries using key case mix severity measures [14]. Patients' demographics included their gender, race (white or non-white), and age group (by decade). Medicare eligibility was divided into three categories: disability, end-stage renal disease (ESRD), and age [15].

The index hospitalisation for surgery had two major characteristics: the source of admission (previous institution vs. community) and whether or not the index hospitalisation was elective or non-elective (including unknown) [16]. Comorbid conditions included congestive heart failure, ischemic heart disease, chronic obstructive pulmonary disease (COPD), chronic renal disease, and solid cancers [17]. Finally, indicators for four census regions were included in the model (Mid-West, South, West, and the combination of Northeast and Mid-Atlantic) [18]. To validate the findings, logistic regression was used in previous studies [19]. Orthopaedic surgical procedures are the fourth most common type of operation in the United States, trailing only obstetrical, cardiovascular, and digestive procedures [20]. SSIs account for approximately 20% of all nosocomial infections in orthopaedic wards, with incidence rates varying depending on the type of surgery [21]. Because of the potentially serious consequences of infection, especially in patients with prosthetic joints, orthopaedic units are classified as high-risk areas [9,18]. Infections affect one to five percent of prostheses, causing significant morbidity and severe functional impairment [22].

Some cardiovascular studies show that Cardiovascular operations are the second most common surgical procedures, with over 6 million operations performed in the United States in 1999 [23]. In cardiac surgery patients, SSI is a serious complication that leads to increased morbidity, mortality, and a longer hospital stay [24]. Furthermore, the financial burden of such infections on the healthcare system can be enormous, costing nearly US$40,000 per SSI. Cardiovascular implants, cardiac transplantation, and the increasingly common high-tech

procedure of coronary artery bypass grafting are the three main types of cardiac surgery (CABG) [25]. Because of the presence of multiple wounds (chest and lower extremity incisions) and the use of post-operative invasive devices, patients undergoing such surgery are at an increased risk of developing SSI (i.e. pulmonary catheter) [25-34].

CONCLUSION:

Despite current infection control measures, Streptococcus aureus continues to burden patients and healthcare systems in India as a major pathogen causing postsurgical infections following oral surgeries. Our findings imply that advances in infection control, risk reduction, and prevention methods that further prevent SAIs could improve clinical and economic outcomes following oral surgery.Patients who have a history of chemotherapy, immunosuppression, or recent hospital exposure prior to their surgery are at higher risk of developing MRSA-specific SSI and may benefit from prophylactic antibiotic therapy with appropriate coverage. Additionally, patients who develop MRSA SSIs are likely to have an extended postoperative inpatient stay. Good monitoring and better infection controls would reduce the risk of MRSA.

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CONFLICT OF INTEREST

Authors declare that there was no conflict of interest in the present study

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