



Skin and soft tissue infections (SSTI) caused by *Staphylococcus aureus* isolated from patients attending the OPD of Shri B M Patil Medical College, Bijapur, India

¹Metri Basavaraj C.*, ²Peerapur B. V. and ¹P. Jyothi

¹Department of Microbiology; BLDEU's Shri B M Patil Medical college, Bijapur –Karnataka

²Department of Microbiology, RIMS-Raichur

ABSTRACT

Skin and soft-tissue infections (SSTIs) are the most frequent forms of the disease. *S. aureus* is capable of causing a wide range of infections including skin infections, abscesses, toxic shock and scalded skin syndrome. The current study was undertaken to know the Antibiotic resistance of *S. aureus* causing SSTIs, isolated from patients attending the OPD of our tertiary care hospital. Pus samples were collected from patients presenting with ailments like abscesses, carbuncles, osteomyelitis and skin infections at our hospital OPD from June 2012 to June 2014. *S. aureus* was identified by conventional techniques. Antimicrobial susceptibility testing of the isolates were performed by Kirby Bauer disc diffusion method. The data were recorded and analyzed at the completion of the study as per recommendations of the CLSI. During the study period a total of 50 isolates of *S. aureus* were isolated from SSTI infections in patients visiting OPDs. Among these 31 were isolated from male patients. Majority of the isolates were from (74%) were deep abscesses, were isolated were from middle age group of 20- 50 years age. Anti-biograms of *S. aureus* isolates revealed high level of resistance to penicillin, pefloxacin amoxicillin/clavulanic acid. The most effective agent against *S. aureus* isolates were linezolid, piperacillin/tazobactam followed by tetracycline. The current study revealed that majority of the isolates were from were deep abscesses, Anti-biograms of *S. aureus* revealed high level of resistance to penicillin, pefloxacin amoxicillin/clavulanic acid. The most effective agent against *S. aureus* isolates were linezolid, piperacillin/tazobactam followed by tetracycline.

Keywords: *S. aureus*, Skin and soft-tissue infections (SSTIs), antibiotic resistance, meticillin-resistant *Staphylococcus aureus* (MRSA), antibiotic susceptibility testing.

INTRODUCTION

Staphylococcus aureus is both a commensal organism and a pathogen. The anterior nares are the main ecological niche for *S. aureus*. Approximately 20% of individuals are persistently nasally colonized with *S. aureus*, and 30% are intermittently col- onized. However, numerous other sites may be colonized, including the axillae, groin, and gastrointestinal tract. Colonization provides a reservoir from which bacteria can be introduced when host defenses are breached, whether by shaving, aspiration, insertion of an indwelling catheter, or surgery[1].

Ever since it was first discovered by Sir Alexander Ogston in 1880, *Staphylococcus aureus* has been regarded as a serious threat to human health, capable of causing a multitude of infections. The rise of antibiotic-resistant strains in the 1960s and 1970s, particularly meticillin-resistant *S. aureus* (MRSA), has created additional therapeutic challenges [2.3].

Skin and soft-tissue infections (SSTIs) are the most frequent forms of the disease. [4]. *S. aureus* is capable of causing a wide range of infections including skin infections (folliculitis boils, furuncles, and carbuncles), abscesses, toxic shock and scalded skin syndrome, food poisoning, bacteremia, endocarditis, septicemia, osteomyelitis, and pyoarthritis.[5]

In this part of the India, though many studies [6-11] have been conducted with regards to many pathogenic organisms but none of the previous studies covered the SSTIs therefore, the current study was undertaken to know the antibiotic resistance of *S. aureus* causing Skin and soft tissue infections, isolated from patients attending the OPD of our tertiary care hospital.

EXPERIMENTAL SECTION

Source of data:

The current study was conducted in the Microbiology department, Shri B.M Patil Medical College Hospital, Bijapur. *Staphylococcus aureus* isolated from various SSTIs in were selected for further study.

Method of collection of data: (including sampling procedure)

Pus samples were collected from patients presenting with ailments like abscesses, carbuncles, osteomyelitis and skin infections at our hospital OPD during the study period of two years from June 2012 to June 2014. Pus samples were collected under aseptic precautions from patients using two sterile swabs, of which one was used for culture and the other was used for smear preparation.

Inclusion criterion: *Staphylococcus aureus* isolated from SSTIs in patients attending the OPD if this hospital were included in the study.

Pus samples were screened by preliminary Gram's stain and then inoculated on 10% sheep blood agar and MacConkey's agar. *S. aureus* was identified by conventional techniques [12,13]. Antimicrobial susceptibility testing of the isolates were performed by Kirby Bauer disc diffusion method using following discs. penicillin-G (10 unit); cloxacillin (30µg); cephalixin (30µg); cefuroxime (30 µg); tetracycline (30µg); erythromycin (15µg); gentamycin (10µg); ciprofloxacin (5µg); pefloxacin (5µg); Cefoperazone /salbactan(75 µg/ 30 µg) piperacillin/tazobactam(100µg/10 µg); amoxicillin/clavulanic acid (20 µg /10 µg); azithromycin(15µg); linezolid (15µg). The data were recorded and analyzed at the completion of the study as per recommendations of the CLSI.[14] *S. aureus* ATCC 29213 were used as reference strain for the standardization of antibiotic susceptibility testing.

RESULTS AND DISCUSSION

S. aureus is a Gram-positive coccus where the round cells form grape-like (Greek staphyle) clusters indicative of the ability to divide in more than one plane. They are capable of both aerobic and anaerobic respiration and most strains ferment mannitol anaerobically. On blood agar they form characteristic golden (Latin aureum) or white colonies. They produce catalase, coagulase and an extracellular cell clumping factor, and some strains produce capsules[15].

Community-acquired methicillin-resistant *Staphylococcus aureus* strains can produce a variety of SSTIs, ranging from impetigo to life-threatening necrotizing fasciitis. Abscesses and cellulitis are the most common lesions. Approximately 50%–75% of patients present with abscesses, and 25%–50% with cellulitis. These infections commonly present as single lesions involving the extremities. Systemic signs of inflammation are variable; fever and leukocytosis are often absent in patients with abscess. Abscesses are frequently accompanied by central necrosis and surrounding cellulitis. Furuncles (boils) are very characteristic, are often multiple, and frequently occur in outbreaks.[4]

During the study period a total of 50 isolates of *S. aureus* were isolated from SSTI infections in patients visiting OPDs. Among these 31 were isolated from male patients and 19 were from female patients. Majority of the isolates were from (74%) were deep abscesses, while the rest (26%) were from superficial skin infections. Age wise distributions of the isolates is shown in Table 1, majority of the isolates were from middle age group of 20- 50 years age.

Table 1: Age wise distributions of *Staphylococcus aureus* isolated from SSTIs.

Age in years	Number	Percentage
1-20	10	20
21-50	29	58
50 and above	11	22

Table 2: Antibiotic resistance in *Staphylococcus aureus* isolated from SSTIs.

Antibiotics	Resistant	Percentage
Penicillin-G	45	90
Eythromycin	26	52
Tetracycline	6	12
Cephalexin	27	54
Cloxacillin	17	34
Pefloxacin	37	74
Pepercillin/tazobactam	5	10
Cefoperazone /salbactan	9	18
Gentamycin	11	22
Ciprofloxacin	26	52
Amoxicillin/clavulanic acid	31	62
Cefuroxime	15	30
Azithromycin	23	46
Linezolid	3	6

Anti-biograms of *S. aureus* isolates to various anti-microbial agents including linezolid, cephalosporins, aminoglycosides, and fluoroquinolones are presented in (Table 2). The table revealed high level of resistance to penicillin(90%), pefloxacin (74%) amoxicillin/clavulanic acid (62%). The most effective agent against *S. aureus* isolates were linezolid, piperacillin/tazobactam followed by tetracycline.

The current study revealed that majority of the isolates were from (74%) were deep abscesses, while the rest (26%) were from superficial skin infections. The deep abscesses included abscesses on various parts of the body viz. gluteal abscess, thigh abscess, axillary abscess, perianal abscess, chest- wall abscess, scalp abscess, wound infections, infected ulcers etc. These findings are consistent with various studies carried out in Mangalore[16]. Erythromycin resistance *S. aureus* strains was 52%, which is in agreement with study conducted in Mangalore and study conducted by Wylie et al.[16,17]

CONCLUSION

The current study revealed that majority of the isolates were from were deep abscesses, Anti-biograms of *S. aureus* revealed high level of resistance to penicillin, pefloxacin amoxicillin/clavulanic acid. The most effective agent against *S. aureus* isolates were linezolid, piperacillin/tazobactam followed by tetracycline.

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