

Assessment the Frequency of *Staphylococcus aureus* Golden Methicillin-Resistant (MRSA) and Vancomycin-Resistant VRSA in Determining the MIC Using E-Test

Shahin Asadi*, and Mahsa Jamali

Department of Molecular Genetics, Tabriz Branch, Islamic Azad University, Tabriz, Iran

Abstract

Staphylococcus aureus infections, occur widely in the community and hospitals. The aim of this study was to evaluate the prevalence of resistance to methicillin and vancomycin in patients with *Staphylococcus* compared to the Antibiogram.

Keywords: *S. aureus*; Resistance to methicillin and vancomycin; E-Test; Antibiogram

Introduction

S. aureus is a gram-positive coccal bacterium that is a member of the Firmicutes, and is frequently found in the nose, respiratory tract, and on the skin. It is often positive for catalase and nitrate reduction and is a facultative aerobe that can grow without the need for oxygen [1]. Although *S. aureus* is not always pathogenic, it is a common cause of skin infections such as abscesses, respiratory infections such as sinusitis, and food poisoning. Pathogenic strains often promote infections by producing potent protein toxins, and expressing cell-surface proteins that bind and inactivate antibodies. The emergence of antibiotic-resistant strains of *S. aureus* such as methicillin-resistant *S. aureus* (MRSA) is a worldwide problem in clinical medicine.

Staphylococcus was first identified in 1880 in Aberdeen, Scotland, by the surgeon Sir Alexander Ogston in pus from a surgical abscess in a knee joint [2]. This name was later amended to *Staphylococcus aureus* by Friedrich Julius Rosenbach, who was credited by the official system of nomenclature at the time. An estimated 20% of the human population are long-term carriers of *S. aureus* [3] which can be found as part of the normal skin flora and in the nostrils [3,4]. *S. aureus* is a normal inhabitant of the healthy lower reproductive tract of women [5,6]. *S. aureus* can cause a range of illnesses, from minor skin infections, such as pimples [7], impetigo, boils, cellulitis, folliculitis, carbuncles, scalded skin syndrome, and abscesses, to life-threatening diseases such as pneumonia, meningitis, osteomyelitis, endocarditis, toxic shock syndrome, bacteremia, and sepsis. It is still one of the five most common causes of hospital-acquired infections and is often the cause of postsurgical wound infections. Each year, around 500,000 patients in hospitals of the United States contract a staphylococcal infection, chiefly by *S. aureus* [8-10].

Materials and Methods

This cross-sectional study was conducted during one year from 2017. The study population included both newly admitted hospital patients and patients with hospital infections. Nosocomial infection means infection 48 hours after admission was considered. In this study, all samples, including samples of patients with wound secretions and body fluids in the lab, CSF, blood, urine microbiology Sina Hospital were sent, beginning in the chocolate (MSA) and then for the differential diagnosis of mannitol salt agar if you were cultured positive for *Staphylococcus aureus* were enrolled. All 85 subjects who entered the study with oxacillin and vancomycin E-test methods for disk diffusion method were investigated. Oreo *S. aureus* to determine if growth and fermentation

DNase, gram-positive cocci coagulase tests, CAT was used. In MSA of mannitol on mannitol salt agar positive multiple instances of a patient, only one positive sample was studied.

After determining the strains of *S. aureus*, antibiotic sensitivity test on Mueller-Hinton agar by standard methods Disc diffusion (prepared bacterial suspension in saline 9% and compared with the standard concentration half McFarland) to determine the susceptibility or resistance to oxacillin 1 µg identifying resistant 30 µg vancomycin and methicillin and cefoxitin 30 µg was done. 24 hours after the plates were incubated at 37°C, in accordance with the inhibitory zone diameter (CLSI) Clinical Laboratory Standard Institute was read. To determine the resistance to oxacillin addition cefoxitin oxacillin disk was used. High-media consumer disks owned by E-test strips for participation AB BIODISK India and Sweden. Also, the standard strains of *S. aureus*

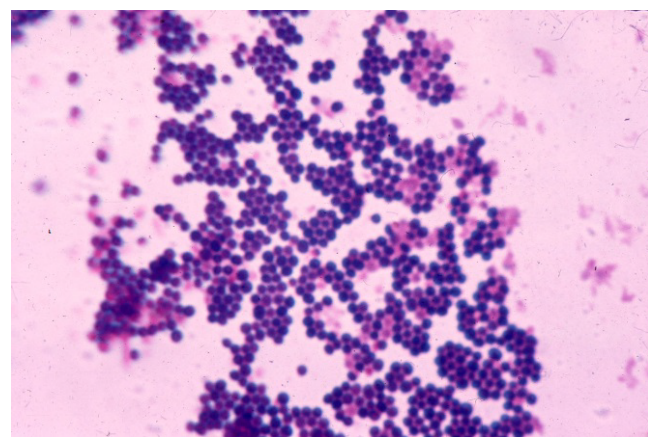


Figure 1: Microscopic view of methicillin-resistant *Staphylococcus aureus* and studied.

***Corresponding author:** Shahin Asadi, Microbial Biotechnology, Department of Molecular Genetics, Tabriz Branch, Islamic Azad University, Tabriz, Iran, Tel: +989379923364; E-mail: shahin.asadi1985@gmail.com

Received: February 01, 2017; **Accepted:** February 27, 2017; **Published:** March 03, 2017

Citation: Asadi S, Jamali M (2017) Assessment the Frequency of *Staphylococcus aureus* Golden Methicillin-Resistant (MRSA) and Vancomycin-Resistant VRSA in Determining the MIC Using E-Test. Immunol Disord Immunother 2: 112.

Copyright: © 2017 Asadi S, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

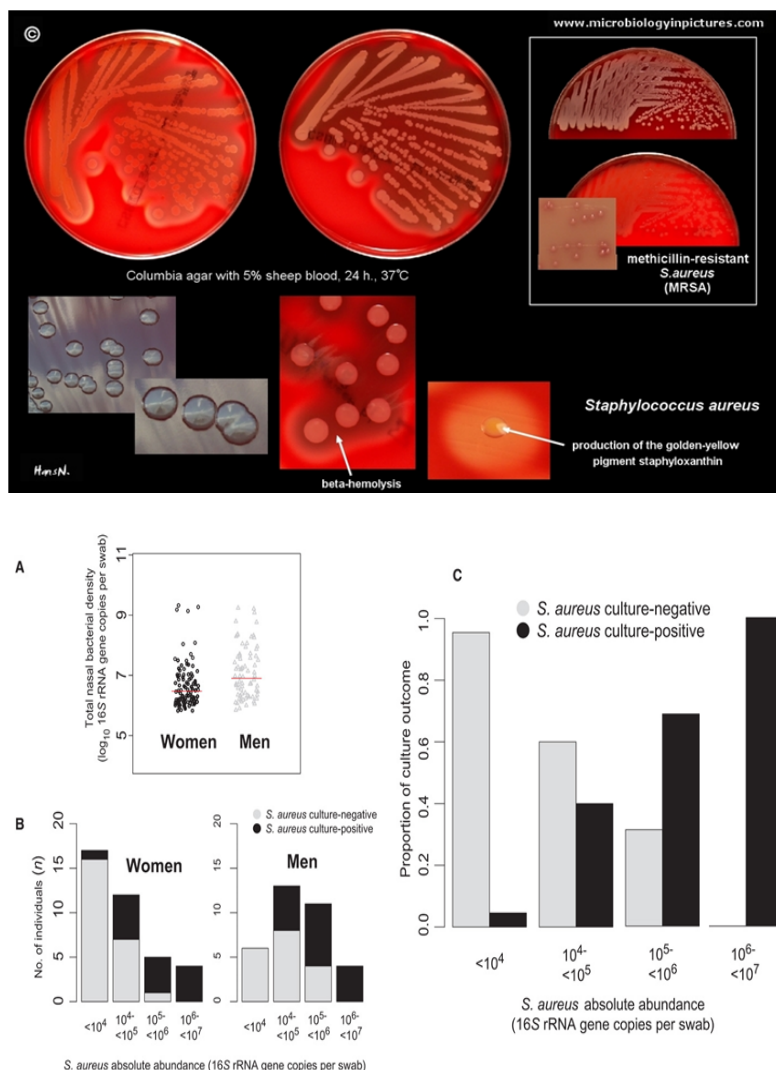


Figure 2: Diagram of cell culture by men and women studied *Staphylococcus aureus* in purpose.

ATCC 25923 were used for quality control of work in each series. Since Disc diffusion method is only qualitative and quantitative data regarding the sensitivity or resistance to clinical application not be obtained, oxacillin and vancomycin using E-test was used to determine the MIC (Figures 1 and 2).

Results

During a year of study were 85 positive cultures of *Staphylococcus* that 46 of the patients were male (54%). Subjects ranged in age from 13 to 86 years and a mean age of $51/46 \pm 19/213$ years. The most common surgical wound infections and septicemia were the primary.

Discussion

S. aureus is one of the most important factors for infection in human society and one of the major problems of public health, drug resistance. In our study, no significant relationship between age and gender of patient's is didn't. studies have reported similar results. Results showed that 40 patients (59.7%) of 67 patients who had nosocomial infections due to *S. aureus* and 3 patients (16.6%) of 18 patients who had acquired infection, MRSA were suffering.

Acknowledgments

The authors of all patients and their parents as well as hospitals and their personnel to cooperation and collaboration in this study, the thank and appreciate.

References

- Masalha M, Borovok I, Schreiber R, Aharonowitz Y, Cohen G (2001) Analysis of transcription of the *Staphylococcus aureus* aerobic class Ib and anaerobic class III ribonucleotide reductase genes in response to oxygen. J Bacteriol 183: 7260-7272.
- Ogston A (1984) On abscesses. Classics in infectious diseases. Rev Infect Dis 6: 122-128.
- Cole AM, Tahk S, Oren A, Yoshioka D, Kim YH et al. (2001) Determinants of *Staphylococcus aureus* nasal carriage. Clin Diagn Lab Immunol 8: 1064-1069.
- Abiola SC, Verstraelen H, Temmerman M, Botta GA (2009) Probiotics for the treatment of bacterial vaginosis. Cochrane Database Syst Rev CD006289.
- Hoffman B (2012) Williams gynecology. (2ndedn); New York: McGraw-Hill Medical 65.
- National Library of Medicine, USA. MedlinePlus. Skin infections are the most common. They can look like pimples or boils.
- Pathogen safety data sheet: Infectious substances. Public Health Agency of Canada. Accessed on 09 March 2017.

8. Bath-Hextall FJ, Birnie AJ, Ravenscroft JC, Williams HC (2008) Birnie AJ (Ed). Interventions to reduce *Staphylococcus aureus* in the management of atopic eczema. *Br J Dermatol* 3: 12-26.
9. Cenci-Goga BT, Karama M, Rossitto PV, Morgante RA, Cullor JS (2003) Enterotoxin production by *Staphylococcus aureus* isolated from mastitic cows. *Journal of food protection* 66: 1693-1696.
10. Zhu J, Lu C, Standland M, Lai E, Moreno GN, et al (2008) Single mutation on the surface of *Staphylococcus aureus* Sortase A can disrupt its dimerization. *Biochemistry* 47: 1667-1674.