

**Molecular Characterization of Methicillin- Resistant
Staphylococcus Aureus Isolated from Soft Tissue
Infections.**

THESIS

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Summary

The genus *Staphylococcus* is composed of Gram-positive bacteria with diameters of 0.5-1.5 μm , characterized by individual cocci that divide in more than one plane to form grape-like clusters.

Resistance to methicillin was uncommon until the late 1960s, when a multidrug-resistant MRSA emerged in Europe.

Until the 1990s, MRSA was exclusively a hospital-associated pathogen. Then, cases of MRSA community infections were documented in individuals in the U.S. without any history of hospitalization. These first cases were fatal, but most CA-MRSA infections present as moderately severe infections of the skin and soft tissues.

The present study was conducted on 200 out patients from EL-Fayoum General Hospital (El-Fayoum-Egypt) during the period from January 2016 to December 2016. Selected Patients were of all age groups, both sexes, and had soft tissue infection.

Swabs were collected from the infected soft tissue (200 cases) using sterile disposable cotton swabs (Eipico Co. Egypt).

- Microbiological identification of *S. aureus* done using routine microbiological methods

- primary Identification of methicillin resistant *S. aureus* by cefoxitin disc diffusion method and culture on ORSAB (oxacillin resistance screening agar base) medium

- Identification of CA-MRSA by polymerase chain reaction

- Detection of MRSA *mecA*, *Pvl* and *SCCmec* genes

the patients age ranged from 1 year to 78 years. Staphylococci were 126 (62%) of the studied cases; one third of them were MRSA and the most common form of infection by MRSA were abscesses.

resistance rates to antibiotics were the highest with penicillin G (100%), ampicillin (100%), amoxicillin- clavulanic acid (100%), Cefotaxime (100%, Cefepime (100%) while the lowest resistance were with Levofloxacin (2.4%), Clarithromycin (12.2%), Ciprofloxacin (12.2), Sulphamethoxazole/Trimethoprim (12.2%), Imipenem (14.6%), Chloramphenicol (14.6%) and Linezolid (24.4%).

None of the isolates were resistant to vancomycin by MIC determination (92.7% sensitive and 7.3% vancomycin intermediate resistance *S. aureus* (VISA)).

Beta-lactam resistance is attributed mostly to mutations in the *mecA* gene, but other genetic elements may also be considered for the explanation of the mechanism of resistance we found *mecA* gene were present in 92.68% of the cases.

SCCmec types: I, II were negative in all cases, type III positive in 7 samples while types IVa, IVb, IVc, IVd were present in 1, 0, 1, 5 cases respectively. Type V found in 5 cases

Panton-Valentine leukocidin (PVL) is a potent cytotoxin and an important virulence factor of *S. aureus*. *Pvl* -positive *S. aureus*, as a rapidly emerging worldwide phenomenon and we found *Pvl* gene in 100% of the studied cases.

Some cases of CA- MRSA had *sec* enterotoxin gene which can cause staphylococcal food poisoning so standard precaution should be applied to prevent infection specially hand hygiene.

