Detection and Genotyping of Methicillin Resistance *Staphylococcus aureus* Infection and Colonization of Surgery Patients

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By

Hisham Abd El-Aziz Ahmed Abd El-Ghafar

M.Sc. of Microbiology
2010
Faculty of Science
Ain Shams University

Supervisors

Prof. Dr. Ahmed Osman Mostafa
Professor of Biochemistry
Biochemistry Department
Faculty of Science
Ain Shams University

Prof. Dr. Mervat Ismail El Borhamy
Professor of Microbiology
Microbiology Department
Faculty of Pharmacy
Misr International University

Prof. Dr. Adel Fahmy Hamed
Professor of Phycology
Botany Department
Faculty of Science
Ain Shams University

Dr. Khaled Zakaria El-Boghdady
Associate Professor of Microbiology
Microbiology Department
Faculty of Science
Ain Shams University

Microbiology Department
Faculty of Science
Ain Shams University
2017

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APPREVIATIONS

ACH	Acute-Care Hospital/Healthcare
ACM	Arginine Catabolic Mobile Element
AK	Amikacin
AMS	Ampicillin/sulbactam
AUG	Amoxicillin/ Clavulanic Acid
BHI	Brain heart infusion broth
BPEI	Branched Poly Ethylenimine
BSI	Blood Stream Infection
C	Chloramphenicol
CA	Community Acquired
CDC	Centers for Disease Control and Prevention
CIP	Ciprofloxacin
CLSI	Clinical and Laboratory Standards Institute
CNS	Coagulase Negative Staphylococci
crr	Chromosome recombinase Ge
CV	Core Variable
CXM	Cefuroxime
DA	Clindamycin
D-Ala-D-Ala	D-alanyl-D- alanine
DNA	Deoxyribonucleic acid
DNase	Deoxyribonuclease
dsDNA	double stranded DNA
E	Erythromycin
EDTA	Ethylene Di-amine Tetra Acetic acid
ELISA	Enzyme linked immunosorbent assay
EMRSA	Epidemic MRSA
ETT	Endo-Tracheal Tube
F	Nitrofurantoin
FDA	Food and Drug Administration
FOX	Cefoxitin
HA	Hospital/Healthcare Acquired
HAIs	Healthcare-Associated Infections
ICU	Intensive Care Unit
IDSA	Infectious Disease Society of America
IPM	Imipenem

APPREVIATIONS

laMRSA	livestock-associated MRSA
LTCF	long-term care facilities
LZD	Linezolid
***mec*A**	Methicillin Resistance Gene
MEM	Meropenem
MGE's	Mobile Genetic Elements
MHC	Major Histocompatibility Complex
MIC	Minimum Inhibitory Concentration
MRSA	Methicillin Resistant *Staphylococcus aureus*
MSA	Mannitol salt agar
NAMRU 3	Naval Medical Research Unit No. 3
OD	Optical Density
OFX	Ofloxacin
ORSAB	Oxacillin Resistance Screening Agar Base
PBP	Penicillin-Binding Protein
PCR	Polymerase Chain Reaction
PRSA	Penicillin-resistant *S. aureus*
PVL	Panton Valentine leukocidin
Q-D	Quinupristin-dalfop
RA	Rifampin
rDNA	ribosomal DNA
RNA	Ribonucleic Acid
SA	*Staphylococcus aureus*
SAg	Super-Antigen Genes
SaPIs	*Staphylococcus aureus* Pathogenicity I
SCF	Cefoperazone / Sulbactam
SDW	Sterile Distilled Water
SEM	Scanning Electron Microscopy
SSI	Surgical site infection
SXT	Trimothoprim/ sulfameth
TAE	Tris Acetate EDTA
TE	Tri-HCl EDTA
TEC	Teicoplanin
Tn	Transposons
TSB	Tryptone soya broth
TSST-1	Toxic shock syndrome toxin
UTI	Urinary tract infection

APPREVIATIONS

VA	Vancomycin
VISA	Vancomycin Intermediate *Staphylococcus aureus*
VRSA	Vancomycin Resistant *Staphylococcus aureus*

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Abstract

Methicillin-resistant *Staphylococcus aureus* (MRSA) is one of the major health hazards responsible for a large number of nosocomial (hospital acquired) infections worldwide and became of greater public health concern since the emergence of community acquired MRSA.

Out of 338 *Staphylococcus aureus* isolates collected from 374 patients, 108 (32.2 %) showed positive growth on Oxacillin Resistance Screening Agar Base **(**ORSAB) selective media for MRSA while only 105 (31.1%) isolates showed resistance to 30 µg cefoxitin susceptibility test and classified as MRSA. Among the MRSA isolates (105), 77 (73.3%) were identified as community acquired (CA) MRSA and 28 (26.7%) isolates were hospital acquired (HA) MRSA.

The frequency of resistant and susceptibility towards 19 antibiotics revealed that all MRSA (100%) isolates were sensitive to vancomycin (VA 30 µg) and linezolid (LZD 30 µg).

All of CA-MRSA and HA-MRSA isolates were screened for *mec*A, *fem*A, *fem*B, *luk*S-PV and *luk*F-PV (PVL) genes and intgrons class I and class II genes. Both *mec*A and *fem*A genes were present in all (100%) HA-MRSA and CA-MRSA isolates. *fem*B gene was recovered from all HA-MRSA isolates and 72 (93.5%) of CA-MRSA isolates.

PVL gene was detected in 8 (28.6 %) HA-MRSA isolates and seventy-one (92.2%) CA-MRSA.

Class I integron gene was recovered from 17 (60.7%) HA-MRSA isolates and 29 (37.7%) CA-MRSA isolates, while class II integron gene was recovered from only 3 (10.7%) HA-MRSA isolates and from five (6.5 %) CA-MRSA isolates.

Decolonization measures were applied on all colonized sites as per CDC, (2007) recommendation and the results of successful decolonization were 90.9% from nasal, 93.9% from groin and 80% from axilla and the total percentage of 91.8% successful decolonization was achieved.