

Summary

During the period from January to March, 2013; a total of 288 clinical specimens were collected from wounds (65), burns (59) and urine (78) for inpatients in Al-Diwaniya Teaching Hospital, in addition 86 food samples (milk 30, cheese 30 and meat 26) were obtained from local markets.

Seventy two staphylococcal isolates were identified by conventional tests, then confirmed by HiCrom agar and VITEK-2 compact system. Results revealed that the predominant species was *S. aureus*, 52 (72.2%).

The pattern of antibiotic susceptibility of *S. aureus* isolates to antibiotic Methicillin was determined using disc diffusion method; the results revealed that 22 (32.3%) of *S. aureus* were methicillin resistant (MRSA) which distributed as 4 (18.9%) from burns; 5 (22.7%); from urine; 10 (45.5%) from wounds; and foods 3 (13.6%).

The extracted DNA of MRSA isolates were subjected to multiplex Polymerase chain reaction (PCR) technique to amplify with primers of coagulase 1 (*Coa1*) and Toxic Shock Syndrome Toxin (*TSST*) encoding genes, the results showed that 17 (77.3%) gave to amplicon size 561 base pair (bp) and 7 (31.8%) gave to amplicon size 387 bp; respectively.

The detection of staphylococcal enterotoxigenicity according to three classical enterotoxins genes which are *SEA*, *SEB* and *SEC* was performed simultaneously using monoplex PCR assay. A 15 (68.2%) of MRSA isolates found to be enterotoxigenic, eight (36.4%) isolates were carried more than one enterotoxin gene.

The *SEA* gene was the most frequent enterotoxin coding gene among the other tested genes; *SEA* accomplished 63.3% of the detected enterotoxin genes followed by the *SEC* gene, which constituted 40.9%, and then the *SEB* coding gene by (31.8%). The results obtained by this study showed that 7 (31.8%) of MRSA isolates harboured only one enterotoxin coding gene, while 2 (9.1%) of the isolates possessed two toxin genes, and 6 (27.3%) isolates of MRSA contained three genes coding *SEA*, *SEB* and *SEC* genes.

In addition to that, the PCR was used for detection of *Coa-2* gene polymorphism. Results revealed that the amplification of the *Coa-2* gene from 15 MRSA isolates produced nine different groups (CG1-CG9). Four isolates showed only one amplicon, 11 isolates showed more than one amplicon, while the most prevalent *Coa2* type was CG3 (26.7%) the result amplicon, size of CG3 were (400-1200)bp. In conclusion, the *Coa* amplification has been considered as a simple and accurate method for typing of *S. aureus*.

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List of Abbreviations

Abbreviate	Details
μM	Micro mitter
AST	Antibiotics susceptibility test
Bp	base pair
CA	Community-Acquired
CDC	Centers for Disease Control
CGs	Coagulase groups
Coa	Coagulase
CONS	Coagulase negative staphylococci
COPS	Coagulase positive staphylococci
DD	Disc diffusion
DNA	Deoxyribonucleic acid
EDTA	Ethylene diamine tetra acetic acid
egc	Enterotoxin gene cluster
ET	Exfoliative toxins
F	Forward
FDA	Food and Drug Administration
Fnb	Fibronectin-binding
HA	Healthcare-Associated
IgG	immunoglobulin G
IL-8	Interleukin-8
IS	insertion sequences
kDa	Kilo Dalton
ME	Methicillin disc
MGEs	mobile genetic elements
MHC	Major histocompatibility complex
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
MSCRAMMs	Components Recognizing Adhesive Matrix Molecules
MSSA	methicillin sensitive <i>Staphylococcus aureus</i>
NCCLS	National Committee for Clinical Laboratory Standards
OB	Oligosaccharide/oligonucleotide binding
OXA	Oxacillin
PBP2a or PBP2	penicillin-binding protein 2a
PBPs	Penicillin Binding Proteins
PCR	polymerase chain reaction
PFGE	pulsed field gel electrophoresis
PIA	polysaccharide intercellular adhesion

PNAG	poly-Nacetylglucosamine
Pro	Proline
PTSAGs	pyrogenic toxin superantigens
PVL	Panton-Valentine leukocidin
R	Reveres
<i>S. aureus</i>	<i>Staphylococcus aureus</i>
SAGs	superantigens
SCCmec	Staphylococcal cassette chromosome <i>mec</i>
SE	Staphylococcal enterotoxin
SEA	Staphylococcal Enterotoxin A
SEB	Staphylococcal Enterotoxin B
SEC	Staphylococcal Enterotoxin C
SED	Staphylococcal Enterotoxin D
SEE	Staphylococcal Enterotoxin E
SEG	Staphylococcal Enterotoxin G
SEH	Staphylococcal Enterotoxin H
SEI	Staphylococcal Enterotoxin I
SFP	Staphylococcal food poisoning
SSSS	Staphylococcal scalded skin syndrome
SSTIs	skin and soft tissue infections
TBE	Tris - Borate – EDTA
TCR	T-cell receptors
TSST	Toxic shock syndrome toxin
µg/ml	Microgram per milliliter
µl	Micro liter