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List of Abbreviation

ACME	Arginine catabolic mobile element.
BORSA	Border line oxacillin resistant staphylococcal aureus
BSAC	British society for Antimicrobial chemotherapy.
CA-MRSA	Community associated methicillin resistant staphylococci.
CAN	Collagen adhesion protein
CCrA, CCrB	Cassette chromosome recombinase genes A and B.
CDC	Centers for Disease control and prevention.
CFU	Colony forming unit.
CHIPS	Chemotaxis inhibitory protein of Staphy lococci.
CLSI	Clinical and laboratory standard institute.
COa	coagulase gene.
CoNS	Coagulase negative staphylococci.
CVC	Central venous catheter.
DD method	Disk Diffusion method
DNAse agar	Deoxyribonucleic agar
EaP	Extracellular adherence protein
E. test	Epsilometer test
ECM	Extra cellular matrix.

EMRSA	Epidemic MRSA
ESBLs	Extended Spectrum Beta Lactamases
EUCAST	European committee of Antimiorobial susceptibility testing.
Fem	Factor essential for resistance to methicillin.
Fox DD test	Cefoxitin disk diffusion test.
GlcNAc	N- acetyl glucosamine.
GPS.	Gram positive susceptibility
HA-MRSA	Health associated methicillin resistant staphylococcus aureus.
HCWs	Health care workers.
HIV	Human immune deficiency virus
KDa	Kilodalton.
LukE/LukD	Leukocidin genes E and D
Mec R1	Mec sensor transducer and repressor genes.
MHA	Mueller hinton agar.
MIC.	Minimal inhibitory concentration.
MLST.	Multilocus-sequencing type.
m-PCR	Multiplex PCR.
MRCoNS	Methicillin resistant coagulase negative staphylococci
MRSA	Methicillin resistant staphylococcus aureus
MSCRAMM	Microbial surface component Recognizing Adhesive matrix molecules.
MUrNAc	N-acetyle muramic acid.

NCCLS	National committee for clinical laboratory standards.
OMSA	Oxacillin mannitol salt agar.
ORF	Opening reading Frame
ORSAB	Oxacillin resistant screen agar base
OxDD test	Oxacillin disk diffusion test
PBPs	Penicillin binding proteins
PCR	Polymerase chain reaction
PFGE	Pulsed-Field gel electrophoresis
PPE	Personal protective equipments
PVL	Panton-Valentine Leucocidin Toxin
SCC mec	staphylococcal cassette chromosome
SCOPE	Surveillance and Control of Pathogens of Epidemiologic Importance
SEs	Staphylococcal enterotoxins
Spa	Staphylococcal protein A gene.
SSS	Staphylococcal Scalded skin Syndrome
TSS	Toxic shock syndrome.
VISA	Vancomycin intermediate-resistant *Staphylococcus aureus*

Screening Test for Rapid Detection of Methicillin Resistance in Staphylococcal Isolates

Thesis
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Introduction

Staphylococcus aureus is by far the most important human pathogen among staphylococci ***(Koneman et al., 1997).***staphylococcal resistance was reported shortly after penicillin was introduced and within 6 years 25% of hospital strains were resistant to penicillin, the introduction of methicillin in 1960 was soon followed by resistance and emergence of methicillinresistant Staphylococcus aureus (MRSA) ***(Ayliffe, 1994).***

The first outbreaks of infection caused by (MRSA) had occurred in European hospitals in early 1960 ***(Ayliffe, 1997).*** Since that time, MRSA has become a worldwide problem, and its prevalence has increased in past two decades, causing nosocomial infections in many countries. Recently, MRSA has also been detected in community ***(Borer et al.,2002).*** Infections caused by MRSA are among the most difficult to treat ***(Glinka, 2002).***

Vancomycin has been considered an effective treatment of MRSA ***(Smith et al., 1999).*** However, reports of decreased susceptibility to vancomycin was firstly described in 1997 in

Japan, this report was quickly followed by similar ones from other countries ***(Srinivasan et al., 2002).***

These therapeutic failure of vancomycin for MRSA infections have aroused considerable concern regarding the emergence of MRSA strains for which there will be no effective therapy ***(Sieradzki et al., 1999)*.**

Coagulase-negative staphylococci (CoNS) are frequently recovered from blood cultures and are a leading cause of nosocomial infections, especially in neonates, immunocompromised individuals, and patients with prosthetic implants ***(Perazzi et al.,2006).***A substantial increase in the frequency of oxacillin resistance in CoNS isolates has occurred over the last decades. At present, more than 70% of the CoNS isolates worldwide are resistant to oxacillin ***(Diekema, 2001).***

Mithicillin resistance in Staph. aureus and CoNS is associated with the production of PBP2A encoded by mecA gene. The Genotypic method polymerase chaine reaction (PCR) is the gold standard method for mecA gene detection but it is expensive and not practical for routine use in many clinical laboratories ***(Adaleti et al., 2007).***

Accepted phenotypic method for detection of MRSA is cefoxitin disk diffusion (DD) test that correlate better with the presence of mecA gene than do the results of disk diffusion test using oxacillin ***(Boubaker 2004).***

The cefoxitin DD test can be used to predict the presence of mecA in Staph. aureus and CoNS with a high degree of sensitivity and specificity when compared to mecA detection using PCR ***(Swenson-Fred et al., 2005).***

Although the use of cefoxitin disk diffusion increases the accuracy of Staph. aureus and CoNS conventional antimicrobial susceptibility tests, testing still requires 24 houres after colony formation ***(Miller et al., 2005).***

So Rapid and accurate detection of methicillin resistance in Staph.aureus isolates is imperative for appropriate treatment to limit the inappropriate use of antimicrobial agents and implementation of institutional program for recognition and management of MRSA outbreaks and cross infection. PBP2A latex agglutination can be performed in 20 minutes with minimal technical training ***(Louie et al., 2002).***