بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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MONA MAGHRABY

"Prevalence of *mecC* Gene among Methicillin Resistant Staphylococcus Aureus (MRSA) Isolated from Patients in Ain-Shams University Hospital"

Thesis

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وقل اعملوا

فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ

وَسَتُرَدُّونَ إِلَى عَالِمِ الْغَيْبِ وَالشَّهَادَةِ

فَيُنَبِّئُكُم بِمَا كُنتُمْ تَعْمَلُونَ

صدق الله العظيم

سورة التوبة - الآية (١٠٥)

"In the Name of God, the Most Gracious, the Most Merciful"

"And say, Do [as you will], for Allah will see your deeds, and [so, will] His Messenger and the believers. And you will be returned to the Knower of the unseen and the witnessed, and He will inform you of what you used to do."

At-Tawba(9-105)

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LIST OF ABBREVIATIONS

Abbreviation	Meaning
MRSA	Methicillin-resistant *Staphylococcus aureus*
HA-MRSA	Hospital associated MRSA
CA-MRSA	Community acquired MRSA
LA-MRSA	Live-stock associated MRSA
SCC	Staphylococcal Cassette Chromosome
ICU	Intensive Care Units
PVL	Panton-Valentine leukocidin.
AST	Active Surveillance Testing
CoNS	coagulase negative *Staphylococcus*
BMD	Broth microdilution
MH	Muller-Hinton
MIC	Minimal Inhibitory Concentration
PCR	polymerase chain reaction
mPCR	Multiplex polymerase chain reaction
CLSI	clinical laboratory standards institute
DA	Clindamycin
FOX	Cefoxitin
E	Erythromycin
P	Penicillin
SXT	Trimethoprim/Sulfamethoxazole
DO	Doxycycline
LZO	Linezolid
RA	Rifampin
CIP	Ciprofloxacin
C	Chloramphenicol
CN	Gentamycin
LEV	Levofloxacin

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INTRODUCTION

Methicillin-resistant *Staphylococcus aureus* (MRSA) has emerged as a major cause of nosocomial infections and was regarded as Hospital associated MRSA (HA-MRSA) Since its discovery in the 1960's, in 1990's it was recognized in patients with no previous contact with healthcare facilities and was designated as community acquired MRSA (CA-MRSA), MRSA also has been recognized in a wide range of host species with evidence of animal to human transmission and was therefore regarded as Live-stock associated MRSA (LA-MRSA). MRSA poses a serious problem for infection prevention and control and antibiotic treatment globally (***Lakhundi, S., & Zhang, K.,2018).***

In a healthcare setting, such as a hospital or nursing home, MRSA can cause severe problems such as bloodstream infections, pneumonia and surgical site infections ***(CDC, 2016).***

Resistance against almost all beta-lactam compounds in clinical use in MRSA is conferred by the expression of a modified Penicillin-binding protein 2a (PBP2a) that is encoded by the *mecA* gene carried on a staphylococcal cassette chromosome *mec* (*SCCmec*) ***(Kumurya, 2015).***

The report of MRSA encoding a divergent *mecA* gene in 2011 was highly significant. This homologue, designated *mecC*, poses diagnostic problems with the potential to be misdiagnosed as

methicillin-sensitive *S. aureus*, with important potential consequences for individual patients and for the surveillance of MRSA ***(paterson et al., 2014).***

The new homologue of *mecA (mecC*) was described sharing only 70% DNA identity with the *mecA* ***(Garcıa-Alvarez et al., 2011)***.

MecC MRSA have been reported from 13 European countries and have been isolated from 14 different host species, with evidence of a recent increase in Denmark Published at the same time as the UK, work in the Republic of Ireland independently described *mecC* in human MRSA strains isolated in 2010 ***(Garcia-Alvarez et al.,2011).***

This *mecC* MRSA produce a distinctive antibiotic susceptibility profile compared to *mecA*. Where both Oxacillin and Cefoxitin are included, *mecA* MRSA, as might be expected, typically display resistance to both. By contrast, the majority of *mecC* MRSA show resistance to Cefoxitin, and are therefore reported as MRSA, but however show susceptibility to Oxacillin ***(Cartwright, 2013).***

Also, Resistance to non β lactam antibiotics is uncommon among *mecC* mediated MRSA ***(Paterson et al., 2014).*** So, detection of the prevalence of *mecC* MRSA is important to give more options in the treatment of MRSA infections.

There are limited data available on the epidemiology and prevalence of (MRSA) that encode the recently described *mecA* homologue (*mecC*) in Egypt. To address this knowledge gap this study was done.

AIM OF WORK

The aim of this study was to detect the prevalence of *mecC* gene in clinical isolates of MRSA in Ain-Shams University Hospitals and to correlate minimal inhibitory concentration (MIC) of Oxacillin with the *mecC* gene expression in MRSA isolates.