



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



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# شبكة المعلومات الجامعية التوثيق الإلكتروني 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



### يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



**MONA MAGHRABY**



Ain Shams University  
Faculty of Medicine  
Department of Medical Microbiology and Immunology

**Detection of Colistin Resistant Gram Negative Bacilli in  
Intensive Care Unit Patients Admitted to Ain Shams  
University Hospitals**

*Thesis*

For Partial Fulfillment of **Master Degree**  
in **Medical Microbiology and Immunology**

By

**Esraa Raafat Ibrahim Abo El naga**

*M.B.B.Ch., Faculty of Medicine  
Ain Shams University*

*Supervised by*

**Assist.Prof.Walaa Abd El-Latif Ibrahim  
El Sadek**

Assistant Professor of Medical Microbiology and Immunology  
Faculty of Medicine - Ain Shams University

**Dr. Yasmin Mohamed Ahmed Mahmoud**

Lecturer of Medical Microbiology and Immunology  
Faculty of Medicine - Ain Shams University

**Dr. Ahmed Kamal Mohamed Ali**

Lecturer of Anesthesia, Intensive Care and Pain Management  
Faculty of Medicine - Ain Shams University

**Faculty of Medicine  
Ain Shams University  
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أَعُوذُ بِاللَّهِ مِنَ الشَّيْطَانِ الرَّجِيمِ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا  
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سُورَةُ النِّعَمِ

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✍ **Esraa Raafat Ibrahim**

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## **List of Abbreviations**

|              |                                                 |
|--------------|-------------------------------------------------|
| <b>AST</b>   | : Antimicrobial susceptibility testing          |
| <b>ATP</b>   | : Adenosine triphosphate                        |
| <b>BMD</b>   | : Broth microdilution method                    |
| <b>CAMPs</b> | : Cationic antimicrobial peptides               |
| <b>CLED</b>  | : Cystine-Lactose-Electrolyte-Deficient-medium. |
| <b>CLSI</b>  | : Clinical and Laboratory Standards Institute.  |
| <b>CMS</b>   | : Colistin methanesulfonate.                    |
| <b>CPSs</b>  | : Capsular polysaccharides                      |
| <b>CSU</b>   | : catheter-stream urine                         |
| <b>DL</b>    | : Deciliter                                     |
| <b>DTT</b>   | : Dithiothreitol                                |
| <b>EA</b>    | : Essential agreement.                          |
| <b>ECV</b>   | : epidemiological cutoff value.                 |
| <b>EDETA</b> | : Ethylenediaminetetraacetic acid               |
| <b>ESBL</b>  | : Extended-spectrum $\beta$ -lactamase          |
| <b>ETA</b>   | : Ethanolamine.                                 |
| <b>GI</b>    | : Gastrointestinal                              |
| <b>GNB</b>   | : Gram-negative bacteria.                       |
| <b>HPLC</b>  | : High-Performance Liquid Chromatography.       |
| <b>ICU</b>   | : Intensive Care Unit                           |
| <b>IU</b>    | : International unit                            |

|                |                                              |
|----------------|----------------------------------------------|
| <b>IV</b>      | : Intravenous                                |
| <b>Kdo</b>     | : Ketodeoxyoctulosonate.                     |
| <b>Kg</b>      | : Kilo Gram                                  |
| <b>KPC</b>     | : <i>Klebsiella pneumoniae</i> carbapenemase |
| <b>LAMP</b>    | : Loop-mediated isothermal amplification.    |
| <b>L-Ara4N</b> | : 4-amino-4-deoxy-L-arabinose.               |
| <b>LPS</b>     | : Lipopolysaccharide.                        |
| <b>MBLs</b>    | : Metallo-beta-lactamases                    |
| <b>Mcr</b>     | : Mobilized colistin resistance              |
| <b>MDR</b>     | : Multi drug resistance.                     |
| <b>Mg</b>      | : Milli Gram                                 |
| <b>MH</b>      | : Muller Hinton                              |
| <b>MMS</b>     | : MICRONAUT MIC-Strip.                       |
| <b>MSU</b>     | : Mid-stream urine samples                   |
| <b>MTS</b>     | : MIC Test Strip.                            |
| <b>Ng</b>      | : <i>Neisseria gonorrhoeae</i>               |
| <b>Nm</b>      | : <i>Neisseria meningitidis</i>              |
| <b>OMP</b>     | : Outer membrane porines                     |
| <b>OST</b>     | : Osthole                                    |
| <b>PCR</b>     | : Polymerase Chain Reaction                  |
| <b>PEA</b>     | : Phosphoethanolamine                        |
| <b>PR</b>      | : Plasmid-borne                              |
| <b>SPSS</b>    | : Statistical package for Social Science.    |

|            |                              |
|------------|------------------------------|
| <b>STC</b> | : Sensitest™ Colistin        |
| <b>TA</b>  | : Tracheal aspirate          |
| <b>TCS</b> | : Two-component system       |
| <b>UV</b>  | : Ultraviolet light          |
| <b>VME</b> | : Very major error.          |
| <b>WHO</b> | : World Health Organization. |

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## Abstract

**Background:** Colistin is the last choice for serious infections caused by multidrug-resistant (MDR) Gram negative bacteria (GNB) and one of the prominent causes for spreading the resistance is Plasmid-borne (PR) Mobile colistin Resistance (*mcr*). Broth microdilution method (BMD) is the reference tool for colistin MIC determination, but it has many obstacles, so commercial BMD methods had been developed that are more user-friendly than the reference method and (Liofilchem ® ComASPTM) is one of them, which we used to determine colistin MIC in this study.

**Objective:** to detect colistin resistant gram negative bacilli by ComASPTM Colistin (formerly Sensi Test™Colistin) among Intensive Care Unit (ICU) patients admitted to Ain Shams university hospitals and screen the presence of *mcr-1* gene by Polymerase Chain Reaction (PCR) in colistin resistant isolates.

**Methodology:** This observational cross-sectional study was performed in the Medical Microbiology and Immunology Department, Faculty of Medicine, Ain Shams University between June 2019 to November 2019. One hundred isolates of Gram negative bacilli were obtained from patients admitted at different ICUs of Ain Shams University

Hospitals. Full identification was done by conventional microbiological methods, Then MIC was measured for all isolated organisms by using commercial BMD ComASPTM Colistin. Lastly, PCR was done for colistin resistant isolates to detect *mcr-1* gene.

**Results:** 60% of the Gram negative bacilli isolates were *K.pneumoniae*. Colistin resistance was 14% among 100 (GNB), Prevalence of *mcr-1* gene was 7.1%.

**Conclusion:** Commercial BMD ComASPTM Colistin is a simple and uncomplicated method for detecting colistin susceptibility.

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**Keywords:** Colistin resistance, *mcr-1* gene, ComASPTM Colistin.