بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

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MONA MAGHRABY

Serum Cystatin C as a Marker for Acute Kidney Injury Evaluation in Neonates Treated with Colistin

Thesis

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Ahmed Fawzy Abdel Aziz Donia

List of Contents

List of Abbreviations

Abb.	Full term
AKI	*Acute kidney injury*
AKIN	*Acute Kidney Injury Network*
ATN	*Acute tubular necrosis*
Auc	*Area under the curve*
BP	*Blood pressure*
BUN	*Blood Urea Nitrogen*
CMS	*Colistimethate sodium*
CPAP	*Continuous positive air way pressure*
CysC	*Serum cystatin C*
DMSA	*Dimercapto Succinic Acid*
ECF	*Extracellular fluid*
ELISA	*Enzyme immune-metric assay*
FENa	*Fractional excretion of sodium*
GA	*Gestational age*
GADD153	*Growth arrest and DNA damage 153*
GFR	*Glomerular filtration rate*
HFNC	*High flow nasal canula*
HIV	*Human immunodeficiency virus*
HPLC	*High performance liquid chromatography*
HRP	*Horseradish peroxidase*
HS	*Highly significant*
IVU	*Intravenous urogram*
KDIGO	*Kidney Diseases Improving Global Outcomes*

List of Abbreviations cont...

Abb.	Full term
KFTs	*Kidney function tests*
LOS	*Length of stay*
MCUG	*Cystourethrogram*
MDR	*Multi-drug resistant*
MDR-GNB	*Multi drug resistant gram negative bacteria*
MIC	*Minimal inhibitory concentration*
Npv	*Negative predictive value*
NS	*Non significant*
PK	*Pharmacokinetic*
PMB	*Polymyxinb*
ppv	*Positive predictictive value*
RBF	*Renal blood flow*
RD$	*Respiratory distress syndrome*
Roc	*Receiver operating characteristic curve*
S	*Significant*
SCr	*Serum creatinine*
sCysC	*Serum cystatin C*
SGA	*Small for gestational age*
SPSS	*Statistical package for social science*
UTI	*Urinary tract infection*

List of Tables

List of Tables cont...

List of Figures

List of Figures cont...

INTRODUCTION

Colistin or polymixin E is a glycopeptide antibiotic. From this group, only colistin and polymixin B have been clinically used. Colistin, which was discovered in 1949, is produced by a certain strain of a Bacillus polymixa variant called colistinus ***(Falagas et al., 2005)***.

In the past 10–15 years, the emergence of multi-drug resistant (MDR) gram negative bacilli, especially Pseudomonas aeruginosa, Acintobacter baumannii and Klebsiella pneumonia, and the drying of the antibiotic development pipeline have led to the return and increasingly worldwide use of colistin ***(Lim et al., 2010).***

The bactericidal effect of colistin is concentration-dependent and there exists a post-antibiotic effect against Pseudomonas aeruginosa, Acintobacter baumannii and Klebsiella pneumonia ***(John et al., 2015).***

Colistin became available for clinical use in the 1960s, and was replaced by less toxic antibiotics after almost a decade, due to concerns about its toxicity, especially nephrotoxicity ***(Li et al., 2006).***

Acute kidney injury (AKI) is associated with mortality, morbidity, and longer hospital length of stay in hospitalized patients ***(Alkandari et al., 2011).*** Nephrotoxic medication use

is a leading cause of AKI in hospitalized children ***(Hui-Stickle et al., 2011).***

The current reference standard test for AKI is based on evaluating serum creatinine (SCr) rise from baseline, indicating acute decrease in glomerular filtration rate (GFR). However, SCr rises late in AKI pathogenesis, up to 3 days after a defined insult ***(Waikar et al., 2007)*** impeding early intervention and minimization of further kidney injury. SCr concentration is affected by various factors such as age, sex, and muscle mass, reducing the specificity of SCr as an AKI biomarker. New AKI diagnostic biomarkers have been identified and studied in recent years, mostly consisting of urine markers of renal tubular injury ***(Zappitelli et al., 2007).***

Serum cystatin C (CysC), a filtration marker of GFR, is an endogenous protease inhibitor produced at a constant rate by nucleated cells and its concentration is not affected by age, gender, or muscle mass in children ***(Grubb et al., 2005).***

In children, CysC is a more accurate estimate of GFR than SCr and is more diagnostic of reduced chronic kidney function ***(Filler et al., 2003).***

Thus, it is possible that acute CysC change may be more effective at detecting acute GFR changes with AKI than SCr (be a better reference test for AKI). Several studies have used CysC to define AKI, though the extent, to which CysC-defined