بسم الله الرحمن الرحيم

وَمَا أُوتِيتُم مِّن الْعِلْمِ إِلاَّ قَلِيلاً

صدق الله العظيم

سورة الإسراء آية (85)

Urinary Nitric Oxide in Newborns with Sepsis

Thesis
Submitted for partial fulfillment of
M. Sc degree in
Pediatrices

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2007

ACKNOWLEDGMENT

Thanks to Great Almighty Merciful God for giving me patience and ability to do and complete this work.

I would like to express my deepest gratitude to Prof. **Dr. Dahlia El Sebaie**. Professor of Pediatric, Faculty of Medicine, Cairo University for her masterful teaching, continuous support and correction.

I am deeply indebted to Prof. Dr. **Mohamed Abdoul Hassan** Assistant. Professor of Pediatric. Faculty of Medicine, Cairo University, for his great support and valuable guidance all through the preparation of my work.

I would like also to thank Dr. **Reham Zyada,** Lecturer of Chemical Pathology, Faculty of Medicine, Cairo University, for her advise and excellent supervision.

Lastly I would like to thank my father and mother for their support and encouragement. I owe special debt to unwavering support of my beloved husband Eng. ***Alaa Salah***.

Urinary Nitric Oxide in Newborns with Sepsis

Key words

Nitric Oxide – Urine – Sepsis – newborns.

Abstract

Background: Neonatal Sepsis is a major problem in newborn nurseries because of the difficulty in early diagnosis and because of high morbidity and mortality.

The objective of this study was to investigate whether urinary nitric oxide (NO) level could be useful for the diagnosis of infected newborns.

Methods: Urinary NO are measured for newborns with sepsis on the 1st and on the 4th day who were group of study (group I) and compared with age matched healthy control (group II).

Results: Ninety percent of the septic group showed increase in the urinary NO level during sepsis, while in the control group there was decrease in the NO level, the mean of NO on the 1st day in group (I) was (67.13 ± 50.03) and was (78.52 ± 36.80) in group (II), the mean of NO on the 4th day was (97.49 ± 65.75) while in group (II) was (56.87 ± 29.62) and the percentage change from 1st day was (76.47 ± 103.33) in group I but was (-30.81 ± 25.77) in group II.

Conclusion: Urinary NO level which are quick and easy to measure are higher in the infected newborns as compared with controls. The sensitivity of the test is good and the serial measurements of NO is recommended to early detection of sepsis.

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List of Abbreviation

ADP	=	**Adenosine diphosphate**
ARDS	=	**Acute respiratory distress syndrome**
ATP	=	**Adenosine triphosphate**
BBs	=	**Blood barriers**
BH4	=	**Tetra hydroptein**
BW	=	**Birth weight**
BW	=	**Birth weight**
CBC	=	**Complete blood picture**
cGMP	=	**Cyclic guanosin monophosphate**
CMV	=	**Cyto megalo virus**
CMV	=	**Cyto megalo virus**
cNOS	=	**Constitutive Nitric Oxide Synthase**
CNS	=	**Central nervous system**
CONS	=	**Coagulase negative staph**
CRH	=	**Cortico tropin releasing hormone**
CRP	=	**C – Reactive protein**
CSF	=	**Cerebro spiral fluid**
DIC	=	**Disseminated intravascular coagulopathy**
DNA	=	**Dinucleic acid**
ECMO	=	**Extra corporeal membrane oxygenation**
EM	=	**Electron microscopy**
eNOS	=	**Endothelial Nitric Oxide Synthase**
ESR	=	**Erythrocyte sedmintation rate**
FAD	=	**Flavin adenine dinucleotide**
FDP	=	**Fibrin degradation products**
FMN	=	**Flavin mono nucleotide**
G –CSF	=	**Granulacyte colony stimulation factor**
GA	=	**Gestational age**

GBS	**=**	**Group B streptococcus**
Gh	**=**	**Growth hormone**
GnRH	**=**	**Gonadotropin releasing hormone**
HIV	**=**	**Human immuno deficiency virus**
HSS	**=**	**Hematological scoring system**
HSV	**=**	**Herps simplex virus**
HVS	**=**	**High vaginal swab**
IFA	**=**	**Immun fluorescent antibody**
IgA	**=**	**Immunoglobulin A**
IgE	**=**	**Immunoglobulin E**
IgG	**=**	**Immunoglobulin G**
IgM	**=**	**Immunoglobulin M**
IL – 6	**=**	**Interlukein 6**
iNOS	**=**	**Inducible Nitric Oxide Synthase**
IPPV	**=**	**Intermittent positive pressure ventilation**
IT	**=**	**Immature neutrophils / total**
IVIG	**=**	**Intravenous immunoglobulins**
LA	**=**	**Latex particle agglutination**
LBW	**=**	**Low birth weight**
LBW	**=**	**Low birth weight**
MBC	**=**	**Minimum bactericidal concentration**
MIC	**=**	**Minimum inhibitory concentration**
mRNA	**=**	**Messenger ribo nucleic acid**
NB	**=**	**Newborn**
NEC	**=**	**Necrotizing entero colitis**
NICU	**=**	**Neonatal intensive care urite**
NK	**=**	**Natural Killer**
nNOS	**=**	**Neuronal Nitric Oxide Synthase**
PCR	**=**	**Polymerase chain reaction**

PGE_2	**=**	**Prostaglandins E_2**
PGES	**=**	**Prostaglandin endoperoxide synthase**
PMNLs	**=**	**Poly morpho nuclear leucocytes**
PPHN	**=**	**Persistant pulmonary hypertension**
PRH	**=**	**Prolacting releasing hormone**
PROM	**=**	**Premature rupture of membrane**
PT	**=**	**Prothrombin time**
PTT	**=**	**Partial thromboplastin time**
RBCS	**=**	**Red blood cells**
RDS	**=**	**Respiratory distress syndrom**
rG – CSF	**=**	**Recombinant granulacyte colony stimulation factor**
RSV	**=**	**Respiratory suncytial virus**
SGA	**=**	**Small gestational age**
SIRS	**=**	**Systemic inflammatory response syndrome**
TFA	**=**	**Immuno – fluorescent – antibody**
TLC	**=**	**Total leucocytic count**
TNF	**=**	**Tumous necrosis factor**
TNFα	**=**	**Tumor necrosis factor-α**
UTI	**=**	**Urinary tract infection**
VD	**=**	**Vaginal delivery**
VIQ	**=**	**Ventilation perfusion matching**
VLBW	**=**	**Very low birth weight**
VLBW	**=**	**Very low birth weight**
WBCs	**=**	**White blood cells**

Correction sheet

Page		
2	isolation	Isolation
4	It occur	It occurs
27	**Early Manifestations**	**Early manifestations**
29	**Late manifestations**	**II Late manifestations**
96	**in 1st day**	**on 1st day**
	nitric oxide	**Nitric Oxide**
100	**Hospital**	**hospital**
103	**cytomegal virus**	**cytomegalvirus**
107	**(forceps used)**	**removed**

Chapter 1
Sepsis of Neonates

Sepsis of Neonates

Introduction:

Sepsis as either primary pathology or a complication of other illness, is a major cause of neonatal mortality and morbidity all over the world. The impact of infection can be reduced as international comparisons show, but even in the most technologically advanced countries, the contribution of a susceptible host, non specific clinical presentation and an ever changing population of pathogens makes for a great challenge ***(Roberton et al., 1999)***.

Infection is responsible for approximately 2 million neonatal deaths per year in developing countries. In other industrialized countries, the mortality rate has decline to 5.1 per 1000 liver births due to progress in obstetrics and neonatal intensive care unit and improved survival particularly preterm and low birth weight neonates, which for the immunological state and the invasive therapies they are subjected to and extremely at risk for sepsis ***(Lanari et al., 2001)***.

Definition:

Neonatal sepsis is defined as a clinical syndrome of bacteremia with systemic signs and symptoms of infection and a positive culture for central body fluid.

The National Neonatology Forum's definition for hospital is as follows:

(A) Probable sepsis:

Infants with clinical picture suggestive of sepsis with one or more of the following criteria:

a) Existence of predisposing factors: maternal fever or foul smelling liquor or prolonged rupture of membranes (>12hrs) or presence of gastric polymorphs.

b) Positive septic screen (two of the four parameters namely, TLC < 5000/mm^3, band to total polymorph ratio of > 0.2, CRP > 6ug/ml, and ESR>10mm 1st hr).

c) Radiological evidence of pneumonia.

(B) Proven sepsis:

Infants with clinical picture of sepsis with either

- Isolation of pathogens from blood, CSF and urine.
- Autopsy evidence.

(Guha et al., 2005)

Neonatal sepsis is resulting from the pathophysiological effect of local or systemic infection in the 1st month of life ***(Behrman, 1996)***.

Sepsis is a set of acute physiologic responses to infection. It is defined by presence of two or more of the following manifestations; fever or hypothermia, tachycardia, tachypnea, and an abnormal white blood cells (WBCs) or increase in immature forms ***(Gotoff, 2000)***.

Incidence:

The incidence rate of neonatal sepsis varies from country to country, nursery to nursery and within the same nursery at different times ***(Kliegman, 1998)***.

The incidence of bacterial sepsis and meningitis, especially for *Gram negative enteric bacilli*, is higher in males than in females. Premature/ preterm infants have an increased incidence of sepsis. The incidence of sepsis is significantly higher in infants with very low birth weight (VLBW) <1000 gm at 76 per 1000 live births, than in infants with birth weight BW of 1000-2000 gm at 8 - 9 per 1000 live births.

The risk of death or meningitis from sepsis is higher with low birth weight (LBW) than full term neonates (***Guha et al., 2005).***