Assessment of Vitamin D status among Septic Children Admitted to PICU and its effect on the Clinical Outcome

Thesis

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List of Abbreviations

°C.....Celsius degree

1,25-(OH)2 vit D...1,25- Dihydroxyvitamin D.

1,25D .....1,25-dihydroxyvitamin D

24-OHase.....25-hydroxyvitamin D-24-hydroxylase

25-(OH) vit D.....25- Hydroxyvitamin D

25D.....25-hydroxyvitamin D

5a .....C5aR Complement fragment 5a receptor

7-DHC.....7- Dehydrocholesterol

AB.....B-lymphocytes

AI.....Adequate intake

AMPs .....Antimicrobial peptides

ANOVA.....Analysis of variance

AODM .....Adult onset diabetes mellitus

ARDS.....Acute respiratory distress syndrome

AT.....T-lymphocytes

ATP.....Adenosine triphosphate

BP.....blood pressure

BS.....blood sugar

C5a.....Complement fragment

Ca.....Calcium

CaSR .....Calcium-sensing receptor

CD .....Crohn disease

CHD.....Coronary heart disease

CNS .....Central nervous system

CRP .....C-reactive protein

D.....Vitamin D deficient ptients

List of Abbreviations

DBP .....Vitamin D binding protein

EFSA .....European Food Safety Authority

FEV1 .....Forced expiratory volume in 1 second

GCS .....Glasgow Coma Score

HAART .....Highly active antiretroviral therapy

HBP .....High blood pressure

Hr .....Hour

I.....Vitamin D insufficient patients

ICU .....Intensive care unit

IL.....Interleukin

IO .....Intraosseous

IOM .....Institute of Medicine

IU.....International Unit

IV.....Inravenous

LBD .....Ligand binding domain

LPS.....Lipopolysaccharide

MARRS.....Membrane-associated rapid response steroid binding protein

min.....minute

MRSA .....Methicillin-resistant staphylococcus aureus

MS .....Multiple sclerosis

N.....Number

NA.....NO abnormality

NF-kB .....Nuclear factor kappa-light-chain-enhancer of activated B cells

NICU.....Neonatal intensive care unit

NO .....Nitric oxide

List of Abbreviations

NOS .....Nitric oxide synthase

PAMP.....Pathogen-associated molecular pattern

PCR .....Polymerase chain reaction

PELOD.....pediatric logistic organ dysfunction

PICU .....Paediatric intensive care unit

PMNs .....Polymorphonuclear cells

Previt .....Previtamin

PRISM .....Pediatric risk of mortality

PRR .....pathogen-recognition receptors

PTH .....Parathyroid hormone

RA .....Rheumatoid arthritis

RDA.....Recommended daily allowances

RhoA .....Ras homolog gene family member A

ROS .....reactive oxygen species

RXR.....Retinoid X receptor

S.....Vitamin D sufficient ptients

SA-HRP.....Streptavidin-HRP

SBP.....Systolic blood pressure

ScvO2.....Central venous oxygen saturation

SD.....Standard deviation

SE.....Standard error

Secs.....Seconds

SIRS .....Systemic inflammatory response syndrome

SNP.....Single nucleotide polymorphism

SOFA .....Sequential [Sepsis-related] Organ Failure Assessment

List of Abbreviations

SOFA .....Sequential Organ Failure Assessment

TB.....Mycobacterium tuberculosis

Th.....T helper cell

TLR .....Toll-like receptor

TLRs.....Toll-like receptors

TNFa.....Tumor necrosis factor alpha

UL.....Tolerable upper intake level

URI .....Urinary tract infection

USA .....United States of America

VDD.....Vitamin D deficiency

VDR.....Vitamin D receptor

VDREs.....Vitamin D response elements

Vit .....Vitamin

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ABSTRACT

Background: Vitamin D deficiency is thought to negatively impact the cardiovascular, respiratory and immune systems directly through cellular vitamin D receptors.

Aim: To determine the incidence of vitamin D deficiency among septic critically ill children admitted to pediatric intensive care unit (PICU), Children's Hospital, Ain Shams University and the influence of vitamin D status on clinical outcome.

Patients and method: Prospective observational study on 52 critically ill children who were diagnosed with sepsis and admitted to pediatric ICU, Children's Hospital, Ain Shams University in the time period from July 2017 till January 2019. The patients aged 1 month - 18 years and they were subjected to detailed clinical history and examination. The patients were divided according to vitamin D status which was obtained as close as possible to diagnosis of sepsis using ELIZA. Studied groups were compared regarding demographic data, risk factors of vitamin D deficiency, severity of illness at admission and clinical outcome during PICU stay.

Results: The frequency of vitamin D deficiency (67.3 %) among septic children admitted to PICU while 11.5 % of patients were vitamin D insufficient. The mean of serum vitamin D (25OHD) among patients was (18.6 ± 20.6 ng/ml). Vitamin D deficiency was highly significant associated with low serum calcium level and high serum CRP level. There was a poor clinical outcome among vitamin D deficient patients but with no significant difference compared to vitamin D sufficient patients regarding need for mechanical ventilation, use of catecholamines, progression to septic shock, length of PICU stay and mortality.

Conclusion: Vitamin D deficiency should be considered as a risk factor for pediatric sepsis. However, it does not affect the clinical outcome.

Keywords: Vitamin D, Pediatric sepsis, PICU.