Assessment of Vitamin D Deficiency in Critically Ill Children

Thesis

Submitted for partial fulfillment Of Master Degree in
Pediatrics

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List of Abbreviations

Abb.	Full term

ACCM ..... *American College of Critical Care Medicine*
AUC ..... *Area under curve*
BUN..... *Blood urea nitrogen*
CaR.....*calcium sensing receptor*
CBC..... *Complete blood count*
CL ..... *confidence interval*
CPR..... *Cardiopulmonary Resuscitation*
CRP..... *C-reactive protein*
CV-SOFA ..... *Cardiovascular Score Sequential Organ Failure*
CYP24A1..... .*cytochrome p450*
D.....*day*
DBP.....*Dibutyl phthalate*
Dl.....*deciliter*
EDTA.....*Ethylenediaminetetraacetic acid*
ELISA ..... *Enzyme linked Immune Assay*
FGF23..... *Fibroblast Growth Factor 23*
HIV ..... *Human immunodeficiency virus*
ICU ..... *intensive care unit*
IIH .....*idiopathic infantile hypercalcemia*
IQR..... *inter-quartile range*
IU..... *International unit*
IV.....*Intravenous*
Kg..... *Killogram*
L..... *Liter*
M2..... *metersquare*
MED..... *minimal erythemal dose*
Meq..... *Miliequvilant*

List of Abbreviations Cont...

Abb.	Full term

ML……milliliter
MMR……Maternal Mortality Rate
MODS……multiple Organ Dysfunction Syndrome
MRSA.....Methicillin-resistant Staphylococcus aureus
NG…… No Growth
ng ..... nanogram
nmol……nanomol
Oz..... ounce
PAMP..... Pathogen-associated molecular pattern
Paco2…… Arterial carbon dioxide partial pressure
Pao2……rterial oxygen partial pressure
PES……Pediatric Endocrine Society
PICU..... pediatric intensive care unit
PMNs..... polymorphonuclear cells
PRISM III..... Pediatric Risk of Mortality score III
PT……Prothrombin time
PTH……Parathyroid hormone.
PTT……Partial thromboplastin time
ROC ..... Receiver operating characteristic curve
SC……Subcutaneous
SUL……Safe Upper Levels
TLR.....toll-like receptors
Treg..... regulatory T-cell
USA ..... United states of American
UV..... Ultraviolet
VDD ..... Vitamin D Deficiency
VDR ..... Vitamin D Receptor

List of Abbreviations Cont...

Abb.	Full term

WBC..... White blood count
WHO..... World Health Organization

Introduction

INTRODUCTION

Vitamin D plays an important role, not only for bone health, but also in the immune system. Both in vitro and clinical studies have demonstrated that vitamin D is important for the innate and adaptive immune response. In adults, vitamin D insufficiency is common in patients who are hospitalized or have a severe infectious process and is associated with increased mortality **(*Moromizato et al.,2014).***

Vitamin D enhances the antimicrobial response of monocytes of adults suggesting a protective role of vitamin D in infection. Similar links between vitamin D status and the immune system have been shown in pediatric populations. For example, children with cystic fibrosis, who suffer from chronic respiratory infections, have a high prevalence of vitamin D insufficiency that is associated with increased risk of pulmonary exacerbations (***McCauley et al., 2014*****).**

Many children are admitted to a pediatric intensive care unit (PICU) with serious infections or with a high chance of acquiring nosocomial infection once admitted. Severe blood stream infections alone account for significant morbidity and mortality. Adequate nutritional support has been a mainstay in

PICU management with research showing improved outcomes and fewer hospital stay days ***(Carcillo et al., 2009).***

However, there have been few studies to investigate the prevalence of vitamin D deficiency in critically ill children. **Madden et al**. found that 40% of children admitted to the pediatric intensive care unit had vitamin D deficiency **(*Madden et al., 2012)***.

The main purpose of the PICU is to prevent mortality by intensively monitoring and treating critically ill children who are considered at high risk of mortality. The capability to estimate patient risk of death is extremely important because such estimate would be useful in achieving many different goals such as assessing patient's prognosis, ICU performance, ICU resource utilization and also evaluating therapies, controlling and matching severity of illness in clinical studies ***(Poonam & Amit, 2008).***

PRISM III is a pediatric physiology based score for mortality risk**.** Severity of illness calculated with Pediatric Risk of Mortality score III (PRISM III), that has 17 physiologic Subscores: