Zinc Status in Egyptian Children With Pneumonia

Thesis

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By

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(M.B.B.cH)

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بسم الله الرحمن الرحيم

((قالوا سبحانك لا علم لنا إلا ما علمتنا إنك انت العليم الحكيم))

صدق الله العظيم

سورة البقرة (32)

ABSTRACT

A retrospective case-control study was conducted in Cairo University Pediatric Hospital (CUPH), from June to December 2007, to compare serum zinc levels in 40 well-nourished Egyptian children, aged 3 to 54 months, admitted with the diagnosis of pneumonia, and 12 age- and sex-matched healthy controls. There was no significant difference of serum zinc levels between cases and matched controls Mean serum zinc level was 1.05 ± 0.36 mg/L in cases, and was 1.26 ± 0.50 mg/L in controls ($p > 0.05$). The study recommends further investigation on a larger scale to determine the magnitude of the problem in Egypt.

Key words: Pneumonia, zinc, children.

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Mohammed Abdo

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List of abbreviations

AAP : American Academy of Pediatrics

AE : Acrodermatitis enteropathica

AR : Autosomal recessive

AOM : Acute Otitis Media

ALRTI : Acute lower respiratory tract infection

AFB : Acid fast bacillus

ASS : Atomic absorption spectroscopy

BAL : Bronchoalveolar lavage

C : Cytokine

CBC : Complete blood count

C. pneumoniae: Chlamydia pneumoniae

CAP : Community acquired pneumonia

CMV : Cytomegalovirus

CRP : C-reactive protein

CT : Computerized Tomography

CXR : Chest x-ray

DPT : Diphtheria-Pertussis-Tetanus toxoid

ET : Endotracheal

ELISA : Enzyme Linked Immunosorbant Assay

FiO2 : Fractional concentration of inspired oxygen

FDA : Food and Drug Administration

Hib : Hemophilus influenzae type b

HIV : Human immunodeficiency virus

Hmpv : Human metapneumovirus

HBoV : Human bocavirus

HCoV-NL63 : Human coronavirus-NL63

IM : Intramuscular

IV : Intravenous

IMCI : Integrated Management of Childhood Illness

IZiNCG : International Zinc Nutrition Consultative Group

IPD : Invasive pneumococcal disease

LBW : Low birth weight

M. pneumoniae : Mycoplasma pneumoniae

MRSA : Methicillin-resistant staphylococcus aureus

NK : Natural killer

NPA : Nasopharyngeal aspirate

NTHI : Nontypable Hemophilus influenzae

NBT : Nitroblue Tetrazolium Test

NVTs : Nonvaccine serotypes

OPAT : Outpatient parenteral antimicrobial therapy

p : p value

PaO2 : partial pressure of oxygen

PaCO2 : partial pressure of carbon dioxide

PVL : Panton-Valentine Leukocidin

PCV7 : 7-valent Pneumococcal conjugate vaccine

PCR : Polymerase Chain Reaction

PCP : Pneumocystis carinii pneumonia

PICU : Pediatric Intensive Care Unit

23PS : 23-valent pneumococcal polysaccharide

RDA : Recommended Dietary Allowance

SD : Standard deviation

RSV : Respiratory Syncytial Virus

SaO2 : Oxygen saturation

S. aureus: Staphylococcus aureus

SIADH : syndrome of inappropriate Antidiuretic Hormone Secretion

TB : Tuberculosis

TH : T helper

UNICEF : United Nations Children's Fund

URI : Upper respiratory tract infections

USA : United States of America

VEGF : Vascular Endothelial Growth Factor

WHO : World Health Organization

WBC : White blood cell

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INTRODUCTION AND AIM OF WORK

INTRODUCTION

Infections of respiratory tract are very common and associated with significant morbidity and mortality. Infections of lower respiratory tract are related to infections below the larynx and include bronchial infections and various forms of pneumonia **(MacFurlane and Thomson, 2003)**.

The increased susceptibility to pneumonia particularly in malnourished children of developing countries is postulated to be due to reduction in cellular immunity **(Zaman et al., 1996)**. One of the reasons for reduced immunological competence in malnourished children may be zinc deficiency **(Zalewski, 2006)**. However, relatively well-nourished children of developing countries also suffer from pneumonia and it is possible that they have impaired immunity due to zinc deficiency.

The dietary zinc (Zn) plays essential roles in cellular metabolism and gene expression. Critical to these processes are the mechanisms that regulate Zn homeostasis in cells and tissues. Recently, the first images of sub-cellular pools of Zn in airway epithelium have been obtained **(Brooks et al., 2004)**.

Zinc deficiency results in enhanced oxidative damage in the airways by causing infiltration of inflammatory cells and increased superoxide and nitric oxide production. When zinc deficiency occurs in conjunction with acute lung injury or asthma, a more intense inflammation is produced **(Tudor et al., 2005)**.

HYPOTHESIS:

Zinc deficiency has been linked to a group of respiratory disorders including pneumonia.

AIM OF THE WORK:

The present study was carried out to study this hypothesis via estimation of serum zinc levels in well nourished Egyptian children suffering from pneumonia.

REVIEW OF LITERATURE