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Evaluation of Serum Vitamin D Level in Children with Atopic Dermatitis

Thesis

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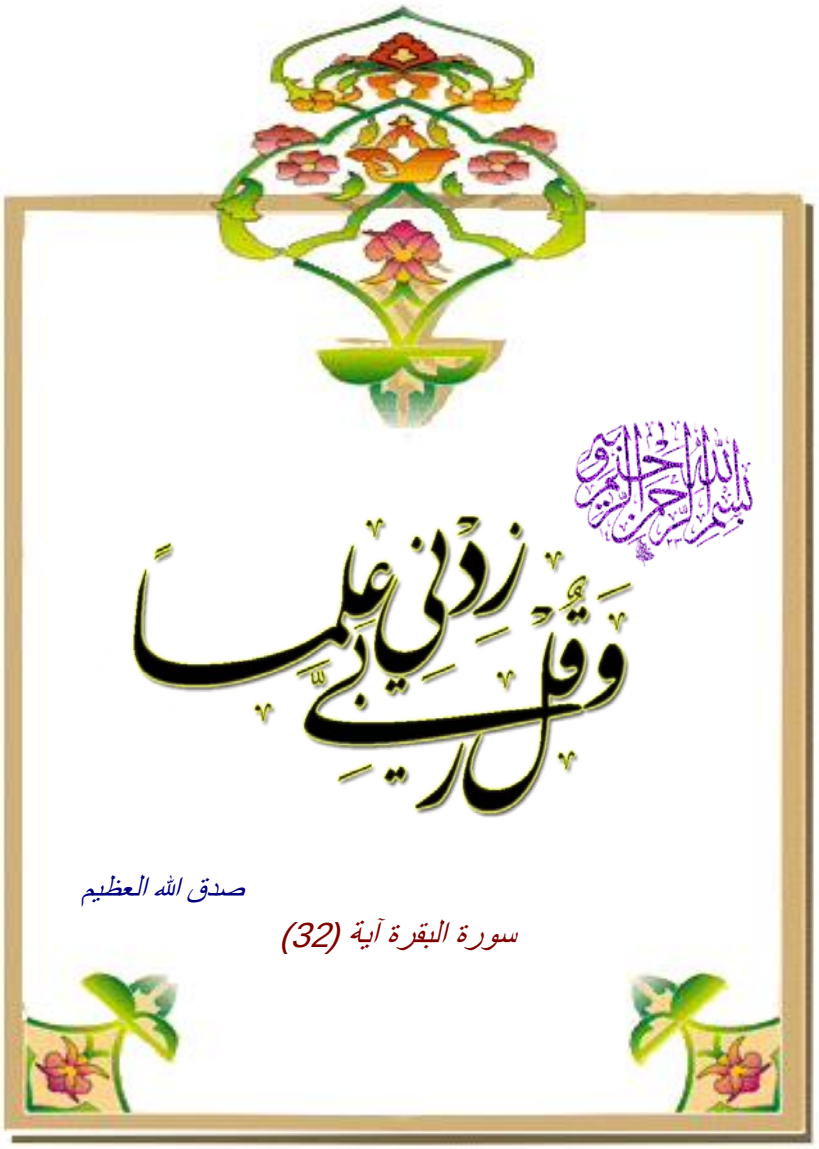

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25(OH)D : 25 hydroxyvitamin D.

25-OHase : Vitamin D-25-hydroxylase.

7-DHC : 7-dehydrocholesterol.

AAP : American academy of pediatrics.

Abs : Antibodies.

AD : Atopic dermatitis.

ADEH : Atopic dermatitis associated with eczema herpeticum.

AI : Adequate Intake.

AMPs : Antimicrobial peptides.

APCs : Antigen presenting cells.

APT : Atopy patch test.

A-SMase : Sphingomyelinase.

BCC : Basal cell carcinoma.

BMI : Body mass index.

C.albican : Candida albicans.

C3 : Complement 3.

CCL27 : Cutaneous T-cell attracting chemokine.

CE : Cornified cell envelope.

CMI : Cell mediated immunity.

CPDS : Cyclobutane pyrimidine dimers.

CTACK : Cutaneous T cell-Attracting Chemochine.

CYP24 : Enzyme 25(OH) D-24-hydroxylase.

CYP27B1 : Cytochrome p450 protien.

DBP : Vitamin D binding protein.

DCs : Dendritic cells.

EAR : Estimated Average Requirement.

EDC : Epidermal differentiation complex.

EGFR : Epidermal growth factor receptor.

FcεRI : High affinity IgE receptor.

FcεRII : Low affinity IgE receptor.

FLG : Filaggrin.

GATA3 : Gene trans-acting T cell-specific transcription factor.

GCMA1 : Gene that maps to the long arm of chromosome14q11.

GM-CSF : Granulocyte-monocyte colony stimulating factor.

H1 : Histamine receptor type 1.

HBD : Human beta definsin.

HDM : House dust mice.

HSV : Herpes simplex virus.

IDECs : Inflammatory dendritic epithelial cells.

IFN- γ : Interferon- γ.

Ig : Immunoglobulin.

ILs : Interleukins

IP 10 : Inducible protein 10.

IU : International unit.

KC : Keratinocyte.

LCs : Langerhans cells.

LEKTI : Lymphoepithelial Kazal-type-related inhibitor.

Mac-2/eBp : IgE- binding molecules.

MCC1 : Mast cell chymase 1.

MHC : Major histocompatibility complex.

MIP : Macrophage inflammatory Protien.

MM : Malignant melanoma.

MPC-1 : Monocyte Chemoattractant Protien.

mRNA : Messenger RNA.

NK : Natural killer cells.

NO : Nitric oxide.

N-SMase : Neutral sphingomyelinase.

PAR-2 : Protease-activated receptor-2.

PBMCs : Peripheral blood mononuclear cells.

pDCs : Plasmacytoid dendritic cells.

PDGF : Platelet derived growth factor.

PGE2 : Prostaglandin E2.

PTH : Parathyroid hormone.

RANTES : Regulated upon activation, normal T cells expressed and secreted.

RDA : Recommended Dietary Allowance.

S.aureus : Staphylococcus aureus.

SC : Stratum corneum.

SCC : Squamous cell carcinoma.

SCORAD : Score of atopic dermatitis.

SEB : Staphylococcus enterotoxin B.

SPINK5 : Serine protease inhibitor Kazal-type 5.

SPT : Skin prick test.

TARC : Thymus and Activation Regulated Chemokine.

TCIs : Topical calcineurin inhibitors.

TCR : T-cell receptor.

TEWL : Trans-epidermal water loss.

TGFβl : Transforming growth factor β 1.

Th2 : T- helper 2.

TIM-1 : T-cell immunoglobulin domain and mucin domain 1.

TJ : Tight junctions.

TLR : Toll-like receptor.

TNF : Tumor necrosis factor.

Treg : Regulatory T-cells.

TSLP : Thymic stromal lymphopoietin.

UV : Ultraviolet.

VDR : Vitamin D receptor.

Introduction

Atopic dermatitis is a chronic inflammatory itchy skin condition that develops in early childhood in the majority of cases. It is typically an episodic disease of exacerbation (flares, which may occur as frequently as two or three per month) and remissions, except for severe cases where it may be continuous **(Hanifin et al., 2004).**

Atopic dermatitis has been reported to affect 10 percent of children in the whole world **(Leung et al., 1997).** In infants and young children with atopic dermatitis, pruritus is commonly present on the scalp, face (cheeks and chin) and extensor surfaces of the extremities. Older children and adult typically have involvement of the flexor surfaces (antecubital and popliteal fossa), neck, wrists and ankles. The presence of extensor distribution in older children and adults indicates a poor prognosis for ultimate cure (**Lookingbill and Marks, 1993).**

As with other atopic conditions, such as asthma and allergic rhinitis, atopic dermatitis often has a genetic component. In atopic dermatitis, inherited factors affect the development of the skin barrier, which can lead to exacerbation of the disease by a large number of trigger factors, including irritants and allergens **(Lewis-jones and Mugglestone, 2007).**

Many cases of atopic dermatitis clear or improve during childhood while others persist into adulthood, and some children who have atopic dermatitis `will go on to develop asthma and/or allergic rhinitis; this sequence of events is sometimes referred to as the ‘atopic march’**(Lewis-jones and Mugglestone, 2007).**

Vitamin D3 can be obtained through the diet, but it is mainly biosynthesized from 7-dehydrocholesterol in skin exposed to ultraviolet light. Vitamin D3 is hydroxylated in the liver to produce 25(OH) D3, a reliable indicator of vitamin D status, and is further hydroxylated in the kidney to form the active hormone $1,25(OH)_2D3$. $1,25(OH)_2D3$, the biologically active form of vitamin D3, is a secosteroid hormone that regulates the growth and differentiation of multiple cell types, and displays immunoregulatory and anti-inflammatory properties. Cells involved in innate and adaptive immune responses including macrophages, dendritic cells, T cells and B cells express the vitamin D receptor (VDR), and can both produce and respond to $1,25(OH)_2D3$. The net effect of the vitamin D system on the immune response is an enhancement of innate immunity coupled with multifaceted regulation of adaptive immunity **(Adorini and Penna, 2008).**

Another potential role for vitamin D is that 1,25(OH)D3 enables keratinocytes to recognize and respond to microbes through action on the Toll-like receptor 2 and leads to upregulation of cathelicidin. Vitamin D deficiency might therefore be important in the predisposition of skin of patients with atopic dermatitis to superinfection by Staphylococcus aureus **(Schauber et al., 2007).**

Recently, the association between serum 25-hydroxy vitamin D levels and severity of atopic dermatitis in children has been suggested **(Peroni et al., 2011).**

Aim of the work

The aim of our study is to evaluate serum vitamin D level in children with atopic dermatitis in comparison to age and sex matched healthy children.

Atopic Dermatitis

Atopic dermatitis (AD) is a multifactorial and polygenic syndrome without pathognomonic histologic findings or disease-specific biomarkers. There are two forms of AD, referred to as extrinsic and intrinsic. The extrinsic/allergic form of AD develops in 70% to 80% of patients and is associated with an elevated serum total IgE level skin test reactivity to common environmental allergens. In contrast, an intrinsic/non-allergic form occurs in approximately 20% to 30% of AD patients and is associated with normal IgE levels. The major difference observed between these two forms of AD is greater production of T-helper (Th) 2 cytokines (interleukin-4 (IL-4) and IL-13) by cutaneous T cells in extrinsic AD, which is responsible for the elevated IgE levels and the enhanced expression of IgE receptors on antigen presenting cells (APCs) within the skin ***(Clemens et al, 2004)***.