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Evaluation of Serum Lipocalin-2 Levels and Its Relation to Insulin Resistance in Patients with Inflammatory Acne Vulgaris

Thesis

*Submitted for Partial Fulfillment of Master Degree in **Dermatology, Venereology & Andrology***

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✍Sara Hameed Samin

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List of Abbreviations

Abb.	Full term
5-LOX	*5-Lipoxigenase*
AD	*Atopic dermatitis*
AI	*Acne inversa*
AV	*Acne Vulgaris*
BMI	*Body mass index*
C.acnes	*Cutibacterium acnes*
CAH	*Congenital adrenal hyperplasia*
CP	*Choroid plexus*
CRH	*Corticotropin releasing hormone*
DHEAS	*Dehydroepiandrosterone sulphate*
ELISA	*Enzyme linked immune sorbent assay*
FAI	*Free androgen index*
GAGS	*Global Acne Grading System*
GBD	*Global Burden of Disease*
GM-CSF	*Granulocyte-macrophages colony stimulating factor*
HETE	*Hydroperoxy-ecosatetraenoic acid*
HOMA	*Homeostasis Model Assessment*
HOMA-IR	*Homeostasis Model Assessment of Insulin Resistance*
HPA	*Hypothalamic -pituitary-adrenal axis*
HRP	*Horseradish peroxidase*
IBD	*Inflammatory bowel disease*
IFNγ	*Interferon γ*
IGF-1	*Insulin like growth factor-1*
IGFBP-1	*Insulin-like growth factor binding protein-1*
IGFBP-3	*Insulin-like growth factor binding protein-3*

List of Abbreviations (Cont...)

Abb.	Full term
IL-10	*Interleukin-10*
IL-11	*Interleukin-11*
IL-12	*Interleukin-12*
IL-17	*Interleukin-17*
IL-17A	*Interleukin-17A*
IL-17F	*Interleukin-17F*
IL-1α	*Interleukin-1α*
IL-1β	*Interleukin 1β*
IL-22	*Interleukin-22*
IL-23p19	*Interleukin-23p19*
IL-23p40	*Interleukin-23p40*
IL-6	*Interleukin-6*
IL-8	*Interleukin-8*
LCN2	*Lipocalin-2*
LDL	*Low density lipoprotein*
LPS	*Lipopolysaccharide*
LTB4	*Leukotriene B4*
MMPs	*Matrix Metalloproteinase*
mTORC1	*mammalian Target of rapamycin complex-1*
NF-κB	*Nuclear factor κB*
NGAL	*Neutrophil gelatinase-associated lipocalin*
NLPR3	*Node like receptor family pyrin domain containing 3*
OA	*Osteoarthritis*
PCOS	*Polycystic ovary syndrome*
PPARs	*Peroxisome proliferators-activated receptors*
RA	*Rheumatoid arthritis*
RBP4	*Retinol-binding protein 4*

List of Abbreviations (Cont...)

Abb.	Full term
ROS	*Reactive oxygen species*
SHBG	*Sex hormone binding globulin*
TGF-α	*Transforming growth factor- α*
TLR-2	*Toll-like receptors 2*
TNF	*Tumor necrosis factor*
TNF-α	*Tumor necrosis factor α*
TSH	*Thyroid-stimulating hormone*
WBC	*White blood cell*

ABSTRACT

EVALUATION OF SERUM LIPOCALIN-2 LEVEL AND ITS RELATION TO INSULIN RESISTANCE IN PATIENTS WITH INFLAMMATORY ACNE VULGARIS

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Acne vulgaris is a common chronic inflammatory disease of the pilosebaceous unit. It is characterized by the formation of non-inflammatory comedones and inflammatory papules, pustules, nodules and cysts. Acne is extremely common and usually starts during the teenage years but can start for the first time in their 20s and 30s. The lesions usually involve the face, back and chest. Psychosocial impact of acne can be tremendous and lead to a poorer quality of life. Lipocalin-2 (LCN2) is an attractive biomarker of inflammation, ischemia, infection, and kidney damage.

Aim of the study: The current study aimed to evaluate serum Lipocalin-2 levels in inflammatory acne vulgaris patients and to reveal the possible relation between its serum levels and the insulin resistance status in patients.

Patients and methods: The study included 60 patients suffering from inflammatory acne vulgaris and 60 healthy control subjects. Full general and dermatological examination were performed, recording of BMI, GAGS score was done. Then, measurement of fasting insulin and fasting glucose was performed to calculate HOMAIR.

Results: Serum fasting insulin and HOMAIR levels were significantly higher in acne patients compared to control subjects. Correlation of HOMAIR with fasting glucose revealed statistically significant positive correlation.

Keywords: Acne vulgaris, Insulin resistance, Lipocalin

1. INTRODUCTION

Acne is the most common skin infection in late adolescence. It affects the face, neck, and upper trunk area, where sebaceous follicles are the densest in population, and its prevalence is about 90% in teenagers ***(Zaenglein, 2018).***

Hormones are considered as the prime factors in initiating acne. It is reported that with the start of puberty, acne mostly heralds, owing to the increased production of hormone, which tends to peak in the mid- teenage years. Hormone primarily stimulates sebaceous gland. The androgenic hormones (sex hormone) like that of dihydrotestosterone stimulate and regulate the metabolic rate and size of sebaceous gland ***(Que et al., 2016).***

The correlation between insulin resistance and severity of acne was investigated. The increased blood glucose which in turn stimulates increased insulin secretion, decreasing the availability of binding protein for insulin-like growth factor 1 (IGF-1) leading to facilitation of the effects of IGF-1 on basal keratinocyte proliferation. Also, insulin stimulates the synthesis of androgens which can cause acne ***(Burris et al., 2018).***

Lipocalin-2 (LCN2), also known as neutrophil gelatinase-associated lipocalin (NGAL), is released by various cell types and is an attractive biomarker of inflammatory skin diseases, infection, and kidney damage. Both intestinal and metabolic inflammation, as observed in obesity and related disorders, are associated with increased LCN2 synthesis ***(Hu et al., 2018).***