

Study of Erythrocyte Superoxide Dismutase, Plasma Malondialdehyde and Osmotic Fragility Test in Psoriasis

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**دراسة نسبة السوبر أوكسيد ديزميوتيز في كريات الدم
الحمراء، المألونديالدهيد في البلازما و الهشاشة
الأسموزية في مرض الصدفية**

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ABSTRACT

Study of Erythrocyte Superoxide Dismutase, Plasma Malondialdehyde and Osmotic Fragility Test in Psoriasis

Background: Psoriasis is a Th-1 skin disease. The pathogenesis of psoriasis remains unclear. However, the increased reactive oxygen species (ROS) and inappropriate action of the antioxidant system might play a role in the pathogenesis of psoriasis. This study aimed to study the oxidant system and the antioxidant system in relation to osmotic fragility test (as a potential marker for psoriasis).

Materials and Methods: 35 psoriatic patients (21 males and 14 females) and 17 healthy controls (10 males and 7 females) were included in the study. Colorimetric methods were used to detect erythrocytes superoxide dismutase (SOD) and plasma malondialdehyde (MDA) levels. Osmotic fragility test, Hb, TLC and platelets were also evaluated.

Results: Significantly increased levels were obtained for plasma MDA, erythrocytes SOD and osmotic fragility test in relation to controls with a positive correlation between PASI score and plasma MDA.

Conclusions: Our results support the hypothesis of an imbalance in the oxidant/antioxidant system in psoriasis with affection of the erythrocyte membrane as reflected by increased osmotic fragility results.

Key words: malondialdehyde, osmotic fragility, reactive oxygen species, superoxide dismutase.

List of abbreviations

α	Alpha
β	Beta
γ	Gamma
κ	Kappa
<	Less than
>	More than
Σ	Sum
%	Percent
°c	Degree Celsius
μg	Microgram
μM	Micromole
μl	Microliter
ΔA	Change in absorbance
A	Area
AA	Arachidonic acid
AMP	Adenosine monophosphate
Ang	Angiotensin
ANOVA	One way analysis of variance
AP	Activator protein
APC	Antigen presenting cell
Apo A-1	Apolipoprotein A-1
Apo-B	Apolipoprotein-B
AuAb-	Autoantibodies against oxidized low density lipoprotein
OxLDL	

cAMP	Cyclic adenosine monophosphate
CAT	Catalase
CCL	Chemokine ligand
CC	Chemokine with two N-terminal cysteine residues adjacent to each other
CXCL	Chemokine ligand
CXC	Chemokine with different amino acid between the two N-terminal cysteine residues
CD	Cluster of differentiation
cGMP	Cyclic guanosine monophosphate
Cl⁻	Chloride ion
CLA	Cutaneous lymphocyte antigen
C. longa	Curcuma longa
COX	Cyclooxygenase
CTACK	Cutaneous T-cell attracting chemokine
cPLA2	Cytosolic phospholipase A2
Cu	Copper
DC	Dendritic cell
DMF	Dimethyl fumarate
DNA	Deoxy ribonucleic acid
DSC	Dead sea climatotherapy
$\mathcal{E}$	Expected value
EC	Extracellular
EDC	Epidermal differentiation complex
EDTA	Ethylene diamine tetraacetic acid
EGF-R	Epidermal growth factor receptor

EN-RAGE	Extracellular newly identified receptor for advanced glycation end product-binding protein
ERK	Extracellular signal regulated kinase
Fe	Iron
Fig.	Figure
FN	False negative
FP	False positive
g	gram
GM-CSF	Granulocyte macrophage colony stimulating factor
GPx	Glutathione peroxidase
GR	Glutathione reductase
GSH	Reduced glutathione
GSSG	Oxidized glutathione
H	Histamine
H⁺	Hydrogen ion
Hb	Haemoglobin
HDL	High density lipoprotein
HMW-Ag	High molecular weight antigen
HLA	Human leucocyte antigen
HO	Haem oxygenase
HOCl	Hypochlorous acid
H₂O	Water
H₂O₂	Hydrogen peroxide
HS	Highly significant
HSP	Heat shock protein
HIV	Human immunodeficiency virus
I-κB	Inhibitory protein-κB

ICAM	Intercellular adhesion molecule
iDC	Immature dendritic cell
IFN	Interferon
IGF	Insulin-like growth factor
IL	Interleukin
IL-1ra	Interleukin-1 receptor antagonist
IL-1RII	Interleukin-1 receptor
iNOS	Inducible nitric oxide synthase
IRF	Interferon- γ -induced kinase
JNK	c-Jun N-terminal kinase
K⁺	Potassium ion
KC	Keratinocyte
Kda	Kilodalton
Kg	Kilogram
KGF	Keratinocyte growth factor
L	Liter
LC	Langerhans cell
LDL	Low density lipoprotein
LFA	Leucocyte function associated antigen
LOX	Lipoxygenase
Lp(a)	Lipoprotein(a)
LPS	Lipopolysaccharide
LTB4	Leukotriene B4
MAPK	Mitogen activated protein kinase
MDA	Malondialdehyde
mDC	Mature dendritic cell
MHC	Major histocompatibility complex

MIP	Macrophage inflammatory protein
ml	Milli
MMP	Matrix metalloproteinase
Mn	Manganese
MPO	Myeloperoxidase
mRNA	Messenger ribonucleic acid
MSK	Mitogen-and stress-activated protein kinase
n	Number
Na⁺	Sodium ion
NaCl	Sodium chloride
NAD⁺	Nicotinamide adenine dinucleotide
NADH	Nicotinamine adenine dinucleotide reduced form
NADPH	Nicotinamine adenine dinucleotide phosphate reduced form
NBT	Nitroblue tetrazolium
NF	Nuclear factor
NFAT	Nuclear factor of activated T-cells
NGF	Nerve growth factor
NHR	Nuclear hormone receptor
NK	Natural killer
nmol	Nanomole
NO	Nitric oxide
NOS	Nitric oxide synthase
NS	Non significant
NTR	NADP-thioredoxin reductase
O	Observed value
O₂	Oxygen
·O₂⁻	Superoxide anion

OH·	Hydroxyl radical
ONOO·	Peroxynitrite
Ox-LDL	Oxidatively modified low density lipoprotein
PAF	Platelet activating factor
PAF-R	Platelet activating factor receptor
PARP	Poly (ADP-ribose) polymerase
PASI	Psoriasis area and severity index
pDC	Plasmacytoid dendritic cells
PDE	Phosphodiesterase
PG	Prostaglandin
PH	-Log H ⁺ ion concentration
PKA	Protein kinase A
PKC	Protein kinase C
PLA2	Phospholipase A2
PLE	Polymorphic light eruption
PMNL	Polymorphonuclear leucocytes
PMS	Phenazine methosulphate
PO2	Partial oxygen pressure
PPAR	Peroxisome proliferator activated receptor
Prdx	Peroxiredoxin
PsA	Psoriatic arthritis
PSORS	Psoriasis susceptibility locus
PTU	Propylthiouracil
PUFA	Polyunsaturated fatty acid
PUVA	Psoralen and ultraviolet A
PVN	Predictive value negative
PVP	Predictive value positive

R	Reagent
r	Pearson correlation coefficient
RI	Regulatory subunit-I
RII	Regulatory subunit-II
RA	Retinoic acid
RAGE	Receptor for advanced glycation end products
RBC	Red blood cell
RNS	Reactive nitrogen species
ROS	Reactive oxygen species
SD	Standard deviation
Se	Selenium
SOD	Superoxide dismutase
SP	Substance P
SPSS	Statistical package for social science
STAT	Signal transducer and activator of transcription
TBA	Thiobarbituric acid
TCR	T cell receptor
TGF	Transforming growth factor
Th	T helper
TIMPs	Tissue inhibitors of matrix metalloproteinases
TLC	Total leucocytic count
TLR	Toll-like receptor
TN	True negative
TNF	Tumor necrosis factor
TP	True positive
Trx	Thioredoxin
TSH	Thyroid stimulating hormone
