Infraorbital pigmentation; Clinical and Histopathological Assessment

Thesis

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Abstract

Background: Dark circles refer to the conditions that present with bilateral, round, homogeneous pigment macules on the infraorbital regions. Although it is a not a medical concern, it can be a cosmetic concern for a large number of individuals. Moreover, possible causes have not been elucidated.

Objective: to study the etiology of infraorbital pigmentation through clinical and histopathology assessment.

Patients & Methods: Thirty female patients with dark circles under the eye (IOP group) were included in our study and they were compared with 15 healthy individuals (control group). Clinical examination was done to exclude patients with systemic illness especially hepatic or renal disease and hemoglobin level assessment was done to evaluate the relation of anemia with dark circles. Eyelid biopsy specimens from IOP group and control group were examined histopathologicaly after Masson-Fontana silver stain (to detect the level of dermal melanin deposition and count

it) and Perl's potassium ferrocyanide (to detect haemosidren deposition).

Results: patients of IOP group showed significantly higher rate of stress, hair fall, family history of IOP and anemia. By histopathological assesament, IOP group showed vacuolated keratinocytes, focal acanthosis and perivasular sub-epidermal inflammatory infiltrates. Masson-Fontana silver stain showed; larger size and number of melanophages which were present more in the mid dermis in addition to upper and deep dermis than control group which showed smaller size and number of melanophages in the more superficial part of the dermis. Perl's potassium ferrocyanide stain detected no haemosidren deposition

Conclusions: In conclusion, the main reason for IOP is dermal melanin deposition which is present in melanophages. No other pigment could be detected in the dermis even in case of venous congestion. Deposition of the dermal melanin may be secondary to certain keratinocyte dysfunction. The cause of keratinocytes dysfunctions is yet to be determined, it may be due to release of reactive oxygen species which may be increased with venous congestion as a result of

stress or eye strain and; ultraviolet B may play role in mediating vacuolar degeneration**.**

Key words: Infraorbital pigmentation, Periorbital pigmentation, Dark circles, Histopathological assesment, Treatment.

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List of Abbreviations

ACD	Allergic contact dermatitis
AD	Atopic dermatitis
α-MSH	Alfa melanocytic stimulating hormone
bFGF	Basic fibroblast growth factor
ß-MSH	Beta-melanocytic stimulating hormone
BaSo4	Barium sulfate
CALM	Cafe-au-lait macule
Co2 laser	Carbon dioxid laser
DA	Deoxy- arbutin
DC	Dark circles
DCT	DoPA chrome tautomerase
DHI	5,6-Dihydroxyindole
DHICA	5,6-Dihydroxyindole-2-carboxylic acid
DOPA	3,4-Dihydroxy-L-phenylalanine
ER	Endoplasmic reticulum
ET-1	Endothelin-1
HGF	Hepatocyte growth factor
HPF	High power field

ICD	Irritant contact dermatitis
I O P	Infraorbital pigmentation
LIF	Leukemia inhibitory factor
Mc	Melanocytes
MC1-R	Melanocortin 1 receptor
MgO	Magnesium oxide
MSH	Melanocyte-stimulating hormone
Nd:YAG laser	Neodymium doped Yttrium aluminium garnet
NF	Neurofibromatosis
NGF	Nerve growth factor
ODM	Oculodermal melanocytosis
PABA	Para-aminobenzoic acid
PBC	primary biliary cirrhosis
PD	papillary dermis
PKA	protein kinase A
PKC	protein kinase C
POMC	proopiomelanocortin
POP	Periorbital pigmentation
PG	Prostaglandin
QSNd: YAG	Q-switched neodymium doped Yttrium aluminium garnet

RAPK	Reticulate acropigmentatin of Kitamura
RD	Reticular dermis
RM	Riehl's Melanosis
SCF	Stem cell factor
TiO2	Titanium dioxide
TSH	Thyroid stimulating hormone
TYR	Tyrosinase
TYRP1	Tyrosinase-related protein1
UVR	Ultraviolet ray
UVA	Ultraviolet A
UVB	Ultraviolet B
VC-IP	Tetra-isopalmitoyl ascorbic acid
ZnO	Zinc oxide

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Introduction

Infraorbital pigmentation (IOP) is one of the main aesthetic facial concerns that affects individuals of any age, both genders and all races **(Yaar and Gilchrest, 2001).**

IOP interfere with the face appearance, giving the patient a tired, sad, or hangover look. Disguising a lesion is almost mandatory for some individuals who depend on a well-cared and positive appearance for their work or social activities **(Gupta and Gupta, 2001).** Many people also describe the IOP as dark circles under the eyes "DC", "Tired Look", "Eyelid Bags", "Puffy Eyes" and "Eye Bags" **(Seckel, 2007).**

IOP is defined as bilateral, round, homogeneous pigmented macules on the infraorbital regions **(Watanabe et al., 2006)**. The condition usually starts after puberty and progresses thereafter. There are many contributing factors that may exacerbate the condition such as weight loss, exhaustion, late hour's eye strain and stress **(Hacker, 1996)**. The skin below the lower eyelid is first involved and with age pigmentation progresses to the area of