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EVALUATION OF SERUM α-MSH LEVEL IN MELASMA

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INTRODUCTION

The term "melasma," or facial hyperpigmentation, is derived from the Greek *melas*, meaning "black". It has been also termed "chloasma gravidarum" and "the mask of pregnancy". Its onset is usually during the second half of the gestational period, and it occurs in 45–75% of pregnancies. It is said to be more common in dark-haired, brown-eyed, dark-complexion women. The major differences in the incidence of melasma in the different studies were attributed to the fact that pigmentary changes are more discernible in fair-skinned individuals.[1,2]

Melasma usually affects the chronically photo-exposed cutaneous areas, especially the face and neck. On the face, the forehead, cheeks, temples, upper lip, chin or nose are commonly involved. More rarely, lesions may afflict extensor arms and sternal region. Although this disorder has been considered a benign condition, which usually has only aesthetic implication, it may affect self-image and self-esteem, with a negative impact on patient's quality of life.[3,4]

The precise cause of melasma has not been determined. Multiple factors are likely to be involved, including pregnancy, oral contraceptives, genetics, sun exposure, cosmetic use, thyroid dysfunction and antiepileptic medications.[5]

Alpha-MSH is a well-characterized peptide that is secreted into the blood stream and stimulates skin pigmentation; however, α-MSH had also been shown to play a pivotal role in regulating inflammation/ immunomodulation, reproductive function, and energy homeostasis.[6]

It is α-MSH role regulating pigment (melanin) in the skin which is arguably best understood. In the skin, α-MSH is produced by epidermal skin cells (keratinocytes and less commonly melanocytes and Langerhans cells) as a protective response to damage caused by UV radiation.[7,8]

The aim of this study is to evaluate of serum α-MSH level in melasma patients compared with control group.

PATIENTS AND METHODS

Formal consent was taken from each patient after full explanation about the nature of the present study and an ethical approval was obtained from the Scientific Ethical Committee of Tikrit University College of Medicine.

The study was conducted on the out-patients who attended to the Dermatology and Venereology Consulting Clinic of Salah-Al Deen General Hospital and a private dermatological clinic in Tikrit City. The current work represented an observational case control study which was conducted during the period extending from September 2017 to February 2018.

The total number of subjects included in the study was sixty individuals in two groups; the patients group were thirty those who complain of melasma while the second group including a thirty healthy individuals as control.

Study population age ranges from (20 - 45) years. Patients and controls had hormonal assay of α-MSH.

Data Collection

The data were collected using a specially designed structured questionnaire form for all subjects including; the socio-demographic information in which all patients were interrogated and a detailed complete medical history was taken regarding the name, age, gender, residency, occupation, level of education, marital status; history of present illness include (onset of disease, duration of the disease, extent of it, history of remissions and relapses, seasonal variations), family history of any autoimmune disease, occupational history, history of serious injury or illness.

Cases were diagnosed clinically through a full careful examination including: general physical examination with a complete dermatological examination, Wood's light examination (Waldmann Medizintechnik, Germany;

365 nm) was done for all patients to confirm the diagnosis.

Collection of Blood Samples

Five ml of venous blood was drawn from melasma patients and control subjects then allowed it to clot in plain tube at room temperature. The serum was aspirated after centrifugation at (3000 rpm) for 20 minutes, then divided into aliquots in plastic tubes and stored at (20 °C) until the time of estimation.

Human α-Melanocyte Stimulating Hormone (α-MSH) ELISA Kit (Sunlong Biotech Company) was used.

Statistical Analysis

All cases were numbered serially, then all variables were coded and transferred into a computerized statistical program; SPSS (statistical package for social sciences) which used for statistical analysis. Descriptive statistics were presented as (mean± standard deviation), T-test for independent two samples; (P-value ≤ 0.05) considered as statistically significant difference.

RESULTS

In the present study, the mean±SD of α-MSH level in total subjects of melasma patients and control was (160.88±51.46) pg/ml and (332.56±64.2) pg/ml respectively; which ranged (58.0-290.2) pg/ml and (220.8-452) pg/ml respectively; with age mean (31.56±6.94) year and (30.23±7.12) year respectively ranged (20-45) year for both groups as in Table and Figure [1]. These results showed that there was a highly significant difference ($p \leq 0.01$) of α-MSH level between melasma patients and control.

On the other hand, the mean±SD of α-MSH level in male melasma patients and male control was (160.69±31.73) pg/ml and (374.12±39.01) pg/ml respectively; which ranged (118.1-204.2) pg/ml and (324-452) pg/ml respectively; with age mean (30.75±8.78) year ranged (21-45) and (30.0±6.43) year ranged (20-40) year respectively as in Table and Figure [2]. These results showed that there was a highly significant difference ($p \leq 0.01$) of α-MSH level between male melasma patients and male control. While the mean±SD of α-MSH level in female melasma patients and female control was (161.0±62.18) pg/ml and (282.34±39.21) pg/ml respectively; which ranged (58.0-290.2) pg/ml and (220.8-352.4) pg/ml respectively; with age mean (32.11±5.62) year ranged (24-40) year and (30.46±7.97) year ranged (20-45) year respectively as in Table and Figure [2]. These results showed that there was also a highly significant difference ($p \leq 0.01$) of α-MSH level between female melasma patients and female control.

In this study, the results showed that there was no significant difference ($p \geq 0.05$) of α-MSH level between male and female melasma patients, while there was a highly significant difference ($p \leq 0.01$) of α-MSH level between male and female melasma control.

Table 1: Level of α-MSH in melasma patients compared with control in total subjects.

Number of subjects		Patient	Control
		30	30
Age (years)	Mean ± SD	31.56±6.94	30.23±7.12
	Range	(20-45)	(20-45)
α-MSH (pg/ml)	Mean ± SD	160.88±51.46	332.56±64.2
	Range	(58.0-290.2)	(220.8- 452)
P value		P ≤ 0.01	

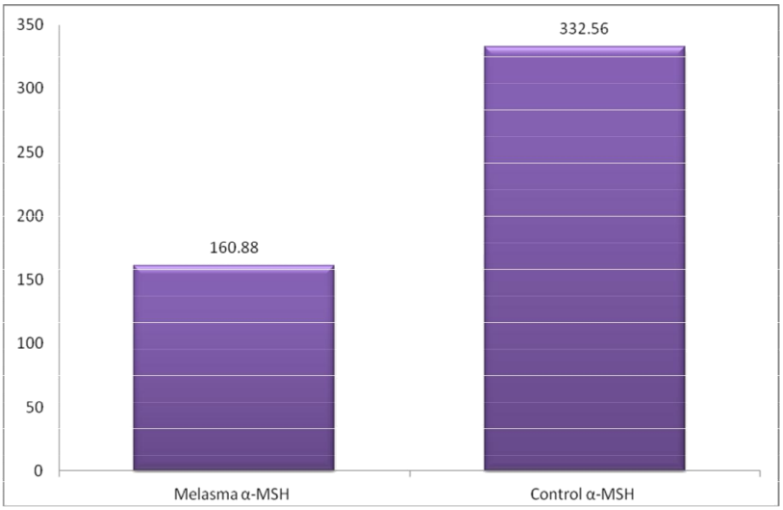

Figure 1: Level of α-MSH in melasma patients compared with control in total subjects.

Table 2: Level of α-MSH in melasma patients compared with control in male and female subjects.

		Patients		Control	
		Male	Female	Male	Female
Number of subjects		12	18	15	15
Age (years)	Mean ± SD	30.75±8.78	32.11±5.62	30.0±6.43	30.46±7.97
	Range	(21-45)	(24-40)	(20-40)	(20-45)
α-MSH (pg/ml)	Mean ± SD	160.69±31.73	161.0±62.18	374.12±39.01	282.34±39.21
	Range	(118.1-204.2)	(58.0-290.2)	(324-452)	(220.8-352.4)

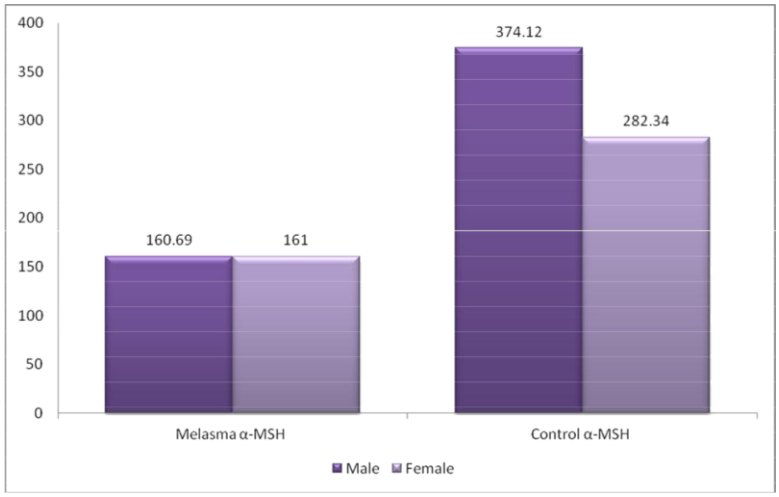

Figure 2: Level of α-MSH in melasma patients compared with control in male and female subjects.

DISCUSSION

The current study showed that there was a highly significant difference ($p \leq 0.01$) of α-MSH level between melasma patients and control; also between male melasma patients and male control; and even also between female melasma patients and female control. But, the present study revealed that there was no significant difference ($p \geq 0.05$) between male and female melasma patients, while there was a highly significant difference ($p \leq 0.01$) between male and female melasma control. These findings may be due to the hyperpigmentary changes done by the disease itself to cause either inhibition for α-MSH that produced locally in the skin (both in keratinocytes and melanocytes) or even through a feedback mechanism on the hypothalamus to decrease the α-MSH secretion from pituitary.

A previous study done by (Brzoska *et al*, 2008)[9] reported that it is becoming apparent that MSH pathway play an important role in cell survival, proliferation, inflammation as well as skin pigmentation.

Another study done by (Fearce *et al*, 2016)[10] reported that injection of human subjects with a super potent analog of α-MSH, increased skin pigmentation especially in anatomical sites that are habitually exposed to the sun; this finding suggested that melanocortins induce human skin darkening, but did not provide a solid evidence for a direct response of human melanocytes to α-MSH. The findings of the present study may give an explanation to the above previous study.

There were no previous studies reporting on plasma α-MSH level melasma have been available. Similarly, it is unknown whether the refractory low levels of this hormone have any correlation with treatment success.

CONCLUSIONS

The α-MSH level in melasma patients was lower than control in total, male and female subjects; also its level in female melasma patients was slightly higher than those of male.

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