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EVALUATION OF SUPER OXIDE DISMUTASE AS BIOCHEMICAL MARKER IN MELASMA PATIENTS AT TERTIARY CARE HOSPITAL, BIKANER.

Biochemistry

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ABSTRACT

Melasma is a persistent genetic skin condition caused by an excess of melanin in areas exposed to UV light. The condition presents as irregular patches and macules with varying shades OF light-dark brown appearing symmetrically1. The aim of study was evaluation of Superoxide dismutase as biochemical marker in melasma patients and healthy controls. It was an observational cross-sectional study carried out in Department of Biochemistry, S. P. Medical College, Department of Dermatology & associated groups of PBM Hospital, Bikaner, Rajasthan. 50 cases with melasma and 50 healthy controls were enrolled. In this study, analysis of serum Super oxide dismutase (SOD) and melasma area severity index (MASI) score was done in both the groups. Mean serum Superoxide dismutase was higher in melasma patients as compared to healthy controls 48.49±11.46 and 63.29±16.24 respectively and the parameter was statistically significant ($p<0.001$). Correlation (r) of SOD with MASI in melasma cases was 0.07.

KEYWORDS

Melasma, Superoxide dismutase, MASI, Melanin.

INTRODUCTION

Melasma is a persistent genetic skin condition caused by an excess of melanin in areas exposed to UV light[2]. It commonly occurs on the face with the neck and forearms being less affected. The condition presents as irregular patches and macules with varying shades from light to dark brown usually appearing symmetrically[3]. The presence of oxidative stress in melasma recently has become an intriguing topic of interest. It is a key element that can cause skin hypopigmentation or hyperpigmentation[4].

First, the presence of oxidative stress in the etiopathogenesis of melasma was thought to be based on the effectiveness of antioxidants in treatment[5]. Superoxide dismutase is an intracellular enzyme that alternately catalyzes the dismutation of the superoxide (O^{-2}) radical into an ordinary molecular oxygen (O2) and hydrogen peroxide. Thus SOD is an important antioxidant defense in nearly all living cells exposed to oxygen[6].

METHODS

Study Design:- It was an observational cross-sectional study.

Study Place:- This study was carried out in Department of Biochemistry, S. P. Medical College and Department of Dermatology & associated groups of PBM Hospital, Bikaner, Rajasthan.

Study Population :

The present study was conducted on 100 subjects. They were further divided in two groups:

1. Group I: Healthy Control Subjects (n=50). It was ensured by routine examinations that all the subjects were healthy and there was no signs and symptoms or positive history of any diseases.
2. Group II: It was included the clinically established patients of melasma (n=50).

Sampling Technique : Purposive Sampling Technique

Inclusive Criteria:-

- All patients attending the dermatology department clinically diagnosed with melasma.
- Age between 20-60 years

Exclusive Criteria:-

- Patients with previous history of skin disease, malignancy, pregnancy.
- Patients with other co-morbid conditions .
- Pregnant women.

Sample Size : 50 cases with melasma and 50 healthy controls were included in this study.

Data Collection:- Ethical approval certificate has been taken from institutional ethical committee. An informed consent was obtained from all subjects those were diagnosed with melasma and healthy controls. A detailed history including family and drug history was taken from all the subjects. Routine clinical examination including the weight, anthropometric measurements and general physical examination was performed. The severity of the disease was determined using the melasma and severity index (MASI) score. The score was calculated from assessments of the darkness of the pigmentation and the percentage of affected area on the face[7].

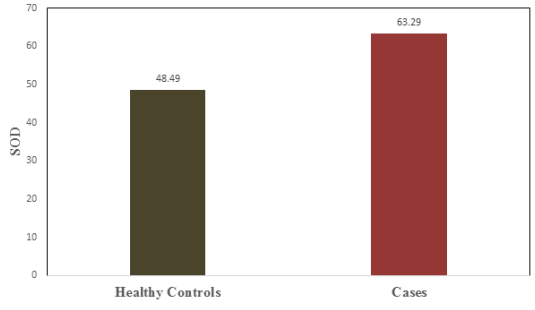
Sample Collection and Processing:

Blood samples were collected by venupuncture using aseptic technique and subjected to the assay of SOD estimated by ELISA[8].

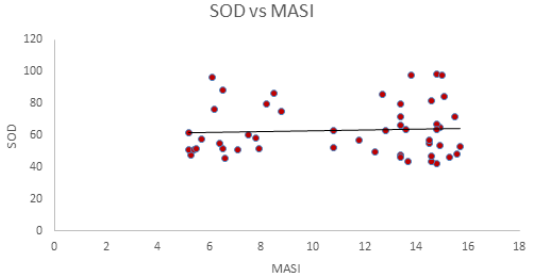
Statistical Analysis:

Data is entered in MS Office Excel worksheet in the form of master chart and analysis is performed with IBM SPSS. All the results were expressed as mean ± SD values. Independent t-test of two means was used for the comparison between both groups. P values < 0.05 was considered significant and pearson correlation was performed.

OBSERVATION TABLE AND GRAPH



Graph: 1 : Graphical representation of mean SOD in both groups



Graph: 2 : Correlation of SOD with MASI in melasma group

Table : 1 Comparison of serum superoxide dismutase in both groups

S.No	Group studied	SOD (U/ml) (Mean±S.D.)	T- test	P value
1	Healthy Controls	48.49 ±11.46	5.26	P<0.001
2	Melasma Cases	63.29 ± 16.24		

Note: $p < 0.001$ = Highly significant

Table: 2 : Correlation of SOD with MASI in melasma cases

S. No.	Parameters (Vs)	Correlation (r)
1.	SOD	0.07
2.	MASI	

RESULTS:

Mean SOD level between case and control group was observed in table 1 and figure 1. 48.49±11.46 and 63.29±16.24 was mean SOD in healthy controls and cases respectively the parameter was statistically significant ($p<0.001$). Correlation (r) of SOD with MASI in melasma cases was 0.07. these findings are in close agreement with previous study of

Choubey V et al.(2017) demonstrated that the serum levels of malondialdehyde, superoxide dismutase and blood glutathione were significantly higher among the melasma cases compared to controls[9]. The difference in the serum concentrations was significant between the two groups ($P < 0.01$). A positive correlation was found between these enzyme levels and severity of melasma. These results improve the understanding of etiology-pathogenesis of the disease and its treatment.

DISCUSSION:

Melasma is a common skin problem caused by brown to gray-brown patches on the face. Oxidative stress is a key contributor to the development and progression of melasma. It plays a significant role in melasma by causing free radicals (reactive oxygen species) to damage skin cells and promote inflammation, leading to increased pigmentation. UV exposure, hormonal changes and other factors increase ROS production beyond the body's ability to neutralize them with antioxidants, leading to this imbalance. Consequently, antioxidants are being explored for melasma management because they can neutralize ROS, reduce inflammation and help inhibit melanogenesis (pigment production). Melasma lesions show high oxidative stress and the body may initially respond by upregulating antioxidant enzymes like SOD.

As per my study, SOD can be used to understand the prognosis and severity and as a therapeutic agent in melasma cases[10].

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