



The Role of Oxidative Stress and its Antioxidants in Patients with Plaque Psoriasis in the City of Samarra

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Abstract: The study was for the period from September 1 to December 1, 2022, when (60) samples were collected, divided into two groups, a control group of 30 people and 30 people for a group of plaque psoriasis. Medical outpatient clinics. All of the oxidative stress represented by MDA and the antioxidants catalase enzyme CAT were measured, as well as the study of immunological variables represented by the rate of alpha tumor necrosis factor (TNF- α) and the rate of interleukin IL-18. The results showed a significant increase in malondaldehyde (MDA), catalase enzyme (CAT), tumor necrosis factor-alpha (TNF- α) and interleukin (IL-18). Compared to the control group at a significant level of $P \leq 0.05$.

Key words: Psoriasis, Oxidative stress and its antigens, Tumor necrosis factor alpha (TNF- α), Interleukin IL-18.

Introduction:

Psoriasis is a chronic autoimmune skin disease characterized by the proliferation of keratinocytes, which are characterized by well-defined red plaques with silvery-white scales, which can involve any area of skin such as the elbows, knees, scalp, hands, and feet and affects 2-3% of the world's population. Approximately 125 million people around the world Psoriasis can begin at any age but most often appears between the ages of 15 and 30 and is common in both males and females, Amina et al. 2019). Clinical symptoms of psoriasis appear as itching, pain, and scaling and are associated with increased severity of the disease and decreased quality of life and work productivity. The most common form is plaque psoriasis, which accounts for about 80% of all psoriasis cases and has a significant impact on quality of life. Today, psoriasis is a systemic inflammatory disease associated with a high risk of various comorbidities, including cardiovascular disease, obesity, diabetes, metabolic syndrome, and psoriatic arthritis (Gerdes et al., 2020).

Oxidative stress (OS) is the result of an imbalance between oxidants and their antioxidants, which leads to increased intracellular levels of reactive oxygen species (ROS). They are normally produced in cells and play important roles in cellular signaling. However, when the cell's ability to produce antioxidants increases, ROS disrupts redox signaling and damages molecules, which can eventually lead to cells death. (Raquel et al., 2020). Inflammatory cells (CD4, CD8 lymphocytes) play an important role in the inflammatory process in psoriasis. These antigen-combined cells are activated

and migrate to the skin, where they release many cytokines, including tumor necrosis factor-alpha (TNF-a), IFN-Y, and IL. 6- These cytokines initiate and stimulate the inflammatory response in the skin (Aringer, 2002).

MATERIALS AND METHODS

The study was conducted for the period from September 1 to December 1, 2022, when (60) samples were collected, divided into two groups, a control group of 30 people and 30 people for a group of plaque psoriasis. The ages of the patients ranged from 15-68 years. Outpatient medical laboratories.(5) milliliters of venous blood were drawn from patients with psoriasis and healthy people after sterilizing the withdrawal area with 70% ethyl alcohol using a sterile medical syringe and placing it in test tubes free of anticoagulant for the purpose of obtaining serum in a Cenrifuge centrifuge at a speed of (3000) cycle / 15.

After that, the serum was withdrawn by a fine pipette and placed in clean and sterile laboratory tubes with tight lids, then kept in the freezer at a temperature of (-20) C until it was used for the purpose of conducting physiological, biochemical and immunological examinations. The level of malondaldehyde (MDA), the enzyme catalase (CAT), the rate of tumor necrosis factor alpha (TNF-a), and the rate of interleukin IL-18 were measured using a ready-made measuring kit (Kit) from the American company MyBio Source based on ELISA technology using the HumaReader Hs device. The results obtained from the current study were analyzed statistically by applying the statistical program (MINITAB), using ANOVE analysis of variance to extract the mean and standard error, and the arithmetic means of the coefficients were tested using Duncan's multiple test at a significant level (0.05) to determine the special significant differences between the groups (Duncan ,1955).

Results and discussion :

The results of the tests in Table (1) that were conducted to measure the levels of oxidants and their antioxidants in the blood serum of people with psoriasis (plaque) showed that there was a significant increase from a significant level of $P \leq 0.05$ in MDA compared with the control group.

Table (1) Measurement of the concentration of mallow aldehyde MDA and catalase enzyme CAT in blood serum

Plaque psoriasis group (N) Mean \pm S.D N=30	Control group Mean \pm S.D N=30	Variables studied
		Catechins
25.31 \pm 3.97 ^a	9.65 \pm 1.51 ^b	MDA (μ mo/L)
167.4 \pm 19.2 ^a	110.0 \pm 19.91 ^b	CAT (μ mo/L)

Different letters vertically indicate significant differences at the probability level of $P \leq 0.05$

Mean \pm S.D = Mean \pm Standard Error

N = Number of samples

These results agreed with what was found by (Mahmood, 2022) in the high concentration of MDA in the blood serum of people with psoriasis. Enzymatic and non-enzymatic oxidation and lipid peroxidation products, leading to angiogenesis, inflammation, cell necrosis, and apoptosis (Shakoei et al., 2021).

The skin is a major target of oxidative stress due to reactive oxygen species (O_2), superoxide anion (O), hydrogen peroxide (Ho), hydroxyl radical (Oh), and nitric oxide (No). In normal aerobic cells, there is a balance between oxidative damage and antioxidant protection, however. Inadequate antioxidant potential or increased production of Ros creates a condition known as oxidative stress, which contributes to the development of skin diseases and disorders (Akdag et al., 2022). The results of the tests are also shown in Table (1).

There was a significant increase from a significant level $P \leq 0.05$ in the activity of the enzyme CAT in people with psoriasis (plaque) compared with the control group. The results of the study did not agree with (AL-Jubori, 2010), which showed that there was a significant decrease in the activity of CAT enzyme in people with psoriasis compared to the control group.

In patients with psoriasis, there is a decrease in antioxidant defenses, such as a decrease in the enzymatic activity of CAT. This enzyme is specifically involved in cell detoxification of oxygen radicals. It appears that failure of this mechanism may explain lipid peroxidation and increased production of Ros, which increases lipid peroxidation, which leads to depletion of the defenses. Antioxidant, psoriasis has been associated with oxidative stress, abnormal lipid metabolism in plasma, and recurrence of cardiovascular disease (Rocho et al., 2001).

In Table (2), the results showed a significant increase in patients with psoriasis (plaque) compared with the control group for a significant level of $P \leq 0.05$.

Table (2) Measurement of IL-18 in Blood Serum

Plaque psoriasis group (N) Mean \pm S.D N=30	Control group Mean \pm S.D N=30	Variables studied
281.0 \pm 30.5 ^a	99.7 \pm 19.4 ^b	Immunoglobulins IL-18 (pg/ml)

Different letters vertically indicate significant differences at the probability level of $P \leq 0.05$

Mean \pm S.D = Mean \pm Standard Error

N = Number of samples

The results of this study agreed with what was found (Jasim, 2017). In the increase of IL-18 in patients with psoriasis compared to the control group, and these results were consistent with (AL-Jubori, 2014). Which showed high levels of IL-18 in psoriasis patients compared with the control group, where studies showed that this cytokine has wide-ranging effects other than activating lymphocytes, given that it is an important regulator in the production of both innate and acquired immune responses, IL-18 directly regulates the effects of T-cells, B-cells, natural killer (NK) cells, and dendritic cells, and usually acts synergistically with IL-12 (Nakanishi et al., 2001). IL-18 plays an important role in cellular adhesion and acts as a pathway that uses IL-1 and TNF-a and leads to the expression of intercellular adhesion molecule-1 (ICAM-1). Expression of the IL-18 receptor is regulated by IL-12 and subsequently these two cytokines stimulate the release of IfN-Y, and TNF-a stimulates TNF-a with IfN-Y, IL-6, IL-8, IL-12 and IL-18 and forms a link Important in the cytokine network in the pathogenesis of psoriasis (Yoshimoto et al., 1998).

The results of the tests in Table (3) showed that there was a significant increase from a significant level $P \leq 0.05$ in the rate of tumor necrosis factor (TNF-a) in people with psoriasis (plaque) compared with the control group.

Table (3) Measuring the rate of tumor necrosis factor TNF-a

Plaque psoriasis group (N) Mean \pm S.D N=30	Control group Mean \pm S.D N=30	Variables studied
87.6 \pm 21.9 ^a	50.60 \pm 11.61 ^b	Immunoglobulins TNF-a (pg/ml)

Different letters vertically indicate significant differences at the probability level of $P \leq 0.05$

Mean \pm S.D = Mean \pm Standard Error

N = Number of samples

These results agreed with (AL-Zeedy, 2013) which showed a significant increase in the concentration of TNF-a in the serum of patients compared with the healthy group, as the significant differences in TNF-a between psoriasis patients and control confirmed the role of this cytokine in the pathogenesis of psoriasis. The exact role of TNF-a in the pathogenesis is still not clear, but the use of anti-TNF-a antagonists in psoriasis was effective, and thus this cytokine plays a major role in the clinical manifestations of psoriasis (Arican et al., 2005). but does not explain the lack of association between serum TNF-a levels and psoriasis severity index in patients with psoriasis and that it is possible that the interaction between T lymphocytes and keratinocytes with the help of cytokines plays an important role in the etiological process of psoriasis (Williams and Griffiths, 2002).

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