ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

Measurement of immunoglobulins(IgE ,IgG) and complement system components(C3,C4) in psoriasis patients in Iraq

EnasSaadSobeih, Dr. MahaFalehNazzal, Dr. Abbas AbboudFarhan
Department of Life Sciences, College of Education for Pure Sciences, University of Diyala, Iraq

Abstract
This study aimed to evaluate immunoglobulins (IgG, IgE) and complement system components (C3, C4) for a sample of psoriasis patients. 80 blood samples were collected from patients and 50 samples from healthy blood (as a control group) during the extended period (1/10/ 2020 to 1/2/2021) from the medical city hospital.
The results of this study showed a significant increase ($p \leq 0.001$) in the level of (IgEIgG, C3, C4) in psoriasis patients compared to the control group
Key Words: immunoglobulins, complement system, Psoriasis

Introduction

Psoriasis is a chronic autoimmune condition that results in a rapid buildup of skin cells. It is characterized by an abnormal proliferation of keratinocytes, increased vascularity in the skin, and an accumulation of inflammatory cells (Perera et al. 2010, Benhadou et al., 2019) It is one of the most common, chronic and currently incurable diseases. The disease is an immune-mediated skin disease in the recurrent setting (Parisi. et al., 2013b). Psoriasis comes from the Greek word "psora" which means "itch" or "rash," although most patients with this condition do not complain of itching. It has been known since antiquity and was originally considered a type of leprosy (Das et al., 2009). The most common symptoms associated with psoriasis are: itching, erythema redness, fatigue, and swelling (Pariser et al., 2015)
ImmunoglobulinsThey are large glycoproteins found in blood and tissues, as well as in body fluids and many secretions. It is synthesized by plasma cells produced by the immune system's B cells (Pileri et al., 2009) and is a family of proteins that confer humoral immunity and play vital roles in enhancing cellular immunity. It is produced after stimulation of the appropriate antigen for the B cells, which mature the plasma cells secreting antibodies. Five distinct immunoglobulins (Igs, IgM, IgG, IgA, IgE, and IgD) have been identified in human serum on the basis of differences in composition and biological and antigenic components (Rich et al., 2013). All Ig monomers have the same basic structure, in that they are composed of two identical light chains (L) and two identical heavy chains (H). The light strings appear in two forms, either (λ)lambda or kappa(K)
And The complement system is part of the innate immune defenses, it distinguishes microbes and undesired host molecules to enhance the phagocytosis process, which is essential in removing the immune complex, resulting from the activation of the complement system to form the C3 convertase, with C3 cleavage, and the production of the complement fragment active, which leads to the Opsonisation, chemotaxis, and cytolysis and that the complement system may control inflammatory diseases, and defects in it may lead to disease (Chimenti et al., 2012) C3 and C4 are two of the most important complement components, as C3 forms the largest part of the complement proteins that are synthesized in the liver, lymphocytes, fibroblasts, and skin, and C4 is synthesized in lung and bone tissue (Alwan, 2012)

Materials and Methods

The groups of experimental randomly & equally divided into two groups as the following:
1. Control group:This group include50 healthy individual not infected with any skin disease, or any other chronic disease such as blood pressure, diabetes and liver disease, kidney and other and were between the ages and races approach for patients with psoriasis.
2. Psoriatic Patients group: This group include80 individual from psoriasis patients of acute-phase and chronic-phase with different ages and from both sexes. Blood samples were collected via venous blood from all experimental groups ,left for(15min) at room temperature, then centrifuged (at 2500 rpm from 5min) to get the serum to
Measuring the following parameter IgG, IgA,C3,and C4 were determined in serum samples of all studied groups according to (fahay&mckelevey, 1965) and (bernne, 1974) methods

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

Statistical analysis

The data of all the tests were analyzed statistically by a computer using the (SPSS) Statistical Package of Social Science program, as the T-Test was adopted at a probability level of (0.05) to identify the degree of significance of the differences between the transaction rates. (Nisi, 2004)

Results and Discussion

Immunoclobulin measurement

Measurement of serum immunoglobulin level Serum IgE

The results of the current study showed a statistically significant ($p< 0.001$) high significant increase in IgE levels for psoriasis patients compared to the control group,as the mean values reached (12.57 ± 29.65) pg / ml, (6.79 ± 6.96), respectively. As shown in the table

Table (4-4) shows the level of IgE for psoriasis patients and the control group

		Study groups	
		Patients	Control
IgE	Mean	29.65	6.96
	Standard Deviation	12.57	6.79
	Median	28.12	5.24
	Percentile 25	20.52	1.96
	Percentile 75	37.93	7.35
P value		<0.001**	

**: highly statistical significance ($p<0.001$)

The current data mentioned indicated that psoriasis patients had an increase in IgE concentrations in patients from the healthy group, and this increase was statistically significant, and this result was consistent with the result reported by Ovcina-Kurtovic and Kasumagic-Halilovic, 2010)) who indicated an increase in the level of IgE concentration in psoriasis patients compared to healthy controls. It also agrees with previous studies that found an increase in the level of IgE in psoriasis patients, and there was a significant difference between the group of patients and healthy subjects (Khalaf, 2015). And IgE synthesis required for the second helper cells IL-4 and IL-13 cytokines. Keratinocytes do not produce IL-4 or IL-13, but rather participate in the biological effects induced by IL-4 or IL-13. It has been shown that the production of IL-10 by Treg coupled with the function of IL-4, however high concentrations of IL-4 have been found. Serum IgE in more severe cases of psoriasis (Li et al., 2005)

While Lajevardi et al. (2014) did not find significant increases in serum IgE concentration between psoriasis patients and healthy controls. Contradictory differences in the data may be due to the geographical location of patients and healthy subjects as well as the season in which the sample was collected that influences the level of IgE case in. In addition to the individual response to seasonal allergens, as well as may be differences in the technique of immunological detection. It was also found that the cell B cell is responsible for the production of Ig, however the amount of antibody secreted depends on the physical interaction between the cells presenting the antigen (APC) and the T cell and the B cell, in addition to other factors such as cytokines. cytokines and chemokines (Janeway et al., 2005)

Measurement level (IgG) in serum

The results of the current study showed a statistically significant increase ($p <0.05$) in IgG levels for psoriasis patients compared to the control group, as the mean values were (231.7 ± 818.6) pg / ml, (102.8 ± 543.7), respectively. As shown in Table

Table (4-4) shows the level of IgG for psoriasis patients and the control group

		Study groups	
		Patients	Control
IgG	Mean	818.6	543.7
	Standard Deviation	231.7	102.8
	Median	758.3	498.5

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

	Percentile 25	673.1	483.7
	Percentile 75	983.0	626.2
P value		0.027*	

*: statistical significance (p<0.05)

The current results indicate that psoriasis patients have a significant increase in IgG concentrations from the healthy group, and this result was consistent with the result mentioned by Hussein, (2013), which indicated an increase in the level of IgG concentration in psoriasis patients compared to healthy groups. It also agrees with previous studies. Which was found by an increase in the level of IgG in psoriasis patients, and there was a significant difference between the patient and healthy group (Weigl-Bea, 2000) and Kia (2007)

Where the high concentration of IgG has been observed in psoriasis patients in the chronic stage due to several reasons, including The effect of injury on the regulation of the immune system, which works to create a state of balance in building and destroying the immunoglobulin, or it may be the result of its small size and can be transmitted through blood vessels easily, or it may be due to the disappearance or disappearance of this immunoglobulin during the acute phase of this disease (Hussein, 2013) IgG immunoglobulin, known as antibodies, are glycoprotein particles produced by plasma cells (white blood cells). It forms a vital part of the immune response against specific antigens, such as bacteria or viruses, and works to destroy them (Edward, 2014), which is against that which is produced after against IgM in the primary infection (Zabriskie, 2009) Immunoglobulin constitutes approximately 85% of the total immune globulin level in the blood serum of healthy subjects (Abel et al., 2013) Igs play important roles in defense against pathogens. However, the altered interactions may lead to chronic inflammation. Also, the overexpression of immunoglobulins (Igs) that make up immune complexes (IC) leads to the spread of autoimmune inflammation to other tissues (MATT, 2016). In studies, immunoglobulin has been increasingly used as a treatment for a variety of medical conditions, as it has the potential to work. Against infection, and has immune and anti-inflammatory effects. The appropriate use of immunoglobulin can be life-saving, however, its administration can lead to many adverse events, as it can be used as a beneficial agent in some diseases, while in other cases it is ineffective and increases the risks to the patient. Thus, the evidence supports the use of immunoglobulin in these settings for him (Elena et al., 2017)

Measurement of the level of complement proteins (C3, C4) in serum

C3 level measurement in blood serum

The results of the current study showed a statistically significant (p≤0.001) high significant increase in C3 levels of psoriasis patients compared to the control group, as the mean values reached (136.2 ± 31.0) pg / ml, (112.1 ± 23.1), respectively. As shown in Table

Table (4-4) C3 level for psoriasis patients and the control group

		Study groups	
		Patients	Control
C3	Mean	136.2	112.1
	Standard Deviation	31.0	23.1
	Median	138.3	120.6
	Percentile 25	89.6	87.0
	Percentile 75	178.5	146.0
P value		0.001**	

**: highly statistical significance (p<0.001)

C4 levelmeasurement in blood serum

The results of the current study showed a statistically significant (p≤0.001) high significant increase in C4 levels of psoriasis patients compared to the control group, as the mean values were (30.66 ± 8.178) pg / ml, (24.38 ± 4.709), respectively. As shown in the table

Level (C4) for psoriasis patients and the control group

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

		Study groups	
		Patients	Control
C4	Mean	30.66	24.38
	Standard Deviation	8.178	4.709
	Median	31.70	26.90
	Percentile 25	23.950	21.40
	Percentile 75	37.60	32.10
P value		0.001**	

**: highly statistical significance ($p<0.001$)

Previous data on psoriasis patients showing higher serum concentrations of C3 and C4 in psoriasis patients compared to healthy control groups. These results are in agreement with the researchers (Chimenti et al., 2012) where they found an increase in the levels of the complement system (C3 and C4) in the blood of psoriasis patients compared to the healthy group, as well as with a result (Khalaf, 2015) that observed an increase in the level of C3 in psoriasis patients compared to With the healthy control group, and with the results of the two studies, Singh (et al. 2009), he found an increase in C4 levels, which increased significantly in psoriasis patients compared to the healthy group. The complement system is an essential part of the innate immune system and plays an important role in host defense against various pathogens, such as bacteria, viruses, and fungi, as complement activation leads to the production of many molecules that mediate chemotaxis, opsonization and mast cell lysis. degranulation, which can contribute to the elimination of disease-causing organisms and infections. Complementary regimen is associated with several skin diseases, such as psoriasis, lupus erythematosus, vasculitis and bullous skin diseases. Many triggers including autoantibodies and microorganisms can activate the complement, while on the other hand, complement deficiency can impair the clearance of the immune complex and thus lead to disease (Giang et al., 2018).
The complement consists of plasma proteins that make up an amplification enzyme system that is able to degrade bacteria or red cells, or it can remove bacteria or cells to complete phagocytosed. The complement chain consists of nine main complements, namely C1, C2, and C3, C4, C5, C6, C7, C8, and C9 which are in turn activated and form a coagulation sequence, and the C3 and C4 components are the most measured; Manufactured in the liver as single polypeptide chains, C3 is the most abundant protein in human serum and is used as a test in the screening test. Complement C4 is the second most abundant complement protein in serum due to its axial location in the complement chain. C3 is consumed by activating the classical or alternative pathway. However, C3 levels are not the most sensitive indicators of classical pathway activation, and a low C4 complement level has often been found as a more sensitive measure of activation of the mild classical pathway (Al-Maaroof, 2013) and the complement system has been found to play a critical role in the pathogenesis of In several chronic diseases including autoimmune diseases, C3 and C4 synthesis is increased in response to inflammation and injury (Abood, 2010). Human cornified cell-derived C3 contributes to epidermal basement deposition of C3 in autoimmune diseases or dermatitis such as psoriasis and plays a role. The alternate pathway has been found to be a complementary method in the pathogenesis of psoriasis (Khalaf et al, 2015)

References

1. Pileri, D.; Accardo, P.A.; D'Amelio, L.; D'Arpa, N.; Arnone, G.; Grisaffi, C.; Amico, M.; Brancato, R.; Lombardo, C. and Conte, F.(2009). Serum levels of Cortisol,Immunoglobulin, and C-Reactive protein in burn patients. *Annals of Burns and Fire Disaster,* 22(1) : 1-3.
2. khalaf . H .Y ; Hussein, T. A. fadheel, B. M.(2015) The Study of Serum Complement C3, C4 and Immunoglobulin E IgE in Psoriasis Patients Baghdad Science Journal Vol.12(4)2015
3. AboodSuraMuhsin (2010). The relevance of serum complement C3 with fasting blood glucose levels in obese type 2 diabetics. KufaMed.Journal 2010.VOL.13.No.2
4. Abel , J. ; Conklin , J. ; Hunter , S. K. ; Empey , R. ; Tyler , E. ; Christensen , A. ; Talcott , K. ; Ballas , Z. K. ; Santillan , M. and Santillan , D. (2013). Defining normal IgG changes throughout pregnancy. *Proc. Obs. Gyn.* 3 (2): 8-11.

ISSN:0975-3583,0976-2833 VOL12,ISSUE05,2021

5. Al-Maaroof ,Z,W, (2013) Estimation of C3 and C4 Level in non-Pregnant Women with Iron Deficiency AnemiaMedical Journal of Babylon-Vol. 10- No. 3 -2013
6. Giang,J, Marc A. J. Seelen, Martijn B. A. van Doorn, Robert Rissmann, Errol P. Prens and Jeffrey Damman(2018) Complement Activation in inflammatory Skin Diseases. Frontiers in Immunology | www.frontiersin.org April 2018 | Volume 9 | Article 639
7. Ovcina-Kurtovic, N. and Kasumagic-Halilovic, E. 2010. Serum Levels of Total Immunoglobulin E in Patients with Psoriasis: Relationship with Clinical Type of Disease. MED ARH.64(1) :28-29
8. Chimenti ,M.S. Perricone C. Graceffa, D. , Di Muzio G., Ballanti E Guarino. M.D., Conigliaro,P. Greco E., Kroegler B., Perricone R.,(2012) Complement system in psoriatic arthritis: a useful marker in response prediction and monitoring of anti-TNF treatment . Clinical and Experimental Rheumatology 2012; 30: 23-30.
9. Abdullah HasanJabbar, SalimOudahMezan, SalihMeri Al Absi et al., Assessment of anticholinesterase effect of polyvinylpyrrolidone/silver nanocomposite biosynthesized by Pandanusatrocarpus extract, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.12.582
10. MATT, P (2016). Fc receptors and immunoglobulins in polyarthritis , *Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Medicine* 1250
11. Zabriskie , J. B. (2009). Basic component of the immune system. In: Essential clinical immunology. Zabriskie , J. B. (Edt). Cambridge university press. Cambridge, PP: 4.
12. Weigl- Bea, A. (2000). Stress hormones (glucocorticoids catecho-lamines)in eruptions and spontaneous rem-ission phases inpsoriasis. Report.1-16.
13. Kia K,NairRP,Ike RW, Hiremagalore R, Elder JT, Ellis CN.Prevalence of antigliadin antibodies in patients with psoriasis is not elevated compared with controls. Am J ClinDermatol 2007;8:301-5.
14. Janeway,C.A.;Travers,P.;Walport,M.andShlomchic,M.J.(2005).Immunobiology :the immune system in health and disease .6th Ed .Garland science .New York and London.pp120.
15. Singh, S.; Singh, U. and Singh, S. 2009. Study of serum Complement C3, C4 and ImmunoglobulinsIgG ,IgA, IgM in Psoriasis patients in North India. Indian J Allergy Asthma Immunol. 23(2) : 73-77.
16. Li, L. F.; Sujan, S. A.; Yang, H.; and Wang, W.H. 2005. Serum immunoglobulins in psoriatic erythroderma. Med Arch. 30(2): 125-7.
17. Nisi, A. D.(2004). Satistiscal analysis in medical research, 2nd(Ed). 22: 21-30.
18. Das, R.P., Jain, A.K., and Ramesh, V. (2009). Current concepts in the pathogenesis of psoriasis. Indian Journal of Dermatology. 54: 7.
19. Abdullah HasanJabbar, SalimOudahMezan, SalihMeri Al Absi et al., Assessment of anticholinesterase effect of polyvinylpyrrolidone/silver nanocomposite biosynthesized by Pandanusatrocarpus extract, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2020.12.582.
20. Pariser, D., Schenkel, B., Carter, C., Farahi, K., Brown, T.M., Ellis, C.N.(2015). Psoriasis Patient Interview Study Group. A multicenter, non-interventional study to evaluate patient-reported experiences of living with psoriasis. J. Dermatol .Treat., 1–8.
21. Elena E. Perez, Jordan S. Orange, Francisco Bonilla, Javier Chinen, Ivan K. Chinn, Morna Dorsey, MMSc,dYehia El-Gamal, Terry O. Harville, ElhamHossny Bruce Mazer, Robert Nelson, Elizabeth Secord, Stanley C. Jordan, E. Richard Stiehm, Ashley A. Vo, PharmD, and Mark Ballow2017, MUpdate on the use of immunoglobulin in human disease: A review of evidenceWork Group Report of the American Academy of Allergy, Asthma & Immunology, J ALLERGY CLIN IMMUNOLMARCH