Study role of interleukin 23 level, family histories and blood groups in psoriasis patients

Eman Wahab Kadhum¹, Basim Mohammed Hanon², Hasaneen KudhairAbdullAbass³

¹Al-Mustaqbal University, Medical Laboratory Techniques; Emanwahab@mustaqbal-college.edu.iq
²University of Waist, Veterinary medicine; bmohammed@uo.wasite.edu.iq
³Alkut University College, Pharmacy department; Hasaneen.kudhair@alkutcollege.edu.iq

Abstract

Background: Psoriasis is one of the most important autoimmune diseases with chronic inflammatory signs in skin, erythematosus, scaly plaques, and can infect all ages and in all countries. Objectives & Methodology: In order to detect the incidence of Psoriasis and its association with elevated IL-23, 70 people were involved in the current study, their ages were (1-45) years and from both genders 30 of them was with Psoriasis and the family history groups 20 and the other healthy 20 were considered as control groups. This study was worked in the central health laboratory, Hilla Teaching Hospital in the period Nov.2018 to Feb.2019 in Babylon Governorate. Results: the IL-23 of in Psoriasis patients has a significant with same results in family history groups in all age groups when comparison with control group. The results also showed that patients of blood group (O+) are the most frequent by percent (33.33) followed by B+, A+, AB+ and AB− with percent reached (30%, 20%, 10% and 6.67%) respectively. Furthermore, there is a genetic tendency in the frequency of onset of Psoriasis as 20% in both parents and (30% and 10%) in mothers and fathers respectively while 40% of the disease does not appear in their families. Results also showed significant increasing in the age groups (31-45) years in comparison with (1-15) and (16-30) years. The disease also rises in males compared with females. Conclusions: a significant increase in IL-23 for patients with Psoriasis compared with the control group. Patients with family history are at high risk to develop Psoriasis. The age group (31–45) found to have high incidence of Psoriasis compared with other age groups. Persons of O+ blood groups may be at high risk to have Psoriasis.

Key words: Psoriasis, IL-23, Family History, Age, Blood Groups

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Introduction

Psoriasis is a most common spreader of chronic autoimmune skin disease, and the undetectable caused with difficulties of recuperation and wide proud of negative effect to lives peoples [1]. These diseases can affects in young and adults and in all part of the word. Some research study of incidence in different countries recorded ranges between 0.09% and 11.43%, with making a global problem with about 100 million peoples affected in world [2]. The recent study recorded the highly number of cases which nearly too double comparison with reported prevalence in 1979-1980 (4.8%) with increased from to 11.4% in 2007-2008, without unknown causes of this reason [3]. The course of clinical signs different depend on severity of symptoms and number of external stimulation and some predisposing factors and disorder, including arthritis, cardiovascular syndrome, metabolic disorder, inflammatory bowel disease (IBD) and depression. The symptom included nails and skin, and related with a number of the simultaneous presence of chronic diseases or conditions in a patient. Generalized skin red papules and plaques lesions or localized with itching, most form of this lesion a symmetrical and covering by white or silver scales, sharply demarcated, this lesions causes harsh and pain discomfort caused by illness or injury [4]. The psoriasis causes etiology of are still unclear, and the main predisposing factor a genetic predisposition to accruing the diseases [5]. Some researcher consider psoriasis one of autoimmune disease depend on the cytokines and cell of immune system, without detectable auto antigen in immune responsible of this disease, another causes depend on internal stimulation such as infections used some side effects of systemic drugs or external causes such as exposure to mild trauma, or reddening and inflammation when overexposure to the ultraviolet rays of the sun, and stress [6]. Some deferent cell such as keratinocytes T lymphocytes and dendritic cells (DCs), play important role in the immunopathogenesis of psoriasis. The thickened and scaly plaques accrue results of skin proliferation of epidermal keratinocytes with
immunopathogenesis seen in psoriasis, lead to produce various cytokines from dendritic cells and T lymphocytes that infiltrating in the skin, the IL-23/IL-17 axis as the important signaling pathway leading to molecular, cellular, and structural changes in psoriatic skin [7]. The produce IL-23 produces from epidermal keratinocytes, dermal dendritic cells and dermal macrophages their cell play important roles in pathogenesis and the severity of lesions [8]. In the both Plaque Psoriasis PS and psoriatic arthritis PsA type of infection the IL-23R gene are MHC genes hasn't associated with disease activity [9], the pathway of IL-23/ IL-17 has been too involved in the development of a particular part or feature of the disease such as spondyloarthropathy [10]. The IL-23 has been high level in body fluid, skin and synovial tissues of (PsA) patients (11) and the severity of PsA disease activity make smaller or less when neutralization of IL-23 [12]. The diametric structure of IL-23 consists of two unitesp19 and p40 [13]. The some cell produced IL-23 and by and activated antigen-presenting cells (APCs), including (DCs), Langerhans, and macrophages, and this cell have able to create development and differentiation of active Th17 cells [14]. Some research study on mice in vivo treated with IL-23 lead to developed arthritis, after a particular thing has was shown high systemic levels of IL-23 with develop enteritis and lesion on skin, skin and in the enthuses have high level of IL-23R+ T cells and this results should be the IL-23 have direct reacting in pathogen city of PsA [10]. The aims of this study explain blood groups and family history with incidence in different age groups and related of IL23 level with Psoriasis patients and the clinical testing of IL-23.

Figure 1.Updated pathogenicity and role of pathway of IL-23/ IL-17 model of psoriasis [7]

Materials and methods
Study population
The study included 30 patients who attended to Hill Teaching Hospital in Babil provinces suffering from dermatitis during the period (Nov. 2018 – Feb. 2019). The diagnosis of Psoriasis depends on dermatologist report in both gender and their ages between 1-45 years. They were divided into three age groups (1-15, 16-30 and 31-45). In addition 20 family history groups from the same age groups and 20 healthy people from the same age groups were involved and considered as a control group of the current study.

Collection of samples
Venous blood samples with volume (3cc) were collected or drawn from patients and normal people (control) in sterile coagulation tubes left for (60 min) at room temperature (37c˚), then centrifuged at 3000 rpm for 15 min. to separate the serum which was stored at -20 C˚ until used. Human IL-23 ELISA Kit manufacture by Elabscience, United States, this ELISA kit applies to the in vitro quantitative determination of human IL-23 concentrations in serum, plasma and other biological fluids. This ELISA kit uses the Sandwich-ELISA principle. Statistical analysis was performed with the SPSS, Version 23 (statistical package for social sciences) and also Chi-square.
Results & Discussion

Frequency of infection in Psoriasis and its relation to the age of Patients
In this study, the total number of infections reported by Psoriasis was shown with an increase in the age, the high frequency of Psoriasis in the age group 31-45 years (43.3%) compared with the age group 16-30, 40% years, while the less percentage in group 1-5 years with incidence rate of infection 16.7%, table (1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Age/Years</th>
<th>Psoriasis Patients No.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 - 15</td>
<td>5 (16.7%)</td>
</tr>
<tr>
<td>2</td>
<td>16 - 30</td>
<td>12 (40%)</td>
</tr>
<tr>
<td>3</td>
<td>31 - 45</td>
<td>13 (43.3%)*</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30 (100%)</td>
</tr>
</tbody>
</table>

*Significance P < 0.01

Frequency of Psoriasis in family Patients

Results of figure (1) clarify that Psoriasis was diagnosed in both parents of (20%) of Psoriasis patients, however, mother of (30%) of Psoriasis patients was also suffering from Psoriasis in addition to (10%) of the fathers of Psoriasis patients. Also, the results showed that (40%) of Psoriasis patients with no family history of Psoriasis.

Comparison Frequency of blood Groups and Rh factor between Patients Samples and controls

In this results showed a difference in frequency of blood groups and Rh factor between samples of Psoriasis patients and control group, hence, the highest percent of Psoriasis patients was for O+ group and reached 28% followed by 20 % and 12 % for the two groups A+ and AB+ respectively. On the other hand, A+ was the highest percent of blood groups for the control group, table (2).

<table>
<thead>
<tr>
<th>Blood Groups &amp; Rh Factor</th>
<th>A+</th>
<th>A</th>
<th>B+</th>
<th>B</th>
<th>AB+</th>
<th>AB</th>
<th>O+</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of group Patients</td>
<td>20%</td>
<td>0</td>
<td>30%</td>
<td>0</td>
<td>10%</td>
<td>6.67%</td>
<td>33.33%</td>
<td>0</td>
</tr>
<tr>
<td>NO. of group Patients</td>
<td>6</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Percentage of control group</td>
<td>35%</td>
<td>5%</td>
<td>5%</td>
<td>Ø</td>
<td>20%</td>
<td>Ø</td>
<td>10%</td>
<td>25%</td>
</tr>
<tr>
<td>No. of control group</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

Ø No samples in the group

Serum level of IL-23 in Psoriatic Patients and controls

The psoriatic patients were showing high serum levels of IL-23 (335.90pg/ml), while the level of control was recorded (208.75 pg/ml) with significant differences, table (1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Number</th>
<th>IL-23 Mean ± S.D(pg /ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Psoriatic patients</td>
<td>30</td>
<td>335.90 ± 116.29**</td>
</tr>
<tr>
<td>2</td>
<td>Family history</td>
<td>20</td>
<td>281.25±41.43*</td>
</tr>
<tr>
<td>3</td>
<td>Control</td>
<td>20</td>
<td>208.75 ± 59.80</td>
</tr>
</tbody>
</table>

**Significant differences compared to the control group at a potential level (p≤0.01).

*Significant differences compared to the control group at a potential level (p≤0.05).

Discussion

Psoriasis and age groups

Psoriasis does not have a specific age of infection. It affects young people and adults as we observed in the collected samples. The infection found in all ages' children and adults, the
number of infections we received in young people 1-15 years was 5 cases, while the highest among the adults was 31-45 years old and the number was 13 cases. Some study has agreed with this study, the age subpopulation is 30-40 years old high age group susceptible to infection (15). Psoriasis patient’s was the destination age of infection 32-33 years at less than 40 years old [16]. Another studies [17-18] was found the same results recorded in this study the 30-40 years old was the high acceptable to infection compared with other ages groups. While in study [19] was found one-third recoded before 20 years old and greatest of cases before 40 years old. In another report study (20) was showing the first recoded of infection in 35 years old, while 75% of patients present during period of less than age 40 years old. [21-22].

**Frequency of Psoriasis in family Patients**

The risk of family history has a clear effect on psoriasis, which was also a genetic disease. This study has noticed this through the collected samples and they were infected with psoriasis of which about 70% have a family history. This result gives the indication that psoriasis has a strong relationship with inheritance. We have demonstrated this relationship through the work of the family tree of the disease. The psoriasis family had history to infection could be more susceptible with early onsite of clinical sings compared with other healthy family because found the risk factor genetic predisposition [23]. The 40% of patients’ disease of both psoriasis and PsA in features have a family history with genetic predisposing [24], while in different study was showing not any related between family history and severity of psoriasis [25]. Comparison Frequency of blood Groups and Rh factor between Patients Samples and controls, when study relation between Psoriasis and blood group's we having been some type of groups more susceptible to infection, the type O 13 cases more common following by type A 11 cases compared with types AB, B. The several researches have carried out a systematic or formal inquiry to discover and examine the facts this relationship in the field of autoimmune diseases. The one of important study the inhabitants of a particular area ABO blood grouping in Iran, Among the 50 patients study group, type A 44%, type O 38%, and 16% type B and 2% had type AB [26], while in study in done in Turkey Patient group A and AB blood group was higher than the control group. There was no statistically significant differences between the two groups [27].

**Interleukin IL-23**

The IL-23 a particular group of the IL-6/IL-12 cytokine family, this cytokine are shows of being similar with IL-12 formed by two subunits heterodimers: in two type of cytokine have p40 subunit, and other subunit p19 or p35 in a way that belongs assembly IL-23 or IL-12 [28]. The sources of IL-23 different depend on type of cell that enter in the immunopathogenesis including keratinocytes and APC, DC are able to produce IL-23 [29] these cell activation when exposure to bacterial and fungal products binding to TLRs [30]. The action of IL-23 depend on of immune cells an opening or location of IL-23 receptor complex (IL-23R), evident on mast cells memory T cells, macrophage, NK cells, Neutrophils and innate lymphoid cells [31], to complete IL-17/IL-23 signal required activity of another type of cytokines such as TGF_β, IL-1, and IL-6, IL-23 produces from T cells [32]. Certainly the role of IL-23 drives differentiation both type of the CD4+ , CD8+ T cells, and ILC3 in induce stimulate IL-17, IL-17F, IL-22, and IL-21 [33]. The self-amplification loop accrue in further expression of IL-23, lead to stimulation of IL-23 receptor [34]. This activity leads to complete IL-17/IL-23 signaling pathway [35]. The high level of IL-23 in lesion of skin is related with increase infiltration and activity of myeloid DC [36]. Acting or done in the same way IL-23 levels in serum high compared with controls [37]. This result confers by used biologic therapies to decrease severity of clinical responses [38]. The IL-23 was acted to stimulation of immunity in earlier lesion of skin; it could be a necessary in induction of psoriatic lesion [39]. Reported that IL-23 is high level in skin disorder or lesion, many studies examination psoriatic lesion biopsies with those of traditional skin showed exaggerated ribonucleic acid expression of IL-23 in lesion samples [40], with different source IL-23 is over expression by dermal nerve fiber cells [41-42]. Reportable that IL-23 is manufacture by many cell varieties together with Th-17, CD8+ T and natural killer T cells [43]. Incontestable that there aren’t any vital studies scrutiny the body fluid levels of IL-23 in psoriatic patients and controls [44]. According no variations bodily fluid levels of IL-23 were found in
psoriatic patients and management, there square measure potentialities that such cytokines could be concerned within the terribly early section of skin condition development or be gift solely within the lesion skin [45]. The researcher when discovery of IL-23/T17 pathway was opining new approach of therapy, Psoriasis was one of more spreading chronic inflammatory autoimmune diseases conditions in all of medicine, lead to development more effective targeted psoriasis treatment. The anti-IL-23 was giving high response more safe, and good responsible in patients [46]. In last few years, the Food and Drug Administration (FDA) give permission to use treatments that inhibit this pathway for the treatment of psoriasis with good results to remove clinical signs in ~80–90% of psoriasis patients.

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