DOI: 10.5455/msm.2020.32.105-107
Received: APR 15 2020; Accepted: MAY 22, 2020

ORIGINAL PAPER Mater Sociomed. 2020 Jun; 32(2): 105-107

Total Serum Immunoglobulin E Levels in Patients with Psoriasis

Emina Kasumagic-Halilovic

Department of Dermatovenereology, University Clinical Center Sarajevo, Bosnia and Herzegovina

Corresponding author:
Emina Kasumagic-Halilovic, MD, PhD, Department of Dermatolovenereology, University Clinical Center Sarajevo, Bolnicka 25, Sarajevo, Bosnia and Herzegovina. E-mail: eminakahalilovic@gmail.com. ORCID ID: http//www.orcid.org.0000-0003-2206-2555.

ABSTRACT

Introduction: Psoriasis is a common chronic skin disorder characterized by inflammation and abnormal epidermal proliferation. Its severity ranges from a chronic plaque psoriasis (CPP) to generalized psoriatic erythroderma (PE). The cause of psoriasis is unknown although most evidence supports the hypothesis that psoriasis is an immunologically mediated disease. The T-helper (Th) 1 and Th17 cells are responsible for the inflammation of psoriasis. Immunoglobulin E (IgE) is a class of immunoglobulin essential for the allergic response. There is some evidence that IgE may take a part in the pathogenesis of psoriasis. **Aim:** The aim of the study was to compare serum levels of total IgE between patients with psoriasis and healthy subjects, and to assess the difference between localized form (CPP) and extensive form of disease (PE). **Methods:** Seventy-five patients with psoriasis and 30 healthy subjects were enrolled in this study. Data on age, gender, personal and family history, clinical type and duration of disease were collected and analyzed. Serum levels of IgE were measured using nephelometric method. **Results:** Serum levels of total IgE were significantly higher in patients than in controls (46.7% *vs.*. 10%; p<0.05). Statistical difference of IgE concentration was also observed between CPP and PE. Comparison between patients and controls with regard to the median of the serum level of total IgE levels showed a statistically highly significant elevation in patients (425 IU/ml) compared with controls (54.5 IU/ml) (p<0,05). A higher total IgE concentration was observed in the group of patients with a longer period of skin changes. No relation was found between the serum level of IgE and family history of psoriasis, age or sex (p>0.05). **Conclusions:** This study supports the evidence that elevation of total serum IgE is associated with psoriasis. The exact role of serum IgE in psoriasis should be additionally investigated in future studies.

Keywords: psoriasis, serum levels, total immunoglobulin E.

1. INTRODUCTION

Psoriasis is a common chronic skin disorder characterized by inflammation and abnormal epidermal proliferation. The worldwide prevalence is about 2%, but varies according the regions (1). Chronic plaque psoriasis (CPP), the most common form of the condition is usually manifested as well-demarcated erythematous, scaly plaques on elbows, knees, scalp, but any skin surface may be affected as well. Psoriatic erythroderma (PE) represents the generalized form of the disease that affects all body sites. The specific pathogenesis of psoriasis is not completely understood, but the underlying mechanisms involve a complex interplay between epidermal keratinocytes, T limphocytes as well as other leukocytes, and vascular endothelium (2, 3). The T-helper (Th) 1 and Th17 cells are responsible for the inflammation of psoriasis. Inflammation is not limited to the psoriatic skin, and has been shown to affect different organ systems. Thus, it has been postulated that psoriasis is a systemic entity rather than a solely dermatological disease (4).

The discovery of immunoglobulin E (IgE) was major stimuli to the investigation of allergic diseases (5). Within a decade of its discovery, reports began to incriminate IgE as a possible contributor to the pathogenesis of several chronic inflammatory disorders (6). Although serum IgE concentrations are low in normal health condition, they are high in atopy, parasitic infestation, human immunodeficiency virus (HIV) infection (7), and certain types of cancer. In some of these diseases, serum IgE concentra-

tion correlated with the activity and intensity of disease, and may be used as a prognostic factor. Serum IgE levels in dermatologic condition other than atopic dermatitis usually have been reported as normal (8), although increased serum IgE concentrations have been documented in patients with contact allergic dermatitis, bullous pemphigoid, systemic lupus erythematosus (9), and alopecia areata (10).

The production of IgE is regulated by genes, cytokines and the environment (11). Altered levels of IgE represent a dysregulation of IgE synthesis and may be seen a variety of immunological disorders. There is some evidence that IgE may take a part in the pathogenesis of psoriasis.

2. AIM

The aim of our study was to evaluate serum concentrations of total IgE in psoriasis patients and control subjects, and also to assess the difference between CPP and PE.

3. PATIENTS AND METHODS

A case-control study was conducted and all patients were from Department of Dermatovenerology, University Clinical Centre Sarajevo. After informed consent, relevant history was taken and clinical examination was performed. The following factors were considered: sex, age, personal and family history, clinical type and duration of disease. The study included 75 patients with psoriasis (34 female and 41 male).

Exclusion criteria included a positive family or personal history of allergy, the presence of concomitant disorders including systemic, parasitic and neoplastic disease, and the use of systemic or topical corticosteroids or immunemodulators before serum immunoglobulin E detection. Patients receiving phototherapy 6 months before this study were also excluded.

Control group consisted of 30 generally healthy subjects (9 female and 21 male).

The total group of psoriasis patients and the two patients subgroups divided according to skin involvement were compared to the control group. Group 1 (n=75) included all psoriasis patients, group 2 (n=58) patients with CPP, and group 3 (n=17) patients with PE.

Serum IgE levels were measured by the nephelometric method (Dade Behring Marburg GmbH, Marburg Germany) with a normal range of 0-100 IU/mL.

The data were statistically evaluated. Statistical significance for variables relationship was considered when $p<0.05$.

4. RESULTS

Among the 75 patients included in this study, 41 (54.7%) patients were men and 34 (45.3%) patients were women. The male /female ratio was 1:0.82. The average age of the patients was 43.7, varying from 16 to 77 years old. There was no statistically significant difference between genders with respect to age ($p>0.05$). Family history was positive for psoriasis in 9 of 75 (12%) patients. The duration of psoriasis ranged from 2 to 221 months.

The control group consisted of 30 generally healthy participants: 21 (70%) men and 9 (30%) women with an age range of 18-75 years, 45 years on average.

The range of individual IgE levels was wide. The median of the total value of IgE was higher in the patients group in comparison to the control group: 425 (min 3.6; max 4205) kU/ml and 54.5 (min 13.4 max 154) kU/ml, respectively. The difference was statistically significant ($p< 0.05$; Mann-Whitney test).

The serum IgE level was elevated in 35 (46.7%) of the psoriatic patients, as compared with 3 (10%) of the control group. Serum levels of total IgE were significantly higher in psoriasis patients than in control subjects ($p<0.05$). The percentage of patients with PE who had increased IgE was 76.5% in comparison to 37.9% of patients with CPP. Both types of psoriasis had statistically significant elevation in the serum IgE levels compared to the control with PE showing the highest elevation.

A higher total IgE concentration was observed in the group of patients with a longer period of skin changes. No relation was found between the serum level of IgE and family history of psoriasis, age or sex ($p>0.05$).

5. DISCUSSION

A variety of humoral changes have been demonstrated in psoriatic skin. Psoriasis patients, especially those with severe disease, have elevated serum levels of IgA and often IgG and even antinuclear antibodies (11). These antibodies can be shown in the stratum corneum, where they may stimulate complement and thus attract neutrophils.

IgE is generally acknowledged as a typical mediator of allergic response, which is low in healthy subjects and elevated in atopic conditions. Factors regulating IgE levels include age, gene-by-environmental interactions, genetic factors, sex and season (12). IgE recognizes exogenous antigens and signals through Fcε receptors (FcεRs), including FcεR I and FcεR II, triggering an immunologic response.

The possible association of serum IgE levels and psoriasis has been previously reported (13-16). Our study clearly demonstrated that total serum IgE was significantly increased in psoriatic patients (46.7%) in comparison to healthy subjects (10%). These results are consistent with a clinical study performed by *Chen et al* (17). They analyzed serum IgE levels in 98 patients with psoriasis, and found serum levels of IgE to be elevated in 53.06% of total patients with psoriasis compared to 12% of the control group. Our findings are similar to the study of *Li et al* (18), who also recorded a significant increase in serum IgE (81.3%) in patients with PE. They indicated that the change in Th2 cell phenotype was introduced as the cause of high IgE levels in erythrodermic psoriasis. In addition, *Yan et al* demonstrated that 39% of patients with psoriasis had elevated serum IgE concentrations and they observed that lesional skin of patients with psoriasis contains more IgE+ and FcεRI+ cells (19). IgE and FcεRI were coexpressed on mast cells, epidermal Langerhans cells, dermal dendritic cells, macrophages and a small number of neutrophils. They concluded that IgE might participate in the development of psoriasis by activating FcεRI-bearing cells. Nevertheless, our observations of serum IgE concentrations in psoriatic patients were in contrast to some previous studies (20-22), which did not find an increase in IgE levels.

Although there may be other mechanism regulating

IgE synthesis, over production of IgE is usually Th2 cell determinated (23,24). The Th2 cytokines IL-4 and IL-13 are required signals for IgE synthesis, they stimulate the transcription of IgE through the immunoglobulin constant region genes. Keratinocytes do not produce IL-4 or IL-13, but are involved in IL-4 or IL-13 induced biological effects (25). Recently, a study showed that IgE-secreting cells differentiation and IgE production could be directly promoted by IL-17 (26). IL-17, as a crucial cytokine involved in psoriasis's pathogenesis, is overexpressed in psoriasis (27) both in skin and blood. *Pigatto et al* stated that the production of cytokines of Th1 lymphocytes occurs during the early phase of psoriasis, whereas the cytokines of Th2 lymphocytes are active during the stable plaque type phase and hence is more associated with IgE-mediated allergies (28). Hyper IgE in psoriasis, specially in PE implies that a shift from Th1 to Th2 has occurred in psoriasis and suggest that caution should be taken in the use of Th2 inducing treatments in psoriasis (18).

6. CONCLUSION

This study supports the evidence that elevation of total serum IgE is associated with psoriasis. Unfortunately, the mechanism by which IgE might interact in the pathogenesis of psoriasis is unknown.

Many researchers have tried to explain the cause of increased IgE, the prototypical marker of Th2 immunity, in some cases of psoriasis, although it has always been known that psoriasis is a Th1 immune response.

Although this process is remarkable, there are still unknowns. Additional studies are clearly warranted to verify mechanisms of such a phenomenon.

- **Declaration of Patient Consent:** The authors certify that they obtained all appropriate patient consent forms.
- **Authors contribution:** Each author were included in all steps of preparation this article. Final proof reading was made by the first author.
- **Conflict of interest:** None declared.
- **Financial support and sponsorship:** Nil.

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