ASSESSMENT OF QUALITY OF LIFE AND SEVERITY INDEX OF PSORIATIC PATIENTS IN NORTH INDIA

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ABSTRACT: The present study conducted on 60 psoriatic patients. Incidence of psoriasis comes out be 0.3636 percent in Punjabi population group of North India with 5:1 male female ratio. Mean age of disease onset stands at 37.5 years and mean chronicity age comes out to be 1.95 years. PASI score calculation ranges between 4-19.9 in males and 10.6-13.5 in females. Its average (11.6) correlated with the psoriasis PASI score (12.9) provided by Finlay. Results of PDI shows that daily life activities of psoriatic patients of Punjab suffered to great extent. PDI value in working class scores at 22.14 and 20.42 in non working class. 32 patients narrated their extremely disabled (21-30) routine activities and 24 patients confessed non-cooperation from family which leads to large disability (11-20). So it is concluded that Indian social structure influence the activities of the patients within the family and society and even addiction to stress reliever viz alcohol, smoking, etc. increases.

Keywords: Psoriasis, Incidence, Disability, Surface Area, Quality.

1. INTRODUCTION

Psoriasis is an ancient autoimmune and universal inflammatory disease (Shai et al., 2002). It is the one of the longest known illnesses of humans. It was firstly described by Hippocrates in Greece in 460-377 B.C. He used term “Psora” which means “to itch”. Initially the psoriasis was confused with the leprosy. It was described as a type or variety of the leprosy. The Greeks used the term lepra which means scaly skin conditions. In 18th century English dermatologists Robert William and Thomas Bateman differentiated psoriasis from other skin diseases by the regular, circular form of patches, while psoriasis is always irregular. In 1841, William identified two categories Lepra graecorun and psora leprosa. The name Psoriasis was given by the Viennese Dermatologist Ferdinand von Hebra in 1841 which is derived from greek word psora. Psoriasis was first diagnosed in Greece (Hebra et al., 1841). Psoriasis is an unrelieved provocative non contagious skin and joint disease that affects our immune system. The white blood cells (T cells) become over stimulated and it commonly causes red crusty dry patches on the skin because of excessive skin production. The skin reacts just the same as with fungus infections.

The process of having psoriasis begins at the bottom layer of the epidermis, where the keratinocytes are completed. Keratinocytes are juvenile skin cells that fabricate keratin, a strong protein that help the structure of hair, nail and skin. The skin cells that are produced in the deepest layers of our skin make their way to the outside in just a week or less. They are full grown and replaced with novel skin cells. Human skin cannot get rid from these cells at necessary speed, so they fabricate upon each other, leading to chunky, dry patches, or plaques, silvery, crumbling areas of dead skin. Psoriatic lesions/patches usually rise in legs, wrist, lower back, knees, feet and palms, which extend up to scalp and genitals and can affect the whole body. The finger and toe nails can also suffered with this disease. Psoriasis cannot be fully cured; certain improvements can be made with the help of medicines and high protein diet. Severity conditions of psoriasis vary from persons to person and depend upon the immune response and protein diet pattern of the individual. This disease is mostly aggravated in winter season due to dry weather. Besides this various factors such as stress, systemic illness, particular drug, dry skin, alcohol, food allergen, infection and climatic changes also participate in aggravation of psoriasis (Khoo et al., 2009; Sampogna et al., 2006). All these conditions and factors lead to discomfort in patient's life and make the conditions of patient miserable and itchy skin results in insomnia in certain cases. This painful condition some time becomes difficult to handle and leads to suicidal tendencies or abnormal psychosocial behavior. In 2003, Fredberg and associates categorized psoriasis into three basic forms on the basis of clinical symptoms viz: Non pustular psoriasis, Pustular psoriasis, Other psoriasis. Psoriasis may remain unnoticeable at its early stage but it is characterized by the onset of itching and burning sensation on the affected body parts. The scales are also formed on the body which varies from pink to deep red colour with silvery layer on the upper surface of the skin. The diagnosis of the psoriasis begins from the appearance of the skin. As there is no special blood test or the diagnostic procedures for it. A skin biopsy is carried out which show rete pegs. Various cure treatments are prevalent in the market viz. topical treatment, phototherapy, photochemotherapy, etc.
2. MATERIALS AND METHODS

Patients
This study included 60 patients with psoriasis diagnosed clinically by dermatologists. The PASI score of the 40 patients had been calculated out of the total 60 patients. PDI of 56 patients only had been calculated, because of the four Guttate psoriasis patients and rest sixteen goes under strong allopathic treatments. Data was collected by taking written consent from patients visiting skin OPD's of different Government and private hospitals of Punjab and Chandigarh.

Methods
The following two tests were administered to observe the results of the present study:
1. Psoriasis Area and Severity Index (PASI)
2. Psoriasis Disability Index (PDI)

PASI
Surface area under disease will be calculated by using PASI calculator developed by Fredriksson and Petterson in 1978. PASI combines the assessment of the severity of lesions and area affected into a single score in the range 0(No Disease) to 72(maximum disease). The total body surface area is divided into four sections viz. Head(H)(10%), Arm(A)(20%), Trunk(T)(30%) and Legs(L)(40%) for the section, the percentage of area of skin involved is estimated by using the patients palm and transformed into a grade from 0-6( as prescribed in the PASI calculator).

PDI
Quality of life of psoriatic patient will be assessed by using Psoriasis Disability Index (PDI) developed by Finlay in 1992, revised in 1999. It is mean for adult patients average of 16 years. It is self exclamatory and can be handed to the patients. It is usually completed in 3 to 4 minutes.

Pedigree Analysis
Pedigree Analysis was done to know the inheritance pattern of this autoimmune disease in Punjab and male female ratio.

3. RESULTS AND DISCUSSION

Data for the present study have been collected from sixty patients of the age group 7-70 years with mean age of 42.33 years, chronicity age 1.95 years and mean age of onset of a disease is 37.5 years. All the sixty patients belong to middle and high income group. The male and female patients ratio comes out to be 5:1. (Table 1)

Table 1: Showing basic results of the study

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Parameters</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Male Female Ratio</td>
<td>5:1</td>
</tr>
<tr>
<td>2.</td>
<td>Mean age of Patient</td>
<td>42.33 years</td>
</tr>
<tr>
<td>3.</td>
<td>Mean Chronicity age</td>
<td>1.95 years</td>
</tr>
<tr>
<td>4.</td>
<td>Mean age of onset of disease</td>
<td>37.5 years</td>
</tr>
</tbody>
</table>

Table 2: Showing Epidemiological data from hospitals (w.e.f 1 Jan, 2006 to 1 Jan, 2011 and 25 Feb, 2006 to 25 Feb, 2011)

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Name of Hospital</th>
<th>Total skin patients as per OPD records</th>
<th>Total Psoriatic patients as per OPD records</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Civil Hospital, Mansa</td>
<td>82,500</td>
<td>300</td>
<td>0.3636</td>
</tr>
<tr>
<td>2.</td>
<td>Dr. Batra's Clinic, Chandigarh</td>
<td>1836</td>
<td>500</td>
<td>27.23</td>
</tr>
</tbody>
</table>

Clinic, Chandigarh for the last five years (January 1, 2006 to January 1, 2011) from skin OPD's (Outdoor Patient Department). It was observed that in Civil Hospital, Mansa a total of 82,500 skin patients were registered for the routine check-up. Out of these 82,500, skin patients only 300 patients were clinically diagnosed as suffering from psoriasis disease ranges from chronic to mild form. When the percentage analysis was done, it was confirmed that 0.3636 percent population of Mansa district suffered from psoriasis (Table 2). So, it was observed that prevalence of psoriasis seems to be much higher in the Mansa belt of Punjab. It must be noted that the area of Mansa district is very much prone to skin infections (fungal infections) that cause the increase in number of skin patients in OPD's. The environmental conditions of Mansa district are not favorable for health prospective. As this area is fully embedded with the heavy metals like Cesium, Cadmium, Zinc and Lead. These heavy metals are found not only in water and air but also in the samples of soil taken by the team of experts from Punjab Agriculture University, Ludhiana, (Aulakh, 2009). Due to this contamination, the rate of dermatological diseases increases day by day. Another factor responsible for the huge number of patients registered for skin OPD in Civil Hospital, Mansa may be that large number of population of this area belongs to rural backgrounds and prefers Govt. Hospitals for routine check-ups due to the low cost. The living standard and hygienic conditions are very pathetic in the interior regions and awareness towards the health and hygiene is still very poor among the rural Punjab.

Another epidemiological data has been taken from special skin treatment clinic i.e. Dr. Batra's Clinic, Chandigarh. A total of 1836 skin patients at Dr. Batra's
Clinic from 25th February 2006 to 25th February 2011 registered out of which only 500 patients clinically diagnosed as suffering from psoriatic diseases. The percentage of registered psoriatic patients at Dr. Batra’s clinic comes out to be 27.23 percent (Table 2) which is much higher than the Civil Hospital, Mansa percentage. This increased number of psoriatic patients may be due to the fact that people avoid lifelong allopathic treatment which includes steroids and corticoids. They feel that allopathic treatment is too difficult to follow in daily life. The homeopathic treatment more over does not affect the body adversely. There may be less side effects of this treatment as compared to allopathic treatment. Generally it was observed that whether the patients suffer from severe conditions or mild conditions he or she has to follow the dosage pattern maximally 5 times and minimally 3 times a day. In case of glucose coated homeopathic medicine it is easy and comfortable for them to follow the dosage pattern. Moreover most of the skin patients approached to this hospital belongs to the upper income group. Because the economic factor is also responsible for such a high profile treatment of Dr. Batra’s Clinic.

![Pedigree 1 showing Mode of Inheritance](Image)

Pedigree analysis
The familial pattern of psoriasis has been studied by using the pedigree flow chart of patients. The pedigree analysis of 30 patients has been done. It is observed that there are total of 365 individuals out of which 200 are males and 165 are females. The total number of affected males is 76 and total number of affected females is 27. The percentage of affected male individuals is 20.82% and female is 7.39% from the total individuals of families. The percentage of the affected males (76) from the total population of male (200) outcomes 38% and the percentage of the affected females (27) from the total population of females (165) is 16.36%. So, it is concluded that more number of males suffered from the disease as compared to their female counter parts.

All the family pedigrees show the autosomal dominant inheritance pattern. As the trait of psoriasis is passed from father to all of his offsprings including daughters. In the same way the trait is transmitted from male to female and as well from female to male equally. This fact explains the autosomal mode of the inheritance (Pedigree 1). The gene of psoriasis is present in all generations of families in all the cases of pedigrees. The disease does not skip out even a single generation explaining its dominant character. Balyavichene in 1969 explained that psoriasis is a multifactorial disease. In 1971 Farber explained that psoriasis is inherited by an autosomal dominant gene and these studies support the present result of pedigree flow chart analysis of the psoriatic families belongs to Punjab.

Psoriasis Area and Severity Index (PASI) In the present study the total PASI score ranges between 4% to 19.9% that is the minimum and maximum value in the males. The PASI score of females lie between 10.6% to 13.5%. The PASI score of the 40 patients had been calculated out of the total 60 patients. In this study 4 patients were affected from Guttate Psoriasis and rest of the 16 patients was under strong allopathic treatment, which cured their body surface area almost completely. As the PASI score calculation was not possible in treated patients that are why these patients are not included for PASI calculations.

Finlay in 2004 studied of percentage involvement of body surface area by using PASI and showed that head and neck: 24.38, trunk 31.5., upper limb: 20.5 and lower limb: 35.25 PASI index respectively. The total overall PASI score was 12.9. Where as in the present study on Punjabi population the PASI score, comes out to be for head and neck: 3.3, upper extremities or limbs: 8.64, while trunk and lower limbs: 12.6 and 10.2 respectively. The total overall PASI score was 11.6 which is very close to PASI score provided by Finlay (12.9). So, it is concluded that severity level of psoriasis disease correlated worldwide. Present results are varied from the previous studies which may be due to the reason that India is a country of great social taboos and customs. People feel unmoral and uncultured to expose their body in front of others especially when an investigator is of opposite sex. So there were very few people who had explained properly about their fully affected body surface. Another factor is that people feel ashamed for having any skin disease in the family as well as in society.

<table>
<thead>
<tr>
<th>Table 3 Showing Results of Pedigree Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>
Table 4: Showing average values of PASI score

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Body Surface Area</th>
<th>PASI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head and Neck</td>
<td>3.3</td>
</tr>
<tr>
<td>2</td>
<td>Upper Limbs</td>
<td>8.64</td>
</tr>
<tr>
<td>3</td>
<td>Trunk</td>
<td>12.6</td>
</tr>
<tr>
<td>4</td>
<td>Lower Limbs</td>
<td>10.2</td>
</tr>
<tr>
<td>5</td>
<td>Total Overall PASI Score</td>
<td>11.6</td>
</tr>
</tbody>
</table>

Table 5 Showing assessment of PDI on the basis of Score

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Range of Score</th>
<th>Severity Accessing</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-1</td>
<td>No effect</td>
<td>NIL</td>
</tr>
<tr>
<td>2</td>
<td>2-5</td>
<td>Small</td>
<td>NIL</td>
</tr>
<tr>
<td>3</td>
<td>6-10</td>
<td>Moderate</td>
<td>NIL</td>
</tr>
<tr>
<td>4</td>
<td>11-20</td>
<td>Very Large</td>
<td>12</td>
</tr>
</tbody>
</table>

Psoriasis Disability Index (PDI)

Psoriasis Disability index of Finlay 1999 (revised form) has been administered for the understanding of the effect of psoriasis on the daily life of psoriatic patients. In the present study the highest PDI score is 29 and lowest PDI score is 15. PDI of 56 patients only had been calculated, it’s because the two Guttate psoriasis patients. As this index was meant for adults only, it can not be administered on the children (Guttate Psoriasis) Out of these 56 erythrodermic psoriasis and pustular psoriasis patients, 28 belonged to working category and 28 belonged Non-working category.

Table 5 shows that the average value of PDI in working patients is 22.14 and 20.42 in non working patients. The PDI value is higher in case of females than males. The average value of PDI of the females comes out to be 25.2 while the males have 19.65. The higher range of PDI shows that the disease effects greatly to the quality of daily life during the routine activities. The PDI is sub divided into the various categories to access the life quality of psoriatic patients. Each different category scored differently according to the answer given by patients.

The psoriasis causes discomfort in daily life. The quality of life is very severally effected and difficult to handle. As the pain and itching can be difficult to tolerate and patients even can think to finish his or her life. Being a patient of psoriasis they face very difficult phase of life which causes psychological stress in them. The psoriatic patients have to face the society’s unbearable behavior. People avoid interactions and hand shaking to them. The normal people afraid of spreading psoriasis to them. The patients have also physical stress along with psychosocial stress. It is concluded that patients feel self-conscious; disturbed by shedding of the scales (skin), live in a constant fear of relapse and avoid social interactions. It is also concluded that whether it may be a matter of psoriasis area and severity index or psoriasis disability index both are equally influenced by the Indian social structure, customs and traditions.

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RESEARCH ARTICLE

EVALUATION OF SERUM LEVELS OF IL-17, IL-20 AND IL-22 IN PSORIATIC PATIENTS FROM NORTH INDIA AND THEIR CORRELATION WITH DISEASE SEVERITY

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3Department of Dermatology, Venerology and Leprology, Government Rajindra Hospital, Patiala

Background: Convincing evidence suggests that Psoriasis is an inflammatory disease. Inflammatory response in psoriasis is mediated by over expression of proinflammatory cytokines produced by Th1 cells and relative under expression of Th2 cytokines. These cytokines induce chemokines and other effector cells via production of IL-17, IL-20 and IL-22, thus play role in pathogenesis of Psoriasis.

Objective: To correlate the serum level of IL-17, IL-20 and IL-22 with Psoriatic lesions and area affected with Psoriasis in North India.

Patients and Methods: In this study we calculated serum levels of IL-17, IL-20 and IL-22 in 150 Psoriatic patients as well as 200 healthy controls. Further the level of cytokines was assessed by ELISA and correlated to disease severity measured by psoriasis area severity index (PASI) score.

Results: The present study includes 150 Psoriatic patients (101 males and 49 females) of age group 18-75 years with mean and SD of age 43.55±14.65. The mean and SD of PASI was 15.10±11.96, ranged from 0.3-19.2.

Conclusion: Results show significant difference in serum level of IL-17, IL-20 and IL-22 in Psoriatic patients as compared to healthy controls. As it was observed that serum cytokines were significantly elevated in psoriatic patients, thus present study correlated the elevated level of serum cytokines with disease severity.

Limitations: Follow-up of psoriatic patients was not done. A larger sample size would have validated the results further.

Key words: Psoriasis, Autoimmune, Interleukin, PASI.

Key Messages: Studies on role of IL-17, IL-20 and IL-22 in psoriatic inflammatory conditions from North Indian patients are not available at all. The present study provides data on total surface area affected in severe cases and explore the role of IL-17, IL-20 and IL-22 in the severity of the psoriasis.

INTRODUCTION

Psoriasis is an ancient, non contagious, universal immune mediated inflammatory, polygenic and chronic skin disease, affecting 2-3% population worldwide (Baliwag et al.,2015). It is characterised by plaques of red (erythematous), scaly and well-demarcated skin lesions formed by the abnormal differentiation and hyperproliferation of epidermal keratinocytes (Christophers et al., 2001). Recent study on North Indian Punjabi population shows that about 0.3636 percent population with 5:1 male female ratio are suffering with Psoriasis (Kaur et al., 2011). The pathogenesis of psoriasis has not been clearly understood so far. Some studies report that it is an immunological disorder having abnormal keratinocyte proliferation mediated by T lymphocytes (Bos et al., 1999 and Griffiths et al., 2003), infiltration of T cells, macrophages, and dendritic cells (DC) into the psoriatic skin (Griffiths et al., 2007). Human IL-17 belongs to a recently discovered family of cytokines that contribute to the crosstalk between adaptive and innate immunity (Stumhofer et al., 2006). IL-17 and its relative IL-17F have strong proinflammatory properties on a broad range of cellular targets, including epithelial and endothelial cells, fibroblasts, keratinocytes, osteoblasts, and monocytes/macrophages (Weaver et al., 2007). So far it has confirmed that IL-17A plays key role in physiopathogenesis of psoriasis (Lee et al., 2004; Langrish et al.,2005 and Martin et al., 2005). Its mechanism of action involves the increased expression of S100 proteins, chemokines as CCL20, CXCL1, CXCL3, CXCL5, CXCL6, and CXCL8, and VEGF in keratinocytes leading to aberrant cell differentiation, proliferation, and immune activation (Batycka-Baran et al., 2014; Johnston et al., 2013 and Girolomoni et al., 2012). IL-17 have also been identified to be act through cholesterol in pathogenesis of psoriasis.
Psoriasis Disability Index (PDI)

Quality of life of psoriatic patients was assessed by using the Psoriasis Disability Index (PDI) (Finlay et al., 1995).

Measurement of cytokines

Cytokines were measured from serum samples of psoriatic patients and controls. Serum levels of IL-17, IL-20 and IL-22 were measured by using enzyme-linked immunosorbent assay (ELISA) kits (KrishGen Biosystems, USA) according to the protocol.

Statistical Analyses

Statistical analyses were performed by Graph Pad PRISM 5.0 software. Spearman rank correlation test was done for assessment of correlation by using VassarStats: a website for Statistical Computation (http://vassarstats.net/corr_rank.html). Continuous variables were presented as mean ± standard deviation. The Psoriasis Disability Index (PDI) measures the impact of psoriasis on specific aspects of daily living consisting of 15 disease-specific items (Finlay et al., 1995). The significance level was set at P<0.05.

RESULTS

Clinical and demographic characteristics of patients

The patients comprised 101 (67.33%) males and 49 (32.67%) females with male: female ration of 2.1:1. The demographic picture of the studied groups showed that mean age of onset of psoriasis was 39.55±14.65 (SD) years. Further it was found that PASI value of psoriatic patients calculated 15.10±11.96 (MEAN±SD), which ranged from 0.3-49.2. Body Mass Index (BMI) of psoriatic patients with mean and SD was found to be 24.89±05.17 Kg/m² (Table 1).

Serum Levels of IL-17, IL-20 and IL-22 in Psoriatic Patients and Healthy Controls

Serum levels of studied cytokines in psoriatic patients were found to be significantly high as compared to control group. Level of IL-17 was found to be 143.78±33.99 pg/ml in Psoriatic patients and controls having serum values for IL-17 32.68±18.71 pg/ml. Level of IL-20 was found to be 96.73±26.52 pg/ml (p <0.0001) where as in control group it was found to be 49.23±9.14 pg/ml. Similarly significant differences were observed in serum levels of IL-22 between the two groups. Level of IL-22 was observed to be 74.42±24.08 pg/ml in Psoriatic patients whereas in controls level of IL-22 was found to be 28.01±07.86 pg/ml (Table 2).

Serum Levels of IL-17, IL-20 and IL-22 in Psoriatic Patients (gender specific patients)

When compared the serum level of IL-17, IL-20 and IL-22 in male and female psoriatic patients separately we did not observe any significant difference among the two gender specific groups (Table 3).

Correlations between IL-17, IL-20 and IL-22 Serum Levels of Psoriatic Patients and PDI Score

Correlations among disease severity and serum level of cytokines are shown in Table 4.

MATERIALS AND METHODS

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Almost three millilitres (3 ml) of peripheral blood was collected from each subject in sterile BD Vacutainer plane vials with the help of medically trained laboratory technician. Serum was separated by centrifugation at 3000 rpm for 10minutes and stored at -80°C for further analysis.

Assessment of Psoriasis Severity

To assess the severity of disease, surface area under disease was calculated using PASI calculator developed by Fredrikkson and Petterson in 1978 (Van et al., 1997). The total body surface area is divided into four sections viz. Head(H) (10%), Arm(A) (20%), Trunk(T) (30%) and Legs(L) (40%), the percentage of area of skin involved is estimated by using the patients palm and transformed into a grade from 0-6(as prescribed in the PASI calculator).

Assessment of Quality of Life

Quality of life of psoriatic patient was assessed by using Psoriasis Disability Index (PDI) (Finlay et al., 1995).
We have presented Spearman rank correlation among elevated serum levels of cytokines, PASI, PDI and disease Induration. In our study we observed that elevated serum levels of IL-17 were significantly (p <0.05) correlated with the severity of disease. On the other hand there were no statistical significance (p >0.05) observed between serum level of IL-20 and PASI score. Correlation between serum levels of cytokines i.e. IL-17 was found to be non-significant with IL-20 and IL-22 whereas IL-17 and IL-20 were significantly (p <0.05) correlated to PDI. Disease indurations was also found to be significantly (p<0.05) correlated with serum levels of cytokines IL-17 and IL-22 as observed spearman rank correlation (Table 4).

**DISCUSSION**

It is reported that expression of IL-17, IL-20 and IL-22 is found to be increased at the site of inflammation in psoriasis (Res et al., 2012 and Sabat et al., 2007). IL-17 plays a key role in defense against pathogens by stimulating the release of antimicrobial peptides, proinflammatory cytokines and chemokines. IL-17 family consists of six ligands (IL-17A –IL-17F) and five receptors (IL-17RA-IL-17RE), with most homologous IL-17A and IL-17F (Baliwag et al., 2015). It is mainly expressed by keratinocytes in lesional skin and arises from innate immune cells like NK cells, gamma-delta T cells, mast cells, neutrophils, NKp44+ CD3-negative innate lymphoid cells (ILC’s) as well as the Th17 (CD4+ IL-17+) and Tc17 (CD8+ IL-17+) cells of the acquired immune system (Baliwag et al., 2015). The increased expression of interleukin-17 at the sites of inflammation in psoriasis (Kryczek et al., 2008 and Lowes et al., 2008) strongly suggests a role in promoting autoimmune pathology (Maddur et al., 2012 and Zhu et al., 2012). We reported here that serum level of IL-17 was found to be highly increased in the Psoriatic patients as compared to healthy control group. Some other studies also support the current finding which also shows overexpression of IL-17 in Psoriatic lesions (ALmakhzangy et al., 2009 and Caproni et al., 2009). Interleukin-20 and interleukin-22 belongs to the IL-10 family and members of subfamily IL-20.

**Table 1. Characteristics of Psoriatic Patients and Control Groups**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Patients (n=150)</th>
<th>Controls (n=200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>39.55±14.6</td>
<td>37.38±7.2</td>
</tr>
<tr>
<td>Male</td>
<td>101 (67.33%)</td>
<td>146 (73%)</td>
</tr>
<tr>
<td>Female</td>
<td>49 (32.67%)</td>
<td>54 (27%)</td>
</tr>
<tr>
<td>Disease Duration</td>
<td>8.68±8.2</td>
<td>-----</td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>24.89±5.1</td>
<td>21.80±3.48</td>
</tr>
<tr>
<td>PDI</td>
<td>19.22±6.5</td>
<td>-----</td>
</tr>
<tr>
<td>PASI</td>
<td>15.10±11.9</td>
<td>-----</td>
</tr>
</tbody>
</table>

Clinical features of psoriasis patients and healthy controls

**Table 2. Serum levels of IL-17, IL-20 and IL-22 in psoriatic patients and controls**

<table>
<thead>
<tr>
<th>Cytokine</th>
<th>Patients (n = 150)</th>
<th>Controls (n = 200)</th>
<th>P values</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-17(pg/ml)</td>
<td>143.78±33.99</td>
<td>32.68±18.71</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>IL-20(pg/ml)</td>
<td>96.73±26.52</td>
<td>49.23±09.14</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>IL-22(pg/ml)</td>
<td>74.42±24.08</td>
<td>28.01±07.86</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Values are represented by mean±SD

**Table 3. Serum levels of IL-17, IL-20 and IL-22 in Psoriatic patients (Gender wise)**

<table>
<thead>
<tr>
<th>Cytokine</th>
<th>Psoriatic Female patients (n=49)</th>
<th>Psoriatic Male patients (n=101)</th>
<th>P values</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-17(pg/ml)</td>
<td>140.3±33.43</td>
<td>145.45±34.31</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>IL-20(pg/ml)</td>
<td>97.32±31.83</td>
<td>96.45±23.71</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>IL-22(pg/ml)</td>
<td>72.97±23.39</td>
<td>75.12±24.50</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

Values are represented mean±SD

**Table 4. Correlation between serum levels of IL-17, IL-20 and IL-22 with PASI Score, PDI and Disease Indurations in psoriatic patients**

<table>
<thead>
<tr>
<th>PASI, PDI and cytokines</th>
<th>Statistical Values</th>
<th>IL-17</th>
<th>IL-20</th>
<th>IL-22</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>0.17</td>
<td>0.13</td>
<td>-0.23</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.04</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>r</td>
<td>0.26</td>
<td>-0.02</td>
<td>-0.25</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.00</td>
<td>0.77</td>
<td>0.00</td>
</tr>
<tr>
<td>Disease Induration</td>
<td>r</td>
<td>0.04</td>
<td>-0.02</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.03</td>
<td>0.05</td>
<td>0.02</td>
</tr>
<tr>
<td>IL-17</td>
<td>r</td>
<td>-0.05</td>
<td>-0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.55</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>IL-20</td>
<td>r</td>
<td>0.05</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IL-20 signals through ‘type I’ (IL-20R1) and ‘type II’ (IL-20R2) receptors heterodimers. Both of these receptor complexes are primarily expressed on epithelial cells and activate the transcription factor STAT3 by promoting wound healing, tissue remodeling and antimicrobial peptide expression. IL-20 is mainly secreted by myeloid and epithelial cell, whereas IL-22 by lymphocytes (Commins et al., 2008). IL-22 is elevated in serum of psoriatic skin (Wolk et al., 2006; Kryczek et al., 2008 and Ward et al., 1997). IL-22 induces epidermal hyperplasia but not keratinocyte proliferation. One of its genetic variant induces childhood psoriasis by increasing activity of pro-inflammatory gene expression (Boniface et al., 2005). Thus IL-22 is another critical cytokine in the pathogenesis of psoriasis and is a target for drug development (Gudjonsson et al., 2012). We observed that serum level of IL-20 and IL-22 was found to be increased in psoriatic patients. Some previous studies supported the present findings which also reported the increase in serum level of IL-20 and IL-22 in the psoriatic patients (Gudjonsson et al., 2010; Suárez-Fariñas et al., 2012 and Sabat et al., 2014). We found a significant correlation in the levels of both IL-17 and IL-20 with PDI score and IL-17 with PASI, which clearly indicates that these cytokines might have pathogenic role in psoriasis (ALmakhzangy et al., 2009). In agreement with these findings we also observed that a significant correlation was observed between disease induration with elevated serum levels of IL-17 and IL-22 whereas we did not found any significant correlation between level of IL-20 and disease induration in psoriatic patients. So in nut shell we can say that interleukins plays an important role in inflammatory and immunoregulatory skin disease.

Conclusion

Present study identified the increased level of IL-17, IL-20 and IL-22 in psoriasis. IL-17, IL-20 and IL-22 stands as the therapeutic target in psoriasis and several new drugs should be explored which inhibit IL-17, IL-20 and IL-22 signal transduction pathways and Th17 gene expression. So, serum level of IL-17, IL-20 and IL-22 can be useful for diagnostic purpose and helpful in the pharmacogenomics for the development of antipsoriatic drugs. Our data indicated that human cytokines IL-17, IL-20 and IL-22 were found to be correlated in one or other way with disease severity in psoriatic patients thus reveals that cytokine producing skin cells may play a role in the pathogenesis of disease.

REFERENCES


