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The Association between Severity of Psoriasis and Diabetes Mellitus

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Abstract

Introduction: Psoriasis is an inflammatory skin disease. About 2 to 4 percent of population suffers from this disease especially in Scandinavian countries. It seems that psoriatic patients are susceptible to the high risk of cardiovascular diseases and diabetes mellitus (DM) so that the morbidity and mortality rates are higher in these patients. The aim of this study was to determine the relationship between psoriasis and type 2 DM. Materials and Methods: This study evaluated 80 psoriatic patients and 80 normal cases with no psoriasis, as the control group. None of the cases had DM history. FBS and glucose tolerance test with 75gr glucose were conducted on all cases of psoriatic patients and control groups. The severity of psoriasis and DM was compared to each other in both groups. On the other hand, the severity of psoriasis was evaluated in the participants. Data was analyzed in SPSS 21. Results: The mean age of the studied cases were 42.1±10.3 with an age range of 23-46. Psoriasis Vulgaris was the most prevalent type of psoriasis reported in 54 cases (67.5%). Of the studied cases, 20 psoriatic cases (25%) suffered from DM while in the control group only 4 cases (5%) had DM and this difference was significant (p=0.017). According to the analyses, the relationship between DM and years of psoriasis was significant (P=0.0001). With the accurate control of blood sugar, the intensity of psoriasis decreased significantly. Conclusion: The prevalence of type 2 DM and impaired fasting glucose (IFG) increased in psoriasis patients. Therefore, they should continuously participate in screening programs, especially in case of severe psoriasis. The mortality rate is higher in psoriasis patients comparing to others. In addition, DM and its side effects such as cardiovascular accidents may be one of the most important causes of this mortality.

Keywords: Type 2 Diabetes, Prevalence, IFG, Psoriasis

Introduction

Diabetes type 2 is a genetic disorder, but the gene or genes involved in the development of this disease have not been well identified so far. In most studies, diabetes has been reported as one of the most common causes of mortality and disability in communities (Niafar & et al, 2018). Psoriasis is an autoimmune noncontagious disease which generally affects skin. The skin lesions appear as dry, round red and plaque-like patches generally in knees and elbows. However, they can appear on other areas such as head skin, ear and around navel and sex organs (Aghamohammadzadeh & et al,2015). Psoriasis involves 2 to 4 percent of population (3 percent on average). Its prevalence is almost the same in different races and in males and females. The incidence of psoriasis is probable in all ages and even it can be considered as a congenital disease. Regarding age, psoriasis has two peak ages: 1) age=20-30 and 2) age=50-60. The mean age of involvement is 27.8 (Aghamohammadzadeh & et al,2015). Psoriatic patients are susceptible to different glucose tolerance disorders which are not associated with some risk factors such as obesity and family history of diabetes (Wolf & et al, 2008). It has been outlined that the risk of DM involvement is so higher in patients suffering the severest psoriasis and the cases should be continuously checked up for DM involvement (Vosoughi & et al, 2017). It seems that psoriatic patients are subjected to high cardiovascular diseases so that relevant morbidity and mortality rate is higher in these patients (Najafipour & et al, 2018; Mobasseri & et al, 2015). A study in 2008 reported the existence of some special gene locus such as rs12035082 in the long arm of chromosome 1 and other loci in chromosomes 6 and 12. This strongly supports the relationship between psoriasis and DM (Cohen & et al, 2008). Considering the fact that DM is accompanied by psoriasis, Robertshaw et el. studied the use of Thiazolidinediones drug pack on 5 psoriatic patients. The results revealed that the return of psoriasis decreased in 3 patients (Aghamohammadzadeh & et al, 2010).

Method

This study evaluated 80 psoriatic patients and 80 non-psoriatic patients, as control group. The psoriatic patients and control groups were homogeneous in terms of sex and age. FBS and glucose tolerance test with 75-gram oral glucose were conducted on all participants. Results were reported as Mean± SD. Data was analyzed using SPSS version 21. Student t-test was used to compare quantitative variables and chi-square and Fisher's exact test, if required, were used to compare the qualitative variables in the groups. Significance level was set at $p<0.05$.

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Results

This study evaluated 80 psoriatic patients and 80 non-psoriatic patients, as control group. The psoriatic patients and control groups were homogeneous in terms of sex and age. FBS and glucose tolerance test with 75-gram oral glucose were conducted on all participants. Results were reported as Mean± SD. Data was analyzed using SPSS version 21. Student t-test was used to compare quantitative variables and chi-square and Fisher's exact test, if required, were used to compare the qualitative variables in the groups. Significance level was set at $p<0.05$.

Table 1- Demographic characteristic (Mean ± SD) of psoriatic patients and control group

Parameters	Psoriatic patients	Control group	P. Value
Male/Female (Number)	46/34	44/36	0.50
Age	41.4 ± 10.3	42.9 ± 10.2	0.51
BMI (kg/m^2)	28.6 ± 5.1	28.9 ± 3.1	0.79
Dyslipidemia	14 (17.5%)	16 (20%)	0.50
IHD	16 (20%)	4 (5%)	0.01*
Rheumatic disease	2 (2.5%)	8 (10%)	0.05
HTN	16 (20%)	4 (5%)	0.01*

BMI: body mass index, IHD: ischaemic heart disease, HTN: hypertension.
* p- value less than <0.05 is significant

The mean age of all cases was 42.1±0.3 whereas the mean age of psoriasis group was 41.4±10.3 and that of control group was 42.9±10.2. Again, the difference was not significant (p=0.51) (see table 1). In the studied patients, the mean year with psoriasis was 7±5.2 with a range of 1-19 years. Mean BMI in psoriasis and control groups were 28.6±5.1 and 28.9±3.1, respectively and the difference was not significant (p=0.79) (see table 1). Table 2 describes psoriasis type in the studied patients.

Table 2 - Frequency of type of psoriasis in this study

Type of psoriasis	Frequency (%)
Vulgaris	54 (67.5%)
Postular	14 (17.5%)
Erythrodermi	10 (12.5%)
Gutate	2 (2.5%)

Involvement area was evaluated in the studied patients. Scalp, face, extremities, trunk and nail involvement was observed in 8 (10%), 10 (12.5%), 22 (27.5%), 14 (17.5%) and 6 (7.5%) cases, respectively. Of the studied patients, 20 cases (25%) showed involvement in different areas of their body. The history of associated metabolic diseases was studied in both groups. Table 1 shows the results in detail. The history of skin (unless the psoriasis) and metabolic diseases was not seen in the first degree relatives of cases. DM diagnosis criteria were considered based on the FBS and 2hpp blood glucose test after consuming 75 gr glucose. Out of 80 psoriatic patients, 20 cases (25%) suffered DM while in control group 4 cases (5%) suffered from DM.

Table 3 shows FBS and 2hpp blood glucose in psoriatic patients and compares them with those of control cases by indicating P value.

Table 3- number of DM, IFG and IGT in psoriatic patients and control group

Parameters	Psoriatic patients	Control group	P. Value
DM Number (%)	20 (25%)	4 (5%)	0.017*
IFG Number (%)	30 (37.5%)	12 (15%)	0.01*
IGT Number (%)	18 (22.5%)	16 (20%)	0.50

DM: diabetes mellitus, IFG: impaired fasting glucose, IGT: impaired glucose tolerance,
* p- value less than <0.05 is significant

The trend of psoriasis after controlling DM was evaluated in the studied patients. According to the results, in 20 cases (25%) disease progress was improved, in 40 cases (50%) it was remained unchanged and in 20 cases (25%) psoriasis was intensified despite the good control of DM. According to analysis, there is a significant relationship between DM and years of psoriasis (p=0.0001).

Discussion

The incidence of cardiovascular diseases and DM is higher in psoriatic patients (Grundy & et al, 2004). A study showed the higher rate of cardiovascular-induced mortality in hospitalized psoriatic patients. The underlying cause of this phenomenon is not clear yet (Azfar & et al, 2012). However, the mortality and morbidity is high when psoriasis is severe (Yavari & et al, 2012). In type 2 DM and psoriatic patients, inflammation increases in the body. Psoriasis-induced inflammation increases IGF level which is associated with DM. Moreover, psoriasis is associated with insulin-resistance, obesity, heart attack, hypertension and high cholesterol level (Armstrong & et al, 2013). A Danish study conducted a 10-year follow up study on 52000 psoriatic patients and compared them with normal population. The researchers discovered that psoriatic patients, whether mild or severe, are susceptible to type 2 DM and in severe psoriasis, the risk of DM is higher (Khalid & et al, 2013). Another study in Pennsylvania University compared 100000 psoriatic patients with 430000 non-psoriatic ones. The researchers found that the risk of type 2 DM is 46% higher in cases with severe psoriasis compared to cases with no psoriasis. The study showed that the risk of type 2 DM is 11% higher in cases with mild psoriasis compared to control group (Takeshita & et al, 2017). DM risk is even higher in psoriatic patients with no other risk factors such as obesity. Therefore, according to researchers' estimations, every year 115500 new DM patients are added to DM patients' population due to psoriasis (Wilkinson, 1996). In addition to DM, psoriasis is associated with other side effects such as metabolic syndrome,

heart diseases, stroke and cardiovascular problems-induced death. (Yeung & 2013).

In the study of Salmanpour et al, psoriasis vulgaris was the most frequent psoriasis type (59.6%). In their study, the prevalence of psoriasis was higher in males than females and distributed involvement was the most frequent involvement followed by occipital area (Dinić & et al, 2016; Salmanpour & Aghaei, 2002). In our study, the involvement areas were scalp, face, extremities, trunk and nail in 8 cases (10%), 10 cases (12.5%), 22 cases (27.5%), 14 cases (17.5%) and 6 cases (7.5%), respectively. In 20 cases (25%), involvement was seen in different areas of the body.

This study observed side effects in psoriatic patients other than DM and pre-diabetes. Hypertension (HTN) and ischaemic heart disease (IHD) was significantly higher in psoriatic patients. A similar study in 2006 was conducted on 65 psoriatic patients. According to the results of the study, the rate of hyperlipidemia, hypertension, coronary artery diseases and type 2 DM was much higher in the studied cases compared to the control group. (Najafipour 7 et al, 2004). Azizzade et al. conducted a study and evaluated the status of serum lipids in psoriatic patients (Azizzadeh, Gharbani & Sharafi , 2009). Their results indicated that triglyceride (TG), total cholesterol, low-density lipoprotein (LDL) and high-density lipoprotein (HDL) levels in psoriatic patients were significantly higher than control group (Azizzadeh, Gharbani & Sharafi , 2009). They concluded that regardless of disease intensity, high blood cholesterol in the patients can raise cardiovascular disease risk. Therefore, the screening of psoriatic patients in terms of hyperlipidemia is recommended (Azizzadeh, Gharbani & Sharafi , 2009).

In our study, the rate of dyslipidemia in psoriatic patients was reported 17.5% which was not higher than normal population. Regarding heart ischemia and hypertension, however, there was a significant difference between the groups (p=0.01) and they were higher in psoriatic patients than normal ones. Differences in race and sample size in various studies could be regarded as the potential reasons behind these controversial results.

Lønnberg et al. studied the data of a group of twins aged 20 to 71 and evaluated type 2 DM involvement. A total number of 33588 twins were included in the study. The prevalence of psoriasis and DM in the participant twins was 4.2% (630 males and 771 females) and 1.4% (235 females and 224 males), respectively. Among 459 DM patients, the prevalence of psoriasis was reported 7.6% while it was 4.1% in non-diabetic cases (Lønnberg & et al, 2016).

The important point in our study was the association of psoriasis with diabetes. It was observed that the severer the psoriasis, the prevalence of DM is higher. On the other side, the higher the blood sugar, the severer is psoriasis. Our study observed that psoriasis can be mitigated by the accurate control of blood sugar. It is notable that firstly psoriatic patients should continuously participate in glucose tolerance disorder screening programs, in order to be treated in the first stages and avoid the chronic effect of DM, and as a result reduce mortality and morbidity. Secondly, according to our study and others, the accurate control of blood sugar mitigates psoriasis intensity and its return.

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Conflict of interest

All authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Ethical approval

The study protocol was approved by the Ethics Committee of Tabriz University of Medical Sciences, Tabriz, Iran. The current study was performed according to the Institutional Committee for the Protection of Human Subjects, which was adopted by the 18th World Medical Assembly, Helsinki, Finland and its later amendments.

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