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Original Article

Glucose tolerance test in patients with lichen planus

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Abstract

Objective To evaluate the prevalence of impaired glucose metabolism among patients with lichen planus.

Methods Fifty-two patients with mucosal or cutaneous lichen planus disease were evaluated regarding disease characteristics, fasting blood sugar levels and glucose tolerance test (GTT) results.

Results Impaired glucose metabolism including impaired GTT and diabetes was observed in 15 (28.8%) patients with lichen planus, so there was not any significant difference in impaired glucose metabolism of patients with lichen planus compared to the general population.

Conclusion It seems that impaired glucose metabolism in lichen planus patients is not more frequent than general population.

Key words
Diabetes, impaired glucose metabolism, lichen planus.

Introduction

Lichen planus is the prototype of the lichenoid dermatitis group and it has a tendency to involve the skin, mucous membranes, hair and nails. Cutaneous lichen planus variants have been observed in the adult population with a variable incidence of about 1% to 0.22%.[1] Pathogenesis of lichen planus shows the role of the cell-mediated immune system that causes damage to the basal keratinocytes and, its associated diseases, that indicate the role of the immune system involvement in its pathogenesis, with diabetes being an example.[2]

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The prevalence of oral lichen planus in diabetes type I (5.7%) and diabetes type II (2.8%) have been reported.[3] The role of the immune system in diabetes type I is clear, but in diabetes type II a direct link has not been observed, although in some studies some involvement has been indicated. In type II diabetes, immune system regulation becomes impaired and this may be grounds for disease manifestation.[4-7] Many cases of concurrent diabetes and or patients having impaired glucose tolerance test results have been reported in lichen planus,[8-12] but this association has not been supported in other studies.[13,14] We decided to evaluate the frequency of impaired glucose metabolism in our population, and for comparison we have used the study conducted on a general population in Iran by Azizi *et al*.[15]

Methods

This is a cross-sectional study that was conducted on lichen planus cases that referred to dermatology clinic of Ghaem Hospital, Mashhad, Iran. Complete physical examination of skin and buccal mucous membrane was performed. Inclusion criteria were typical skin or mucosal lesions of lichen planus, willingness to participate in the study, and histopathological diagnosis of lichen planus. Exclusion criteria were consumption of drugs that might affect test results such as topical or systemic corticosteroids and lack of full participation in performing test or biopsy. Informed consent was obtained from patients. During the study period, 52 patients with confirmed pathological diagnoses of lichen planus were enrolled in the study. A glucose tolerance test was performed on the patients and the results of fasting plasma glucose and glucose tolerance test (GTT) were interpreted according to the diagnostic criteria for diagnosis of diabetes (**Box**).[16]

The data entry was done by SPSS software and after coding and classification by the descriptive menu the findings were presented as frequency tables and graphs. The Fisher's exact test and Mann-Whitney test were used for comparative studies.

Results

Fifty-two patients, with an average age of 44.11±14.33 years (maximum 76 years and minimum 15 years) consisting 27 females (51.9%) and 25 males (48.1%), were included the study. Among the 52 patients, 29 patients had only cutaneous lichen planus, 9 patients had mucosal lichen planus, and 14 patients had cutaneous plus mucosal lichen planus. The mean duration of the onset of the illness was 21.4 ± 29.75 months (maximum 12 years and minimum 2 months). The frequency of the different types of skin and mucosal lesions is shown in **Table 1** and **2**. There was a history of diabetes in 9 (17.3%) patients, and 43 (82.7%) patients did not have any history of diagnosed diabetes.

Based on the results of the fasting blood glucose, out of 43 patients without diabetes, 6 (14%) patients had impaired glucose metabolism and 37 (86%) patients were considered to be normoglycemic based on the fasting blood sugar.

Regarding the results of the oral glucose tolerance test, of 43 patients without diabetes, 37 (86%) patients were classified as normoglycemic (blood glucose levels less than 140 mg/dl) and in 5 (11.6%) patients, there was impaired glucose tolerance (blood glucose levels between 140 to 200 mg/dl) and one (2.3%)

Box *Criteria for the diagnosis of diabetes mellitus*
- Symptoms of diabetes plus random blood glucose concentration ≥ 11.1 mmol/L (200 mg/dL) or
- Fasting plasma glucose ≥7.0 mmol/L (126 mg/dL) or
- HbA1C ≥ 6.5% or
- Two-hour plasma glucose ≥11.1 mmol/L (200 mg/dL) during an oral glucose tolerance test

Table 1 Frequency of different types of lichen planus (n=52)

Type of skin lesions	*N (%)*
Classic	28 (53.8)
Hypertrophic	7 (13.5)
Annular	2 (3.8)
Pigmented	1 (1.9)
No skin lesion	14 (26.9)

Table 2 Frequency of different types of mucosal lesions in lichen planus cases (n=52).

Mucosal lesion type	*N (%)*
Reticular	7 (13.5)
White plaques	5 (9.6)
White papules	4 (7.7)
Atrophic	4 (7.7)
Erosive	3 (5.8)
No lesion	29 (55.8)

Table 3 The mean and standard deviation of fasting blood glucose and blood glucose in oral glucose tolerance test (GTT) in nondiabetic case of lichen planus.

	Mean (mg/dl)	*Standard deviation*	*Minimum*	*Maximum*
Fasting blood glucose	89.51	16.69	39	122
Blood glucose 30 minute after GTT	151.56	43.31	87	279
Blood glucose 1 hour after GTT	143.28	51.24	62	252
Blood glucose 2 hour after GTT	105.63	35.65	52	203

Table 4 The prevalence of impaired glucose tolerance in patients above 20 years compared to patients with lichen planus in comparison with the general population

Age groups (years)	*General population*			*Patients with lichen planus*			*The Fisher Test Results*
	Total	*GTT impaired*	*Percentage*	*Total*	*GTT impaired*	*Percentage*	
20-29	1828	56	3.1	6	1	16.6	*P*=0.173
30-39	2474	208	8.4	8	1	12.5	*P*=0.506
40-49	1856	254	15.1	13	0	-	*P*=0.149
50-59	1468	263	18.0	14	1	7.1	*P*=0.257
60-69	1226	223	19.8	6	2	33.3	*P*=0.302
≥70	377	90	24.1	1	0	-	*P*=0.762

GTT: glucose tolerance test.

Table 5 The comparison of diabetes prevalence of patients 20 years of age in patients with lichen planus compared with the general population.

Age groups (years)	*General population*			*Patients with lichen planus*			*The Fisher Test Results*
	Total	*Patients*	*Percentage*	*Total*	*Patients*	*Percentage*	
20-29	1828	9	0.5	6	1	16.6	*P*=0.032
30-39	2474	68	2.8	8	0	-	*P*=0.800
40-49	1856	199	10.7	13	3	23.0	*P*=0.158
50-59	1468	276	18.8	14	5	35.7	*P*=0.108
60-69	1226	315	25.8	6	1	16.6	*P*=0.518
≥70	377	105	27.9	1	0	-	*P*=0.722

patient was identified as a new case of diabetes mellitus (blood glucose levels over 200 mg/dl), **(Table 3)**.

Comparing the prevalence of impaired glucose tolerance and diabetes in patients with lichen planus differentiated by gender, the Fisher's exact test showed no significance (*P*=0.175), although the prevalence of carbohydrate metabolism disorders were more common in women.

In addition, the Fisher's exact test did not show any significance (*P*=0.602) in comparing the prevalence of impaired glucose tolerance and diabetes in patients with lichen planus differentiated based on the type of disease (cutaneous, mucosal, mucocutaneous).

The Mann-Whitney test did not show any significance (*P*=0.123) in comparing the average age of patients in the two groups with and without carbohydrate metabolism disorders in patients with lichen planus, the mean age in the group with carbohydrate metabolism was 48.53±11.67 years and in the normoglycemic group it was 42.32±15.5 years.

Discussion

In our study, impaired oral glucose tolerance tests in lichen planus cases in comparison with general population were not statistically different. Similarly prevalence of diabetes mellitus in two groups was not statistically different in each group (except in age group of 20-29). Thus based on our study, impaired

metabolism of glucose did not seem to occur more frequent in lichen planus cases.

We compared the findings of our study with the study of Azizi *et al*.[16], which was conducted on an Iranian population in Tehran, based on information obtained on the frequency of diabetes and impaired oral glucose tolerance tests in patients with lichen planus. The frequency of diabetes and impaired oral glucose tolerance test were different based on age groups, thus Fisher test was performed for each age group of patients and the control group **(Table 4** and **5)**. Impaired oral glucose tolerance tests in lichen planus cases in comparison with general population were not statistically different in each group. Prevalence of diabetes mellitus in two groups was not statistically different in each group (except in age group of 20-29 years). In this comparison, since there was no information on the age group under 20 years in the study by Azizi *et al.*[16], the population under 20 years was excluded in our study (Four cases).

The frequency of diabetes in patients with lichen planus in studies done by Lundström *et al.*[17] on 40 patients with oral lichen planus showed 28% had diabetes. The recent study by Syhan *et al*. in Turkey that was conducted on 30 patients, indicated that 26.7% had diabetes, while the frequency in the control group was 3.33% (*P*=0.007). Impaired glucose tolerance test was 46.7% (diabetes mellitus + impaired glucose tolerance) and 16.7% for the control group.[9] Nigam *et al*.[8] found impaired glucose tolerance test in 30.3% of 56 cases of lichen planus. In 1990, Gibson *et al*.[18] pointed out the accompaniment of diabetes with oral lichen planus in their study.

In another study in 1993, Brown *et al*.[19] noted a greater link between erosive and ulcerative forms of lichen planus in patients with diabetes. A study on 674 patients with oral lichen planus did not show any significant relationship with diabetes.[13] Van Dis *et al.*[14] in 1995 also evaluated the frequency of oral lichen planus in 273 patients with diabetes and observed lichen planus in 4% patients and in the control group this frequency was 3%, which did not show any significant difference between the two groups.[14]

In 1992, Albrecht *et al*.[20] pointed out that using ant-diabetic drug can cause clinical lesions similar to lichen planus. Conte *et al*. in their evaluation of 200 patients with lichen planus, recorded 8% of patients had diabetes.[21]

In 1988, Petrou *et al*. also evaluated lichen planus frequency in patients with diabetes. His study consisted of 139 patients with diabetes type I, 353 patients with diabetes type II and 274 patients as the control. Clinical evidence of lichen planus in type I was 5.67%, in type II 2.83%, and in the control group was 1.82%. These results indicated a special relationship between lichen planus and type I diabetes, in which both share a common immune mechanism and the immune response of the cells play an important role.[3]

As has been observed, association between lichen planus and diabetes in different studies is not the same. The reason for this dissimilarity might relate to the genetic differences of populations. The sample size in the study of Azizi *et al.*[15], used as a control group in our study, was considerable, which increases the accuracy of comparison in this study.

However, we have not been able to find any significant difference between lichen planus patients and the normal population, thus making it impossible to suggest that lichen planus patients more frequently present with impaired glucose metabolism. However study on a bigger

sample size in a case-control study may provide more reliable results.

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