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Research Article

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Discussing Different Class I HLA Phenotypes among Type II Diabetic Patients of Urmia Diabetes Centers

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ABSTRACT

Diabetes is a type of metabolic disorder. This illness diminished the ability of the body for production of Insulin. Also sometimes the body's resistance against Insulin is increased in a way that the produced amount of Insulin can no longer have its natural performance. The main role of Insulin is reduction of blood sugars through a variety of mechanisms. There are two main known types of diabetes. In type I diabetes, the destruction of Beta cells in pancreas results in a defect in Insulin production process. In Type II diabetes, the body gains increased resistance against Insulin which may also lead to complete destruction of Beta cells in pancreas. For the Type II, it is obvious that genetic factors, overweight and lack of activity are major contributors in occurrence of diabetes. Type II diabetes includes a strong genetic context. The present study is a descriptive-analytic study and is also a review research. A number of 52 type II diabetic patients were selected as the sample group and also 75 individuals were assigned to control group. Discussing the abundance of various class I HLA phenotypes and comparisons between the sample and control groups indicated that there were no significant differences between the control and sample groups in terms of HLA CW (P= 0.030); HLA B35 (P=0.006) and HLA B22 (P= 0.025).

Keywords: Diabetes, Class I HLA

INTRODUCTION

Diabetes is an important and common disease throughout the world. More than 14.000.000 people in U.S. suffer from diabetes [1]. Among these people, almost 90% have the type II diabetes and the remaining 10% have type I diabetes. Almost 50 percent of the aforementioned population hasn't still been diagnosed with type II diabetes and therefore, no related treatments have been regarded for them [2]. This illness is associated with acute metabolic complications and may result in Hypoglycemia. In fact hypoglycemia is the major cause of 7 percent of deaths due to diabetes. On the other hand, Ketoacidosis and hyperosmolar coma are respectively responsible for 10% and 50% of mortalities among diabetic patients [3].

Diabetes is also known as the major cause of blindness and, non-traumatic lower limb amputations [4] among 20-74 year old matures. It is also considered as the final-stage of renal diseases [5]. Among the over 35 year old people who live in urban areas, occurrence of diabetes has a 14% rate which is 2 or 3 times larger than rural areas [6]. Diabetes is related to several different environmental and genetic risk factors. In this context, the relation between type I diabetes and the HLA system has been proven (HLA-DR4, HLA-DR3). However no proved relations have been found between the type II diabetes and the HLA system [7]. Type II diabetes has a very strong genetic context in a way that there is a 90 to 100% correspondence between twins; however its exact genetic base is not known.

There may be more than one pathologic mechanisms involved in occurrence of type II diabetes [8]. In this study, the abundance of different phenotypes of class I HLA in type II diabetes is discussed.

EXPERIMENTAL SECTION

The present study is a descriptive-analytic study which is also considered as a review research and is performed on 52 insulin independent diabetic patients of Urmia's diabetic research center and 75 non-diabetic individuals. The samples were selected through an easy sampling method. In this method, the type II diabetic patients of diabetic centers of western Azerbaijan province were selected as the sample. The control group also consisted of individuals who had referred to internal infirmary of hospitals but were diagnosed as non-diabetics. In terms of race, the control group and the sample group were identical. Required data were also collected through questionnaires, interviews and laboratory results. After that, the studied patients were sent to the Blood Transfer Organization for taking samples and determining the Class I HLA phenotypes. Determination of various phenotypes of class I HLA was completed through serology through the method proposed by Naipal et al. [9]. In addition, data analyses were performed through Chi-do and Fisher-exact tests.

RESULTS

The experimental group included 52 Insulin independent diabetic patients and also the control group included 75 individual with no diabetes diagnosis. The experimental group included 20 males and 29 females. Also the control group included 14 men and 39 women. The highest abundance of HLA-A subgroups among the patients was related to HLA-A2 (30.7%). Also in the control group, it was related to the same sub-group with 29.3%. the differences between the two groups were measured through the Chi-Do and Fisher-Exact tests and it was revealed that there were no statistically significant differences (table 1).

Table1, positive counts of different HLA-A subgroups in control and experimental groups

P. value	Control (75 individuals)		Experimental (52 individuals)		HLA-A subgroups
	Positive percentage	Positive number	Positive percentage	Positive number	
N.S	5.3	4	15.3	8	A1
N.S	29.3	22	30.7	16	A2
N.S	5.3	4	9.6	5	A3
N.S	10.6	8	15.3	8	A11
N.S	0.4	3	3.8	2	A23
N.S	1.3	1	1.9	1	A24
N.S	0	0	3.8	2	A25

It is noteworthy to state that the entire subgroups of class I HLA were studied but subgroups which did not exist in any of the samples, were eliminated from the tables.

The highest abundance of HLA-B subgroups among the patients were respectively related to BW6 (34.6%) and B5 (26.9%). Also for the control group, it was respectively related to BW6 (48%) and B5 (33.3%) subgroups. The differences between the control and the experimental group were not statistically significant.

The amount of HLA CW4 was 30.7% for the experimental group and 22.6% for the control group. There was no significant difference between the groups in terms of CW4. Also the amount of HLA CW1 was 12% for the control group which indicated the higher abundance of this phenotype among the control group (P: 0.030) (Table 3).

In addition, no significant differences were observed between the control and experimental groups in terms of positive counts of various subgroups of HLA A, A, B and C (table 2).

Table 2, positive counts of various subgroups of HLA-B among control and experimental groups

P. value	Control (75 individuals)		Experimental (52 individuals)		HLA-B subgroups
	Positive percentage	Positive number	Positive percentage	Positive number	
N.S	33.3	25	26.9	14	B5
0.025	10.6	8	0	0	B22
0.006	13.3	10	7.6	4	B35
0.001	0	0	19.23	10	BW4
N.S	48	36	34.6	18	BW6
N.S	33.3	25	26.9	14	B5
0.025	10.6	8	0	0	B22

It is noteworthy to state that the entire subgroups of class I HLA-B were studied but subgroups which did not exist in any of the samples, were eliminated from the tables.

Table 3, positive counts of various subgroups of HLA-C among control and experimental groups

P. value	Control (75 individuals)		Experimental (52 individuals)		HLA-C subgroups
	Positive percentage	Positive number	Positive percentage	Positive number	
0.030	12	9	0	0	CW1
N.S	28	21	11.5	6	CW3
N.S	22.6	17	30.7	16	CW4
N.S	0	0	5.7	3	CW5
0.030	12	9	0	0	CW1
N.S	28	21	11.5	6	CW3
N.S	22.6	17	30.7	16	CW4

Table 4, positive counts of various types of phenotypes of class I HLA (A,B and C) among the control and experimental groups

Control (75)				Experimental (52)				HLA subgroup
female		male		female		male		
percentage	Positive number	percentage	Positive number	percentage	Positive number	percentage	Positive number	
42.6	32	16	12	40.3	21	25	13	A
50.6	38	25.3	19	34.6	18	34.6	18	B
0.28	21	10.6	8	15.3	8	15.3	8	C

DISCUSSION AND CONCLUSION

The disease of diabetes is related to several environmental and genetic risk factors. According to previous studies, type II diabetes has a very strong genetic context [7].

In a research, it was reported that prevalence of diabetes and impaired glucose tolerance test among the parents of type II diabetic patients is higher than type I diabetic patients. Also in this research it was concluded that type II diabetic patients have a stronger prognostic factor compared to type I patients. Furthermore, some researchers believe that type II diabetes is related to various phenotypes of HLA [8].

In current study, the difference between prevalence of phenotypes of class I HLA was discussed. In this regard, it was revealed that the highest abundances are related to HLA-B22 (P: 0.025) and HLA-B35 (P: 0.006) for the control group and HLA-BW4 (P: 0.001) for the experimental group.

In a study by Matsuda et al. (1992) a significant relation was discovered between the HLA-B40, HLA-B48 and HLA-B60 phenotypes and type II diabetes. This study found no significant relation between class II HLA phenotypes and type II diabetes [7]. In another study carried out by Ida et al. (1991); no significant difference was discovered between NIDDM patients and healthy individuals in terms of abundance of HLA-DR antigens.

An else study by Ronald et al. (1994) signified that GDM patients who had later progressed towards NIDDM, had a higher prevalence of HLA-B41 and HLA-DR2 compared to the control group [8].

In terms of gender, the present study found no significant difference between prevalence of HLA phenotypes of control and experimental groups. In other words, this study and also the previous studies have shown that there

exists a relation between type I, Type II and GDM diabetes and the HLA system. Also the risk of occurrence of type I diabetes is increased with presence of HLA-DR4. However, in presence of HLA-B17, this risk diminishes. It is also believed that type I diabetes can be diagnosed through determination of different types of HLA [11].

Dittmer et al. performed a study in New Zealand and signified that non-European races had a higher risk of developing type I diabetes in presence of HLA-B60 and HLA-B48. Existence of a relation with HLA-B40 antigens shows that MHC or other genes on chromosome 6 have a role in occurrence of type II diabetes [12].

Another study by Ardakan & Kalantar (2003) has resulted in results similar to the results obtained from the present study.

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