

## Atopic Dermatitis and Type 1 Diabetes Mellitus in Iranian Children

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**Abstract: Problem statement:** Atopic diseases, including asthma, eczema and allergic rhinitis, are characterized by a chronic inflammatory reaction mediated by T helper 2 cells, while type 1 diabetes mellitus is mediated by T helper 1 cells. **Approach:** The aim of this study was to compare the prevalence of atopic dermatitis between children with type 1 diabetes mellitus and age-matched controls. We conducted a case-control study enrolling 150 cases with type 1 diabetes mellitus between 2-20 years from pediatric endocrine out patient clinic and 450 controls randomly selected from the general population matched on sex and age. The diagnosis of atopic dermatitis was determined for patients and controls by the Hanifin and Rajka's diagnostic criteria. **Results:** From 150 cases, 75 (50%) were male and 75 (50%) were female, with the age between 2 and 20 and among the 450 controls, 228 were male (50.66%) and 222 were female (49.33%) the age was as the case. Dermatitis past or present, was identified in 1.3% of cases and 3.1% of controls, a difference which was not statistically significant ( $P>0.05$ ). **Conclusion:** In present study, the prevalence of atopic dermatitis was comparable in diabetic children and the controls which may be due to difference between races and geographic areas and lack of support for an inverse relationship between the Th2-mediated atopy and th1-mediated autoimmune disorder. Further studies are needed to show the difference in serum IgE and cytokine profiles between the groups.

**Keywords:** Atopic dermatitis, case control study, children, diabetes mellitus, Iran

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### INTRODUCTION

Atopic Dermatitis (AD) is an itchy, chronic or chronically relapsing, inflammatory skin condition. The age of onset is between 2 and 6 months in the majority of cases, but it may start at any age, even before the age of 2 months in some Cases. The clinical features include: itching, macular erythema, papules or papulovesicles, Eczematous areas with crusting, Lichenification and excoriation, Dryness of the skin, secondary infection<sup>[1]</sup>.

About 2/3 of patients with AD have a Th2 (T-helper2) immune reactivity pattern<sup>[2]</sup>. AD is a common disease. The consequence of the rising prevalence of AD is a heavy burden on medical Services and budgets<sup>[3]</sup> The prevalence of AD in Iran is about 2%<sup>[4]</sup>.

Type 1 Diabetes mellitus (T1D) develops as a result of the synergistic effects of genetic, environmental and immunologic factors that ultimately destroy the pancreatic beta cells. T1D results from

autoimmune beta cell destruction, which leads to insulin deficiency. Criteria for the diagnosis of DM are:

- Symptoms of diabetes plus random blood glucose concentration  $\geq 11.1 \text{ mmol L}^{-1}$  (200 mg dL<sup>-1</sup>)
- Fasting plasma glucose  $\geq 7.0 \text{ mmol L}^{-1}$  (126 mg dL<sup>-1</sup>)
- Two hour plasma glucose  $\geq 11.1 \text{ mmol L}^{-1}$  (200 mg dL<sup>-1</sup>) during an oral glucose tolerance test<sup>[5]</sup>

It seems that T1D has a Th1 (T-helper 1) immune reactivity pattern. There is often a reciprocal relationship between Th1 immune responses, which suggests that AD (Th2 phenotype) and T1D (Th1 Phenotype) are unlikely to coexist in the same individual<sup>[2]</sup>.

Few studies have investigate the association between T1D and AD and the results are controversy between different studies.

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The study carried out by Rosenbauer and colleagues in Germany 2003 indicates that atopic eczema in early childhood could be protective against T1D<sup>[5]</sup>, however another study carried out in Netherlands by Meerwaldt and colleagues<sup>[4]</sup> shows the lower prevalence of asthma, hay fever and eczema symptoms in DM patients compared with age-matched controls, although not statistically significant, is consistent with the Th1/Th2 concept<sup>[6]</sup>. The aim of our study is to determine the association between these two diseases, in our city, because such studies were not conducted in this region and if we can found an association, further studies are needed to determine the pathogenesis.

**MATERIALS AND METHODS**

We conducted a case-control study enrolling 150 cases with T1D between 2-20 years from pediatric endocrine outpatients and 450 controls randomly selected from the general population matched on sex and age. The diagnosis of AD was determined for patients and controls by the Hanifin and Rajka’s diagnostic criteria<sup>[1]</sup>. Which is the most suitable one for determining this disease in population based studies. To compare the Frequency of categorical variables, chi square test was used and using multivariate logistic regression, the association between diabetes and AD was analyzed.

**RESULTS**

From 150 cases, 75 (50%) were male and 75 (50%) were female, the mean age of cases was 9.46 with a range between 2 and 20 (SD = 3.38) and among the 450 controls, 228 were male (50. 66%) and 222 were female (49. 33%), with a mean of 9.55 (SD = 3.74) (Table 1).

Dermatitis past or present, was identified in 1.3% of cases and 3.1% of controls and the difference was not statistically significant (p>0.05). The relative frequency of dermatitis was 3.7% among women and 1.7% among men (p>0.05).

Table 1: The association between type 1 diabetes mellitus and AD by multivariate logistic regression

Variable	Total	Dermatitis		Adjusted odds ratio	Confidence interval 95%	p-value
		Yes	No			
Age	600	8.4±4.6	9.6±3.6	0.91	0.80-1.04	0.177
<b>Gender</b>						
Female	297	11 (3.7)	286 (96.3)	-	0.14-1.28	1.129
Male	303	5 (1.1)	298 (98.3)	0.43		
<b>Diabetes</b>						
Yes	150	2 (1.3)	148 (98.1)	-	0.10-2.1	0.336
No	450	14 (3.1)	436 (96.9)	0.47		

**DISCUSSION**

Atopic patients are Known to have hyper-reactivity of the Th2 immune mechanism<sup>[7]</sup>. Immune dysregulation is an important factor in the creation of this condition<sup>[8]</sup>.

“Th1 and Th2 cells have been found to be mutually antagonistic leading to either Th1 or Th2 dominated responses upon immunization”<sup>[9]</sup>.

Another study carried out by Simpson *et al.*<sup>[10]</sup> shows that Th1 and Th2 mediated diseases are significantly associated in a large general practice population. This finding support the proposal that autoimmune and atopic diseases share risk factors that increase the propensity of the immune system to generate both Th1 and Th2 mediated inappropriate responses to non-pathological antigens<sup>[11,12]</sup>.

**CONCLUSION**

In our study, the incidence of dermatitis among patients with T1D was 1.3 and 3.1% in control group, but it was not statistically significant (p>0.05), may be due to difference between races and geographic areas and lack of support for an inverse relationship between Th2 mediated atopy and Th1-mediated autoimmune disorders.

More studies are needed to show the differences in serum IgE and cytokine profiles among patients.

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