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Review Artilce Open Access

Prevalence of Autism is Positively Associated with the Incidence of Type 1 Diabetes, but Negatively Associated with the Incidence of Type 2 Diabetes, Implication for the Etiology of the Autism Epidemic

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Abstract

Background: Epidemics of type 1 diabetes had been linked to inflammation. Previous reports have suggested the prevalence of autism is increased in patients with type 1diabetes.

Methods: Medline and Google searches were performed in late 2010 to find a country where there was simultaneous data on the incidence or prevalence of type 1 diabetes, type 2 diabetes and autism in multiple different races. The association between prevalence of autism in children and the incidence of type 1 diabetes or type 2 diabetes in children, when stratified by race, was studied.

Results: The prevalence of autism has a statistically significant positive association with the incidence of type 1 diabetes but has a statistically significant inverse association with type 2 diabetes.

Conclusion: This suggests that patients with autoimmune autism likely represent a large subset of patients with autism and that the etiology of the epidemic of autoimmune/inflammation mediated autism in children is likely to be related to the etiology of the simultaneous epidemic of type 1 diabetes in children.

Keywords: Autism; Diabetes; Cortisol

Introduction

Type 1 diabetes has been linked to an increased risk of autism [1]. Furthermore patients with autism have an increased family history of type 1 diabetes [2]. Both diseases are epidemic in many parts of the world, especially Europe and North America, both has an autoimmune link and both have been reported to have a male predominance [3-5]. Both type 1 diabetes and autism have been shown to be more frequent in low cortisol producers [6,7]. Vaccines have been shown to increase the risk of type 1 diabetes in a prospective clinical trial and in animal models [8]. Epidemiology data has linked the epidemic of type 2 diabetes/metabolic syndrome/obesity to vaccines [9,10] while vaccines have been suggested as a cause for the increased risk of autism. Both diseases existed before the onset of immunization and a number of cases occurring are almost surely not vaccine related. The incidence of type 1 diabetes has been shown to be inversely associated with the incidence of type 2 diabetes and this has been attributed to an immune suppressive response in type 2 diabetics that is associated with cortisol activity [6,9,10]. High cortisol activity protects against autoimmune diseases such as type 1 but increases the risk of insulin resistance and type 2 diabetes. Previous studies have stratified the incidence of type 1 and type 2 diabetes by race to show the incidence of the diseases were inversely associated which was attributed to racial disparity of cortisol release. The current study explores the association between type 1 and type 2 diabetes and autism by also stratifying by race. By comparing the association of all three diseases it was hoped to learn whether it is likely the epidemics of all three diseases could have a common etiology.

Methods

Medline and Google (including Google Scholar) searches were performed to find a country where there was simultaneous data on the incidence or prevalence of type 1 diabetes, type 2 diabetes and autism in multiple different races. Once data was found the data were analyzed by a Wilcoxon log rank analysis using the software Statistica (StatSoft, Tulsa, OK).

Results

Data from two published studies of US children allowed direct correlation between the incidence of type 1 diabetes, type 2 diabetes [11] and the prevalence of autism [5] in multiple different races (Whites, Blacks, Hispanics, Asians, Native Americans). Data on the prevalence of autism in Native Americans was provided by the CDC. Data is shown in Table 1. Diabetes, both type 1 and type 2 were recorded in the table by ages 5-9, 10-14, 15-19 as presented in the reference source while autism was recorded in the table as prevalence at age 8, as presented in the reference source. Information on the incidence of type 1 and type 2 in children age 0-4 was not included because the incidence of type 1 and especially type 2 diabetes was too low to be reliable.

A statistically significant association was found between the prevalence of autism at age 8 and incidence of type 1 diabetes in children age 5-19 ($p=0.0076$). Races with the highest incidence of type 1 diabetes generally had the highest prevalence of autism while races with the lowest incidence of type 1 diabetes had the lowest prevalence of autism. An inverse association was found between the prevalence of autism at age 8 and the incidence of type 2 diabetes in children age 10-19 ($p=0.0284$) but not in children ages 5-19. Races with the highest incidence of type 2 diabetes generally had the lowest prevalence of autism while races with the lowest incidence of type 2 diabetes had the highest prevalence of autism.

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	Yearly Incidence/100,000		Prevalence
	Type 1	Type 2	Autism age 8
Incidence age 5-9			
Indians	5.5	0	6.8
Asians	8	2.2	7.3
Hispanics	15.7	1.3	5.9
Blacks	16.2	1.7	7.2
US Whites	28.1	0.3	9.9
Incidence age 10-14			
Indians	7.1	25.3	6.8
Asians	8.3	11.8	7.3
Hispanics	17.6	8.9	5.9
Blacks	19.2	22.3	7.2
US Whites	32.9	3	9.9
Incidence age 15-19			
Indians	4.8	49.4	6.8
Asians	6.8	22.7	7.3
Hispanics	12.1	17	5.9
Blacks	11.1	19.4	7.2
US Whites	15.1	5.6	9.9

Autism at age 8 and type 1 diabetes age 5-19: p=0.0076
Autism at age 8 and type 2 diabetes age 5-19: p=0.28
Autism at age 8 and type 2 diabetes age 10-19: p=0.0284

Table 1: Incidence of Type 1 and Type 2 Diabetes versus Prevalence of Autism by Race.

Discussion

The results show that there was a direct correlation between the prevalence of autism and the incidence of type 1 diabetes in children 5-19 but an inverse correlation between the prevalence of autism and the incidence of type 2 diabetes in children age 10-19. The lack of a statistically significant inverse correlation between prevalence of autism and the incidence of type 2 diabetes in children age 5-9 can be explained by the small number of cases and low incidence of type 2 diabetes in this age group.

Our findings are consistent with a clinically significant proportion of autism cases having an autoimmune component. It has been subject to debate what proportion of autism cases had an autoimmune component. Prior publications have shown that the incidence of type 1 diabetes, an autoimmune disease, is increased in those races with lower cortisol activity and decreased in those in races with higher cortisol activity [6]. Autism has been associated with decreased cortisol activity and autoimmune activity [7]. These phenomena are likely not independent in autism but instead the low cortisol activity in patients increases the risk of autoimmune diseases that can include autoimmune autism. The fact that there is a statistically significant positive correlation between type 1 diabetes and autism is consistent with the role of autoimmunity and low cortisol in the pathophysiology of both diseases. The statistically significant inverse correlation with type 2 diabetes and autism is consistent with the findings that type 2 diabetes is associated with a high cortisol activity which can inhibit autoimmune diseases including type 1 diabetes and autoimmune autism.

The positive association between type 1 diabetes and autism suggests that the epidemics of type 1 diabetes and autism are likely to share many of the same etiological causes. While the present study did not directly look at the effect of vaccines on type 1 diabetes or autoimmune autism, the direct correlation between the incidence of type 1 diabetes and the prevalence of autism suggest these autoimmune diseases not only share the same pathophysiology but that epidemics are likely to share the same etiology. This is reinforced by the negative association with type 2 diabetes and autism. Vaccines have shown to cause a large number of cases of type 1 diabetes in both a prospective clinical trial as well as in animal toxicity studies [8]. The pathophysiology is believed to involve vaccine induced macrophage activation, especially by aluminum adjuvants and complex polysaccharides, and resulting interleukin 1, interleukin 6, and TNF production. It is the belief of the author, based in part on the data present in this manuscript that the epidemics of type 1 diabetes and autoimmune autism are more likely than not to share the same etiological cause.

Acknowledgement

The author is CEO and Owner of a biotechnology company involved in studying vaccine adverse events. He holds patents related to testing vaccines for their ability to cause diabetes and other inflammatory/ Immune mediated disorders.

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