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TO DETERMINE THE THYROID DYSFUNCTION PREVALENCE AMONG CHILDREN OF TYPE-I DIABETES MELLITUS

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Abstract:
Aim: *The purpose of this study is to determine the prevalence of clinical and biochemical thyroid dysfunction in children with type 1 diabetes. A relationship between type 1 diabetes and thyroid dysfunction has been reported globally.*
Place and Duration: *In the department of Paediatric Endocrinology, Children Hospital Lahore for one year duration from May 2018 to May 2019.*
Methods: *A total of 116 children with type 1 diabetes (62 men and 54 women), aged 1 to 16 years, were examined for signs of thyroid dysfunction and thyroid size was assessed by palpation and TSH, T3 and T4 were measured to assess the incidence of thyroid dysfunction.*
Results: *the incidence of thyroid dysfunction in diabetics was 12.93%, 6.9% of them were subclinical hypothyroidism, 3.4% of them had hypothyroidism, and 0.86% had hyperthyroidism, 1.7% showed hyperthyroidism, sex distribution showed 27% men and 73% women with thyroid dysfunction, which means a higher than normal population in the same age group. The incidence of goiter due to palpation was in 9.5% of diabetics, which is associated with poor consumption of iodized food.* ***Conclusion:*** *We conclude that the frequency of thyroid dysfunction is higher in type 1 diabetes than in the normal population, we recommend a routine thyroid test at the time of diagnosis of children with type 1 diabetes.*
Key words: *diabetes mellitus, thyroid dysfunction, Children*

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INTRODUCTION:

The incidence of thyroid dysfunction in children with type 1 diabetes varies significantly between 3 and 50% in different countries. There is a great kinship in Pakistan, and the diet is poorly iodized, and the lack of shoreline, so the incidence of thyroid dysfunction is highly reported compared to the general population with this study in developing countries[1-2]. Insulin dependent diabetes mellitus (IDOM) is associated with other autoimmune diseases, especially thyroid disorders (Riley 1981)[3-4]. The incidence of thyroid autoimmunity in children and adolescents with type 1 diabetes has been described between 3.9 and 50% in several studies (Barek 1990, Lorini 1996, Lindberg 1997) and includes hashimoto thyroiditis and severe disease (Lorini 1996, Roldan 1999, Pearce 2003)[5-6]. It is very important to detect thyroid disease or autoimmunity in children because of its progression in subclinical hypothyroidism in 11% and overt hypothyroidism in 3% of them (Pearce 2003). Early detection of thyroid dysfunction in diabetic patients and early treatment improve the insulin action in these patients and reduce future lipid disorder in a diabetic patient to control hypothyroidism (Mohn 2002, Taddei 2003, and Gonzales 2007)[7-8]. To reduce adverse outcomes in children with diabetes, early subclinical hypothyroidism should be diagnosed and treatment should be started immediately. We decided to study the incidence of thyroid dysfunction, especially subclinical hypothyroidism, in children and adolescents with newly diagnosed type 1 diabetes.

MATERIALS AND METHODS:

One hundred and sixteen children (62 men and 54 women) with type 1 diabetes who attended outpatient clinics in the department of diabetology and pediatric endocrinology of the Services hospital Lahore were selected and compared to 93 healthy children whose age range (1-16 years) and (3-17 years), the average age is (12.43 years) and (10.5 years) respectively. Diagnosis of type 1 diabetes was based on the criteria of the world health organization. All patients received insulin and had no signs of thyroid dysfunction. None of the diabetic patients were in ketoacidosis, immediately after glycemic control after diagnosis, all were examined for thyroid dysfunction. None of the patients studied received any drug that would affect thyroid dysfunction, and children with a family history of autoimmune thyroid disease or a history of previous thyroid disorders were excluded from the study. The blood glucose level of the diabetic patient was monitored during blood sampling according to HpA1c level. All patients with diabetes carry out a clinical examination for signs of thyroid dysfunction, and thyroid size has been reported by palpation and classified according to WHO grade 0 not detectable, 1 detectable but invisible and 2 visible goiter. All parents and patients asked about the nature of iodized food in parallel with thyroid dysfunction, a venus sample was performed to assess thyroid hormone levels and TSH levels. All measurements were carried out in one laboratory by the same method. Normal range values were 4-6.5 ng dl for T3, 0.89-1.8 µg dL for T4 and 0.3-4.9 iUml for TSH. Subclinical hypothyroidism was defined as an elevated TSH level above 4.9 IU with normal thyroid hormone levels in the serum. Hypothyroidism was defined as increased TSH with a decrease in serum thyroid hormone levels. Subclinical hyperthyroidism was defined as a reduction in TSH below 0.3 [mu] m together with normal thyroid hormone levels, but hyperthyroidism was defined as a reduction in TSH levels with increased thyroid hormone levels. The results were presented as the mean ± SD, and group comparisons were made using the sum of unpaired Mann-Whitney ranges. Frequency comparisons were performed using the Chinese sequential test [X^2] $p < 0.05$ was considered statistically significant.

RESULTS:

Screening of thyroid dysfunction was conducted in 116 children and adolescents diagnosed with type 1 diabetes (62 men and 54 women), the average age of patients and controls was 12.42 and 11.97 years, respectively, which was not different age groups.

Table 1: Age and sex distribution in the cases and control

Groups	Sex		Age in years
Cases (n=116)	Male (n=62)	Female (n=54)	12.43 Years
Control (n=93)	Male (n=39)	Female (n=54)	10.5 Years

As shown in Table 1, the results of the biochemical thyroid test between the two cases and control groups were significantly different.

Table 2: TSH, T3 and T4 value in cases and controls.

Biochemical parameters	Cases (n=116)	Controls (n=95)	P value
TSH (iUml)	6.02	2.75	0.03
T4 (µg/dL)	0.52	1.45	0.02
T3 (ng/mL)	3.9	5.9	0.003

P* < 0.05 significant

Table 2 shows the results of thyroid biochemical dysfunction in both groups, which gives a significantly different result. Hypothyroidism in the presentation of subclinical hypothyroidism and overt hypothyroidism is more common in patients with diabetes than in the control groups. But subclinical hyperthyroidism did not show significance in both selected groups, otherwise hyperthyroidism showed a significant difference in both groups when two cases were found in the diabetic groups and one case in the control groups, Table 3.

Table 3: Distribution of clinical presentation in cases and controls

Clinical presentation	Cases (n=116)	Control (n=93)	P-value
Subclinical hypothyroidism	8(6.9%)	3(3.2%)	0.009
Hypothyroidism	4(3.4%)	1(1%)	0.0002
Subclinical hyperthyroidism	1(0.86%)	1(1%)	Ns
Hyperthyroidism	2(1.7%)	1(1%)	0.02
Total number	15(12.93%)	6(6.45%)	0.01

The large size of the goiter in the physical examination was found in 9.5% (11 children) with diabetes and in 8.6% (8 children) in the control groups, the result was not significant in both groups, as shown in Table 4, but there are no children with thyroid dysfunction with goiter in groups control.

Table 4: Goiter distribution in cases and controls

Goiter grade	Cases (n=116)	Controls (n=93)	P-Value
1	6(55%)	5(62%)	Ns
2	5(45%)	3(38%)	Ns

Table 5 shows the distribution of thyroid dysfunction by sex, which is more common in women than in men, and there is no difference in significance for both cases and controls.

Table 5: Sex distribution of thyroid dysfunction

	Cases (n=116)	Controls (n=93)	P-value
Male	4(27%)	2(25%)	Ns
Female	11(73%)	4(75%)	Ns

P-value <0.05 significant

DISCUSSION:

Thyroid dysfunction may affect the treatment of diabetes. Excess thyroid hormone led to an insulin support state and accelerated the onset of hyperglycemia, insulin resistance decreased after restoration of normal thyroid function, and helped alleviate beta cell destruction when beta cell mass was relatively well preserved[9-10]. Thyroid disease usually increases with age, and hypothyroidism is the most common thyroid disorder in the healthy and diabetic population, the incidence of thyroid disease is higher in patients with diabetes than in the normal population worldwide because patients with autoimmune disease are at risk occurrence of other autoimmune disease disorders (Mckennas 1990, Puna 1994) In a previous study in Iran, the incidence of thyroid dysfunction was 8.9% in patients with type 1 diabetes, 5.1% of them were subclinical hypothyroidism and 3.8% hypothyroidism thyroid, but 4.7% with subclinical hyperthyroidism was found in the control group with a significant difference in the variable thyroid function between diabetes and control group[11-12]. In our study, the incidence of thyroid dysfunction in patients with diabetes was 12.93%, of which 6.9% was subclinical hypothyroidism, 3.4% hypothyroidism and 0.86% hyperclinical hyperthyroidism, 7% showed hyperthyroidism[13]. The incidence is higher than normal control as in previous studies. In addition, gender-based distribution is more common in women than in men, which is 3 times higher in women than in men in control groups and cases. Our patient's thyroid enlargement accounts for 9.5% of patients and 8.6% in control groups, which was greater than in other populations for several reasons, such as kinship, salt deficiency in iodine, and available weak seafood[14]. In another study conducted in a multiple-control study involving a large number of patients (twice as much as our study), it was found that 21.6% had a significantly increased antiseptic effect, at least one anti-thyroid antibody and at least one The opportunity was much more common in children with diabetes[15]. We did not assess thyroid antibodies, which is not our goal of the study.

CONCLUSION:

Detection of thyroid function in children with diabetes is mandatory because the incidence of autoimmune disease as a whole is high, affects the treatment and control of hyperglycemia and its effect on development and metabolism, early detection of thyroid dysfunction in patients with early disease. Management of asymptomatic thyroid dysfunction provides better diabetes control and prevention of thyroid disorders.

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