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PREVALENCE OF HYPOTHYROIDISM IN TYPE 1 DIABETES MELLITUS AMONG THE PEDIATRIC AGE GROUP AT PRINCE HAMZA HOSPITAL, A RETROSPECTIVE DATA ANALYSIS AND LITERATURE REVIEW

Esraa M. Shatnawi*

(Pediatric Endocrinologist)
Department of Pediatric, Jordan Ministry of Health, Prince Hamza Hospital, Amman Jordan.

***Corresponding Author: Esraa M. Shatnawi**
(Pediatric Endocrinologist) Department of Pediatric, Jordan Ministry of Health, Prince Hamza Hospital, Amman Jordan.

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ABSTRACT
The association between hypothyroidism and various other autoimmune diseases, such as type 1 diabetes mellitus (T1DM), is well-recognized, and numerous previous studies have discussed the significance of early detection and control. In our study, we made every effort to gather the data accurately and evaluate the prevalence of hypothyroidism among our T1DM pediatric patients. (Who regularly visit the endocrine unit at Prince Hamza Tertiary Hospital).

KEYWORDS: Autoimmune, Hypothyroidism, Type 1 diabetes mellitus, Pediatric.

INTRODUCTION
Hypothyroidism and T1DM are two autoimmune disorders that frequently coexist, especially in the pediatric population, so it is crucial to screen for hypothyroidism in diabetic patients for early detection and treatment; as both need replacement therapy with levothyroxine and insulin, respectively, to decrease their morbidity and mortality rates.

MATERIAL AND METHODOLOGY
All patients who have T1DM and have a regular follow-up profile were enrolled in our study (n=254). As a legal rule, our study was approved by the ethical approval unit at our hospital, in addition to illustrating the importance of this study for patients and having a formal consent form. We filtered our patients as diagnosed cases of hypothyroidism according to a well-known step. Firstly, venous blood samples were obtained and sent for laboratory analysis, namely thyroid-stimulating hormone (TSH) level, with anti-thyroid peroxidase antibody (TPOAb). Accordingly, patients with a TSH level of > 5 and positive TPOAb were considered to have hypothyroidism.

RESULT
The total number of diabetic patients included was 254, (girls n=111, boys n=143). The age group was (4- 15) years with a median age of 8.4 years. By concluding the positive ones with the criteria illustrated above, there were 12 patients (girls n=6, boys n=6) with hypothyroidism in our sample, with an overall prevalence of 4.7%.

DISCUSSION
Our study was aimed at demonstrating the prevalence of hypothyroidism in children and adolescents who have T1DM, as many complex factors including genetic and non-genetic ones play an important role in the pathogenesis of both diseases including HLA, AIRE, *PTPN22*, FOXP3, CTLA-4, infection, vitamin D deficiency, and CXCLs.[1] It is worth mentioning a condition known as autoimmune poly- glandular syndromes (APS), which are clusters of endocrine abnormalities that occur in discreet patterns in subjects with immune dysregulation, it involves different entities, but I will include APS (2&3) which consist of both T1DM and hypothyroidism (as well as adrenocortical insufficiency in APS2) and happens more in females.[2]

Although our study demonstrates that only 4.7% of T1DM patients have concurrent hypothyroidism, many other studies were performed worldwide and concluded that Autoimmune thyroid disease is the most common autoimmune disorder associated with diabetes, occurring in (3–30) % of patients with T1DM,[3,4] in contrast to its prevalence among general pediatric population which is reported to be (0.1-2) % (5,6); this could be due to some shared genes involved in the susceptibility for both conditions according to recent studies,[7,8] Moreover, another study identified that hypothyroidism is associated with a more aggressive form of T1DM, with higher rates of DKA, younger age at initial presentation and higher levels of HbA1C.[9] Also, some demographic characteristics were demonstrated in the same study, as patients with co-existing hypothyroidism and T1DM

have higher levels of TPOAb, a positive family history of DM in first-degree relatives and consanguinity in their parents.[9] Since many studies approved that hypothyroidism causes a reduction in gluconeogenesis,[10,11] impairment in glycogenolysis[12] and slowing of insulin clearance,[13] patients with coexisting T1DM and hypothyroidism require lower insulin dosages; to avoid hypoglycemia. Finally, I want to mention another recent study that was conducted in Jordan in September 2023 which concluded that 7% of T1DM pediatric patients have hypothyroidism and the predictors for developing it were female sex and positive antibodies to glutamic acid decarboxylase.[14]

CONCLUSION

Hypothyroidism is strongly associated with T1DM which could then manifest in a more aggressive form; making it essential to routinely check for hypothyroidism in all diabetic patients, with a thyroid function test which should be done upon diagnosis then repeated annually if it falls within the normal range, in addition to testing for thyroid autoantibodies; to ensure an optimal health outcome for these individuals with early detection and proper treatment.

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