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Brief Communication

The Overall Prevalence of Hypothyroidism in Children Suffering Chronic Constipation in Shahrekord in 2019

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Abstract

Background and aims: Children with thyroid disorders may be significantly exposed to a higher likelihood of constipation; however, the cause of this link remains unclear. The study aimed to assess the prevalence of hypothyroidism in children suffering from chronic constipation.

Methods: This cross-sectional study was conducted on 380 infants over 30 days old with chronic constipation. All participants were asked for thyroid-stimulating hormone (TSH) and free T4 tests.

Results: The average age of participants was 64.62 ± 37.28 months. The overall hypothyroidism in the study population was estimated to be 4.2% based on the value of measuring serum TSH and 1.0% based on the value of serum-free T4. Further, abnormal values of both serum biomarkers led to the prevalence rate of 0.02% for hypothyroidism.

Conclusion: According to the findings, there was a relationship between hypothyroidism and constipation in children; however, this relationship needs further evaluation.

Keywords: Hypothyroidism, Constipation, Child, Prevalence

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Introduction

Since only a minority of constipation patients seek health care, it is difficult to estimate its exact prevalence. The results of previous studies demonstrate its prevalence as extremely variable, and the prevalence in children was reported between 0.7%-29.6%.[1,2] Moreover, approximately 5% of all outpatient referrals to pediatric clinics and up to 25% of outpatient referrals to pediatric gastrointestinal clinics were due to constipation.[3] The peak of constipation is at the age of 2 to 4 years and at the same time with toilet training, and there is a higher prevalence in male children.[4] In addition, approximately 40% of children with functional constipation develop symptoms of constipation in the early years of life.[5]

Regarding the close link between childhood constipation and thyroid disorders, practical-clinical guidelines released by the North American Society of Gastroenterology, Liver, and Nutrition recommend that thyroid hormone testing should be performed in children with severe and refractory constipation and that most patients should be screened before referring to a pediatric gastroenterologist. The diagnosis of hypothyroidism should be also considered in the differential diagnosis of constipation.[6,7] For example, a 5-year study reported that hypothyroidism was associated with constipation in a small number of patients and that these patients had other hypothyroidism symptoms.[6] Overall, the relationship between thyroid disorders and constipation in children remains unclear. This study aimed to assess the prevalence of hypothyroidism in children suffering from chronic constipation in Shahrekord in 2019.

Materials and Methods

This cross-sectional study was conducted on all infants over 30 days old with chronic constipation referred to Hazrat Rasool and Imam Ali clinics in Shahrekord, Chaharmahal va Bakhtiari, Iran, in 2019. The inclusion criterion was the diagnosis of chronic constipation based on the Rome III criteria[1] with the presence of at least two of the following criteria: (a) straining on > 25% of defecations, (b) lumpy or hard stools on > 25% of defecations, (c) sensation of incomplete evacuation on > 25% of defecations, (d) sensation of anorectal obstruction/blockage on > 25% of defecations, (e) manual maneuvers on > 25% of defecations, and (f) less than 3 defecations per week.[8] Reluctance to participate in the study was considered an exclusion criterion.

In case of having the necessary criteria for inclusion in the study, the necessary explanations were provided to the patients or their parents, and the consent of the parents was obtained. All patients participating in the study were selected via available sampling and asked for thyroid-stimulating hormone (TSH) and free T4 tests in a single referral laboratory. Free T4 less than 0.8 ng/μL or TSH

greater than 5.5 mlU/L were described as hypothyroid.[9]

For statistical analysis, results were presented as mean ± standard deviation for quantitative variables and summarized by frequency (percentage) for categorical variables. For the statistical analysis, the statistical software SPSS version 23.0 for windows (IBM, Armonk, and New York) was used.

Results

In total, 380 patients suffering from chronic constipation were included in the study (46.7% female and 52.4% male). The average age of participants was 64.62 ± 37.28 months ranged from 3 to 168 months. The level of serum TSH ranged from 0.36 to 18.54 mlU/L with a mean value of 2.87 ± 1.85 mlU/L as presented in Table 1.

The mean value of serum-free T4 was also 1.22 ± 0.24 mlU/L ranged between 0.50-2.19 mlU/L. Considering the definition of hypothyroidism as serum free T4 of less than 0.8 mlU/L or serum TSH higher than 5.5 mlU/L, the overall hypothyroidism in the study population was estimated to be 4.2% based on the value of measuring serum TSH and 1.0% based on the value of serum free T4. Further, abnormal values of both serum biomarkers led to the prevalence rate of 0.02% for hypothyroidism among children with chronic constipation.

Discussion

Despite the uncertainty of the main causes of constipation, especially in childhood, its association with some underlying disorders such as metabolic disturbances has been also proposed. In this regard and according to the literature, those with thyroid disorders can be significantly exposed to a higher likelihood of constipation. It has been demonstrated that thyroid dysfunction can result in the reduced gut motility, digestion and elimination, and common borderlines with constipation.[10] Further, those with hypothyroidism may face abnormal nutritional habits, and an unusual lifestyle exposes them to changing defecation habits leading to constipation. Overall, as evidenced in the present study, 1.0% of patients with constipation might suffer from hypothyroidism, which is higher than the normal population. In this regard, 4.2% of the present study' population (based on the low value of TSH) suffer from functional constipation. Of course, by considering the level of free T4 as a landmark for diagnosis of hypothyroidism, the overall prevalence of hypothyroidism was estimated to be 1.0%. In a study by Bennet and Heuckeroth,[6] 6.4% of patients with constipation had concomitantly hypothyroidism. In their study, the criteria for diagnosis of hypothyroidism included free T4 less than 0.8 ng/μL along with TSH level higher than 10 mIU/L. The mean age of their patients was also higher than that considered in the present survey (7.4 years versus 5.3 years). According to their judgment, considering different underlying profiles including age and children's growth status could potentially affect the real rate of constipation. In a study by Tahan et al,[10] constipation affected nearly 12% of children with congenital hypothyroidism, and the connecting chain between two phenomena included hypomotility and pseudo-obstruction. In this regard, it seems that hypothyroidism and Hirschsprung disease should be considered in the differential diagnosis of children suffering from severe constipation.[11] Thus, according to the fact that severe gastrointestinal motility disorders have been demonstrated as a main and common manifestation of hypothyroidism,[12-14] increasing the likelihood of constipation in hypothyroid children and vice versa can be expected.

Table 1. Descriptive Statistics of Age, TSH, and Free T4 in Patients With Constipation

Variable	Number	Min	Max	Mean ± SD
Age (Month)	380	3	168	64.62 ± 37.28
TSH (mlU/L)	380	0.36	18.54	2.87 ± 1.85
Free T_4 (ng/ μL)	380	0.5	2.19	1.22 ± 0.24

Note. TSH: Thyroid-stimulating hormone; SD: Standard deviation; Min: Minimum; Max: Maximum.

Conclusion

It can be concluded that several children with constipation suffer simultaneously hypothyroidism. The overall hypothyroidism in this population as estimated in this survey was 4.2% based on increasing serum TSH, 1.0% based on reducing the level of free T4, and 0.02% according to abnormal values of both criteria.

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This article was derived from a research project approved by the Research and Technology Deputy of the Shahrekord University of Medical Sciences (approval No. 3175). Hereby, the researchers gratefully thank the patients who participated in this study. Hence, a relationship was observed between hypothyroidism and constipation in children, although this relationship needs further evaluation.

Conflict of Interest Disclosures

The authors declare that there is no conflict of interests.

Ethical Approval

This study protocol was approved by the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1398.166).

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