Original article:

Analysis of the Prevalence of Thyroid Disorders Among Children at a Tertiary Care Hospital

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ABSTRACT

Background: Survey reveals that in India, thyroid disorders are amongst the most common endocrine disorders. The present study was conducted for assessing the prevalence of thyroid disorders among children.

Materials & Methods: A total of 500 children were enrolled in the present study. All the children belonged to the age range of less than 15 years. Thyroid function test estimation, diagnosis and statistics: The triiodothyronine (T3), tetraiodothyronine (T4) and thyroid stimulating hormone (TSH) were analysed by electrochemiluminescence assay. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

Results: Thyroid dysfunction was seen in 6.2 percent of the subjects (31 subjects). Among these 31 subjects with thyroid disorders, hypothyroidism was seen in 38.71 percent while subclinical hypothyroidism was seen in 25.81 percent. Hyperthyroidism was seen in 35.48 percent.

Conclusion: Early diagnosis and treatment are essential to prevent irreversible and permanent nervous system damage and developmental delay, especially in infants as they are extremely vulnerable to thyroid dysfunction.

Key words: Thyroid Prevalence, Children.

INTRODUCTION

Survey reveals that in India, thyroid disorders are amongst the most common endocrine disorders. The prevalence and pattern of Thyroid disorders depend on sex, age, ethnic and geographical factors and especially on iodine intake. Iodine deficiency can lead to mental retardation, stillbirths, congenital anomalies and psychomotor defects Research shows that hypothyroidism can contribute to morbidity from Osteoporosis, Hyperlipidemia, Hypercholesterolemia, Cardiovascular and Neuropsychiatry disease in the 3 population. The seriousness of thyroid disorders should not be underestimated as thyroid storm and myxedema coma can lead to death in a significant number of cases.[1- 3]

Subclinical hypothyroidism (SH) is biochemically defined as a serum TSH concentration above the statistically defined upper limit of the reference range when serum-free thyroxine (fT4) concentration is within its reference range. The clinical presentation varies widely, ranging from no manifestations to clear signs or symptoms of

hypothyroidism. SH prevalence in the adult population is reported to be 1–10%, being higher in the elderly population, in females, and in white subjects. In the pediatric population, SH prevalence is reported to be slightly lower than 2%, even if epidemiological studies concerning childhood and adolescence are scanty. Therefore, SH is quite a common disorder in pediatric patients, and both primary care physicians and pediatric endocrinologists frequently face the decision of what to do regarding these children.[4- 6] Hence; the present study was conducted for assessing the prevalence of thyroid disorders among children.

MATERIALS & METHODS

The present study was conducted in the Department of Paediatrics, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha (India) for assessing the prevalence of thyroid disorders among children. A total of 500 children were enrolled in the present study. All the children belonged to the age range of less than15 years. Thyroid function test estimation, diagnosis and statistics: The triiodothyronine (T3), tetraiodothyronine (T4) and thyroid stimulating hormone (TSH) were analysed by electrochemiluminescence assay. Primary hypothyroidism was defined as presence of TSH > 5.5 µIU/mL and T4 <5.1 µg/dL or T3 < 60 ng/dL. Subclinical hypothyroidism was defined as TSH > 5.50 µIU/mL and normal T4, normal T3. Hyperthyroidism was defined as TSH <0.35 µIU/mL and T3 >180 ng/dL or T4 >14.1 µg/dL while Subclinical hyperthyroidism was defined as TSH < 0.35 µIU/mL and normal T3, normal T4. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

Mean age of the subjects enrolled in the present study was 12.8 years. Out of 500 subjects, 280 were males while the remaining 220 were females. Out of 500 subjects, thyroid dysfunction was seen in 6.2 percent of the subjects (31 subjects) (table 1). Among these 31 subjects with thyroid disorders, hypothyroidism was seen in 38.71 percent while subclinical hypothyroidism was seen in 25.81 percent. Hyperthyroidism was seen in 35.48 percent (table 2).

Table 1: Prevalence of thyroid disorders

Thyroid disorders	Number of subjects	Percentage
Present	31	6.2
Absent	469	93.8
Total	500	100

Table 2: Distribution of thyroid disorders

Thyroid disorders	Number of subjects	Percentage
Hypothyroidism	12	38.71
Subclinical hypothyroidism	8	25.81
Hyperthyroidism	11	35.48
Total	31	100

DISCUSSION

Thyroid diseases are, arguably, among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Thyroid diseases are different from other diseases in terms of their ease of diagnosis, accessibility of medical treatment, and the relative visibility that even a small swelling of the thyroid offers to the treating physician. Early diagnosis and treatment remain the cornerstone of management.[6- 9]

Mean age of the subjects enrolled in the present study was 12.8 years. Out of 500 subjects, 280 were males while the remaining 220 were females. Out of 500 subjects, thyroid dysfunction was seen in 6.2 percent of the subjects (31 subjects). Shalitin S et al established the prevalence of elevated thyroid-stimulating hormone (TSH) levels in obese children and adolescents and identify the relationship between changes in TSH levels and other metabolic and hormonal variables before and after weight reduction. 207 obese participants aged 5–18 years were evaluated for anthropometric, biochemical, metabolic and hormonal variables before and after a weight reduction. At baseline, 46 participants (22.2%) had hyperthyrotropinemia (≥4.0 mIU/l). Free T4 levels were normal in all cases. Triglyceride levels were significantly higher in participants with hyperthyrotropinemia than in those with normal thyroid function ($p = 0.011$). Baseline TSH was significantly correlated with triglyceride levels ($r = 0.261$, $p < 0.001$), but not with age, anthropometric, or laboratory variables. There was no significant relationship between changes in TSH level and changes in body mass index-standard deviation score. A significant correlation was found between the final TSH level and triglyceride level ($r = 0.167$, $p = 0.045$), and between the decrease in TSH level and the decrease in waist circumference ($r = 0.291$, $p = 0.013$). In obese children, hyperthyrotropinemia with normal free T4 levels appears to be frequent.[10]

Among these 31 subjects with thyroid disorders, hypothyroidism was seen in 38.71 percent while subclinical hypothyroidism was seen in 25.81 percent. Hyperthyroidism was seen in 35.48 percent. Thyroid hormones play a crucial role as a regulator of growth, of nervous system myelination, of metabolism, and of organ functions. Disorders affecting the thyroid gland represent the most common endocrinopathies in childhood. The etiology and clinical presentation of thyroid disorders in children and adolescents substantially differ from that in adults. Thus, pediatric medical care requires an appreciation of distinct characteristics of thyroid function and dysfunction in childhood and adolescence.[11] Skarpa V et al defined the epidemiological clinical and laboratory characteristics of children and adolescents with AT. Various parameters including thyroid ultrasonography of 228 children and adolescents aged 10.2 ± 2.5 yrs (mean ± SD) with AT, who attended our Pediatric Endocrine Unit during a 5-year period were retrospectively analysed. 191 (83.8%) were female and 142 (62.3%) were pubertal. At AT diagnosis, 130 children (57.0%) were euthyroid, 75 (32.9%) had subclinical hypothyroidism, 19 (8.3%) had hypothyroidism and 4 (1.8%) had hyperthyroidism. There was a positive correlation between thyroid stimulating hormone (TSH) levels and thyroid volume SDS ($r=0.15$, $p=0.02$). Sixty-three children (28%) had a goiter and 32 (14%) had thyroid nodules. Three children (1.3%) had papillary thyroid carcinoma. Compared to euthyroid children, children with hypothyroidism were younger (9.2 ± 1.8 vs 10.6 ± 2.4 yrs, $p<0.05$) and had higher thyroid volume SDS (3.1 ± 1.9 vs 1.2 ± 1.2, $p<0.05$) and higher prevalence of goiter [11(57.9%) vs 29(22.3%), $p<0.05$]. Children and adolescents with AT are mostly asymptomatic; the majority are female, pubertal and Euthyroid.[12]

CONCLUSION

Early diagnosis and treatment are essential to prevent irreversible and permanent nervous system damage and developmental delay, especially in infants as they are extremely vulnerable to thyroid dysfunction.

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