PREVALENCE OF THYROTOXICOSIS: CLINICAL PRESENTATION AND RESULTS OF TREATMENT IN 384 PATIENTS WITH GOITER UNDER 18 YEARS

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Abstract- ***Goiter is common among growing children and adolescents but thyrotoxicosis is a rare thyroid disorder in this age group. This study was undertaken to determine the prevalence of thyrotoxicosis and clinical presentation of the disease among children and adolescents presenting for goiter at the clinics of Pediatric Endocrinology of Tehran and Iran University of Medical Sciences and private offices. In a retrospective study the medical records of 424 patients with goiter were studied, of whom 384 (285F, 99M) had goiter and records available for review. All patients were examined by pediatric endocrinologist and their goiters were classified according to WHO criteria. Total T4, TSH, T3 and T3RU were measured. Out of the 384 cases that were diagnosed as goiter, 320 were euthyroid (83.4%), 49 were hypothyroid (12.7%) and 15 were hyperthyroid (3.9%). Ninety-three percent of the hyperthyroid patients had graves' disease and seven percent of them had toxic adenoma. The most common presenting feauture in thyrotoxic patients was goiter. Sustained remission with medical treatment alone was attained in 46% with a mean treatment duration of 2.9 years. The comparison was made between the findings of this study and those of western countries indicating that the incidence of hyperthyroidism in Iranian pediatric population is not as high as in North America but is higher than in Europe. Clinical presentation, response to treatment and etiologic causes of the disease in our study was similar to other studies.***

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Key Words: Goiter, thyrotoxicosis

INTRODUCTION

Goiter is common among growing children and adolescents that may be euthyroid, hypothyroid or hyperthyroid (1,2). Hyperthyroidism is a rare disorder of childhood that is characterized by an accelerated metabolism of body tissues which results from the stimulation of thyroid gland activity. Graves' disease is the predominant cause of hyperthyroidism in the pediatric age group (1-3). During the last decade, as a result of the national iodination program in Iran, nearly all of the population was provided with iodized salt. Despite the average estimated daily intake of iodine of 100-200 µg/day, goiter is still prevalent. We have conducted this study in order to determine the prevalence of thyrotoxicosis and clinical presentation of the disease in patients with goiter who were referred to the pediatric endocrine clinics.

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MATERIALS AND METHODS

In a retrospective and descriptive study the medical records of 424 patients with goiter aged less than 18 years who were admitted to the pediatric endocrine clinics and private offices in a 5 year period (November 1996-2001) were reviewd. Of 424 medical records that were studied, 384 cases (285 females, 99 males) had goiter and their records available for review. All patients were examined by pediatric endocrinologist and their thyroid gland was determined according to WHO goiter classification. Data pertinent to age, sex, family history of the thyroid disorders; physical growth and developmental milestones, presenting symptoms and clinical signs, goiter size, kind of treatment and duration of treatment and recurrence rate were collected. Data on serum T4, T3, T3RU (T3 resine uptake) and TSH were available in most patients. Serum total T4, T3, T3RU were measured by conventional radioimmunoassay and serum TSH was determined using a sensitive Immuno Radio Metric Assay (IRMA).

RESULTS

The prevalence of different grades of goiter is shown in Figure 1. Overall 90.5% of the subjects had goiter, but visible goiter (grade lb and above) was present in 65.5%. Out of the 384 cases that were diagnosed as goiter, 320 were euthyroid (83.4%) 49

were hypothyroid (12.7%) and 15 were hyperthyroid (3.9%).

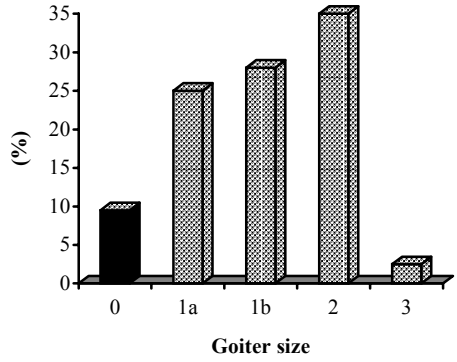

Fig. 1. Distribution of goiter size in 424 growing children

The ages of the patients ranged from 2 to 18 years (mean±SD, 13±2.3 years). In thyrotoxic patients the most frequent age was from 10.1 to 15 years (Table 1). Out of the 384 cases with goiter, 288 (75%) were females and 96 (25%) were males and female to male ratio was 3:1. In thyrotoxic patients female to male ratio was 2.75. 1 (Table 1).

Table 1. Characteristics of children with thyrotoxicosis at presentation

Age group (y)	M	F
<5	0	1
5.1-10	1	3
10.1-15	2	5
> 5	1	2
Total	4	11

Table 2. Presenting features of children with thyrotoxicosis

Symptoms and signs	Percent (%)
Goiter	100
Tachycardia	93%
Weight loss	86%
Hyperhydrosis	80%
Thyroid bruit	66%
Psychiatric manifestation	60%
Exophthalmos	60%
Tremor	60%
Sleep disturbance	53%
Fatigue	53%
Frequent defecation	26%

A positive family history was obtained in 169 (44%) that in patients with thyrotoxicosis was higher (60%). In thyrotoxic patients a first degree relative was involved in 6 (3 hyperthyroid, 2 hypothyroid, 1 subclinical hypothyroid). Out of the 15 cases that were diagnosed as thyrotoxicosis, 14 (93%) had Graves' disease and 1 (7%) had toxic adenoma. Thirteen percent (Two out of 15) of our patients have had another autoimmune disorder (diabetes mellitus and vitiligo) associated with hyperthyroidism. All of the patients with thyrotoxicosis had visible goiter (1_b= 27%, 2= 53%, 3= 20%). The major signs and symptoms and their relative frequency in thyrotoxic patients are listed in table 2.

DISCUSSION

Graves' disease is the most common cause of thyrotoxicosis in children. The disorder is rare before the age of 3 and increases progressively with age thereafter (2-5). In the present study our data showed a similar trend, there was an increased prevalence during the pubertal years (Table 1). In this study Graves' disease was the commonest etiology and female to male ratio was 2.75:1 that is similar to references (4-6). The most frequent and permanent clincal symptoms at diagnosis were goiter and tachycardia that is similar to other studies (4-7). The incidence of psychiatric manifestation in children with thyrotoxicosis is difficult to ascertain, but Raza et al. (4) and levy et al. (8) who included poor school performance, irritability, excessive crying and emotional lability, reported the incidence as 40-56% that is similar to our series , whereas others have not reported behavioral problems in their series (5). It has been alleged that hyperthyroidism accounts for 10-15% of all pediatric thyroid disorders and that children constitute 1-5% of all Graves' disease patients (2). This study shows that while this may be the case in North America, thyrotoxicosis in children in our country is not as high as North America but may be higher than in Europe (4). We used methimazole as the first line of therapy in 13 of 15 (87%) patients and 1 patient was treated by propylthiouracil. Initial remission was achieved in 10 (66%) of patients a figure similar to that was reported in other series (35-64%) (4,8). Sustained remission with medical treatment alone was attained in 7 patients (46%) with a mean treatment duration of 2.9 years. Other groups have reported similar remission rate of 21-42% (4,5,8,9). The overall incidence of side effects of drugs in our series (6.6%) was similar to Raza et al study (4), but was much lower than in other pediatric series (17-30%) (5,8-10). Cutaneous rash was the most common side effect of drugs in our study but more serious side effects such as agranulocytosis, hepatotoxicity and lupus were not seen in our patients. Surgery was performed in 5 patients (35%) because of failure of medical treatment to control the symptoms and recurrent relapses which is similar to that reported by Raza et al (4). Post surgical hypothyroidism developed in 1 patient but recurrence of hyperthyroidism was not seen in this study. Radio-iodine (I_{131}) ablation therapy was contemplated as the first line of therapy in 1 patient

with toxic adenoma who refused surgery. In the light of our experience, we recommend measurment of serum total T4 or Free T4 and TSH in all patients with goiter but because of the high cost of these tests, T3 and T3RU or Free T3 should be measured only in patients with signs and symptoms suggestive of hyperthyroidism. In families with high incidence of thyroid problems and in patients with other autoimmune diseases such as diabetes mellitus, we recommend thyroid palpation and screen for the presence of thyroid stimulationg or blocking immunoglobulins and recommend follow up for symptoms in the event of a positive research.

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