REVALENCE OF SUBCLINICAL HYPOTHYROIDISM AMONG FEMALE RESIDENTS OF ANDIJAN REGION IN UZBEKISTAN

Subclinical hypothyroidism is the most widely spread thyroid dysfunction with normal serum levels of free thyroxine (FT4) and elevated serum thyrotropin (TSH) levels. The work was initiated to study prevalence of subclinical hypothyroidism among women aged from 18 to 65 residing in Andijan region, Republic of Uzbekistan. It turned to be 12.4% confidently increasing to 28.3% when TSH upper limit was reduced. Regardless of TSH upper limit subclinical hypothyroidism frequency is higher among women over 40 years of age than among those under 30.

Saidaiganikhodja Ismailov 1, Dilbar Abdurazzakova 2

1 Center for Scientific and Clinical Study of Endocrinology, Uzbekistan
2 Andijan State Medical Institute, Uzbekistan

Keywords: Free thyroxine, prevalence, subclinical hypothyroidism, thyroid stimulating hormone


Introduction

Subclinical hypothyroidism is the most widely spread thyroid dysfunction with normal serum levels of free thyroxine (FT4) and elevated serum thyrotropin (TSH) levels (Cooper, 2001). Subclinical hypothyroidism prevalence in general population may reach 10-20%, its maximum being registered in subjects over 75 years of age (in 21% of women and 16% of men) (Gasparyan et al., 2012; Demidova and Galieva, 2008; Canaris et al., 2000; Vanderpump and Turnbridge, 2002). Today subclinical hypothyroidism is quite frequently diagnosed in young and middle-age people, presumably, due to wider use of clinical methods to measure thyroid hormones.

In Japan subclinical hypothyroidism is diagnosed in 4-8.5% of population, the value increasing to 20% in women over 60 years (Nakajima and Yamada, 2012). In a cross-sectional, multicenter, epidemiological study in eight cities of India prevalence of subclinical hypothyroidism with normal FT4 and TSH concentrations > 5.50 mIU/l was found 8.02%, the elevated thyroid peroxidase antibodies (TPOAb) levels being registered in 21.85% (Unnikrishnan et al., 2013). Study on spectrum of thyroid dysfunction in 472,393 patients visiting Kantipur Hospital in Kathmandu, Nepal, from February 2010 to January 2011, revealed subclinical hypothyroidism in 16.9% (Mahato et al., 2013). In Charak Hospital, Nepal, subclinical hypothyroidism was diagnosed in 10.50% of 1,504 patients visiting the setting from January 1, 2011 to December 30, 2012, its frequency being higher in 41-50-year old women (Yadav et al., 2013). Such a high prevalence of subclinical hypothyroidism is thought to be associated with iodine deficiency of Himalayan regions and plain land areas of Nepal. The work was initiated to study prevalence of subclinical hypothyroidism among women residing in Andijan region, Republic of Uzbekistan.

Materials and methods

We examined 315 women aged from 18 to 65 years (mean age 35.1±0.68 years, Me 33.0; IQR 33.0-44.0). All examinees were divided into 4 age groups. Thus, the first age group comprised 121 (38.4%) women under 30 years, 83 (26.4%) examinees aged from 30 to 40 were included into the second one, 60 (19.0%) and 51 (16.2%) women comprising the third (40-50 years) and fourth (over 50 years) age groups, respectively (Figure1).
Insufficient and excess body mass was registered in 46 (14.6%) and 97 (30.8%) women, respectively, 32 (10.2%) of the examinees being obese. Thyroid status parameters, such as, thyroid stimulating hormone (TSH), free thyroxine (FT_4) and thyroid peroxidase antibodies (TPOAb) were measured at the Center for the Scientific and Clinical Study of Endocrinology, Uzbekistan Public Health Ministry. Subjects taking anti-thyroid medications as well as pregnant women and nursing mothers were excluded from the study.

Data were processed by means of a Microsoft Excel and BIOSTAT software packet. Logistic regression was used to calculate odds ratio (OR) and 95% confidence interval (CI). The critical value of significance level for statistical hypothesis test was set at 0.05. Quantitative parameters are presented as Median (Me) and 25th and 75th percentiles as Inter Quartile Range (IQR).

Results and discussion

Subclinical hypothyroidism was diagnosed in 39 (12.4%) of all examinees. Mean serum TSH concentration was found to be 7.14±0.47 mIU/l versus normal one in the range of 0.17-4.05 mIU/l (Me 5.9; IQR 5-30-8.25), mean free T_4 being 14.0±0.46 pmol/l versus normal one in the range of 11.5-23.0 pmol/l (Me 13.4; IQR 11.9-15.3). In 25.6% of patients levels of TPOAb were found elevated (normal value < 12 IU/ml), mean concentration being 11.7±0.25 IU/ml (Me 11.8; IQR 10.3-12.7).

FIGURE 1. DISTRIBUTION OF THE EXAMINEES BY AGE (%)
As to age groups, subclinical hypothyroidism occurred in 15.4% of women under 30 years, its prevalence being increased with ageing reaching 33.3% in the examinees over 50 years. It should be noted that in the group of women over 40 years subclinical hypothyroidism was registered more frequently than among those under 40 (64.1% vs 35.9%, OR 3.19, 95%CI 1.26-8.04; P=0.02) (Figure 2).

Thyroid dysfunction may be either manifest or latent. Irrespective of the form, the disorder can be diagnosed by the level of serum TSH and concentrations of peripheral thyroid hormones. Following National Health and Nutrition Examination Survey (NHANES III) recruiting 13,344 healthy subjects over 12 years of age to measure serum TSH the recommended reference range of the hormone was established 0.45-4.12 mIU/l (2.5-97.5 percentiles) (Hollowell et al., 2002).

According to Wartofsky et al. (2005), as in most healthy euthyroid subjects (>95%) TSH concentrations are within the range from 0.3 to 2.5 mIU/l, upper normal limit of the hormone should be 2.5 mIU/l. Previously, TSH level was found to be in the range from 0.3 to 2 mIU/l in 70-80%, being lower than 5.0 mIU/l in 97% (Baloch et al., 2003). When persons with the elevated level of anti-thyroid antibodies, those diagnosed with goiter or those having close relatives with thyroid pathology are excluded from the whole sample, in 95% of new sample serum TSH is found not exceeding 2.5-3 mIU/l.

Others are of the view that two upper normal limits for serum TSH can confuse physicians (Brabant et al., 2006; Surks and Hollowell, 2007). Surks et al., (2000) proposed to introduce two subclinical hypothyroidism forms depending on TSH level, that is, mild subclinical hypothyroidism with TSH concentrations in the range of 4.5-9 mIU/l and severe one with TSH concentrations ≥ 10 mIU/l.

We studied prevalence of subclinical hypothyroidism by TSH upper normal limit. Three categories were used to classify patients. 39 women with TSH concentrations > 4.05 mIU/l were included into the first category, those with TSH concentrations in the range from 2.5 to 4.05 mIU/l were assigned to the second one (n=50), all data on patients with TSH concentrations > 2.5 mIU/l (n=89) being pooled in the third. TSH upper limit reduced (>2.5 mIU/l), subclinical hypothyroidism prevalence was found confidently increasing (28.3% versus 12.4%, OR 2.79, 95%CI 1.84-4.22; P<0.0001) (Figure 3).

Fatourechi et al. (2005) analyzed hypothyroidism prevalence among 75,882 patients of Mayo Clinic Hospital (Rochester, Minnesota, USA). TSH upper limit was set at 3.0 mIU/l and 5.0 mIU/l. The findings from the study demonstrated that the reduction of TSH upper limit from 5.0 mIU/l to 3.0 mIU/l caused hypothyroidism prevalence increasing more than by 4 times, that is, from 4.6 to 20%. TSH concentrations higher than 3 mIU/l were registered approximately in 15% subjects under 15 years.
Studying subclinical hypothyroidism in various age groups we have managed to find that, irrespective of TSH concentrations, its frequency is confidently higher in women over 30 years of age than in younger ones (Table 1).

**Table 1. Effect of Change in TSH Upper Limit on Subclinical Hypothyroidism Prevalence**

<table>
<thead>
<tr>
<th>Age</th>
<th>TSH &gt; 4.05 mIU/l</th>
<th>2.5 - 4.05 mIU/l</th>
<th>&gt; 2.5 mIU/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 30 years, n=121</td>
<td>5.0</td>
<td>13.2</td>
<td>18.2</td>
</tr>
<tr>
<td>From 30 to 40 years, n=83</td>
<td>9.6</td>
<td>12.0</td>
<td>21.7</td>
</tr>
<tr>
<td>From 40 to 50 years, n=60</td>
<td>20.0</td>
<td>13.3</td>
<td>33.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>OR, 95%CI; P</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50 years, n=51</td>
<td>4.79, 1.7-13.5; 0.004</td>
</tr>
<tr>
<td>≥ 50 years, n=51</td>
<td>6.56, 2.33-18.5; 0.0001</td>
</tr>
</tbody>
</table>

In addition, we established that, irrespective of the patients’ age, reduction of TSH upper limit resulted in progressive increase of subclinical hypothyroidism prevalence. Subclinical hypothyroidism occurred 2.2 and 3.6 times more frequently in women over 50 years and those under 30 with TSH concentrations > 2.5 mIU/l, respectively. Our findings are in accord with those of Fatourechi et al. (2005) who managed to demonstrate that with reduction of TSH upper limit hypothyroidism is registered 3.8 and 4.8 times more frequently in women over 70 years of age and those under 50, respectively.

According to Vanderpump et al. (2002), probability of progression to overt hypothyroidism in subjects with the elevated concentrations of TPOAb is 4.5% a year, while in those without TPOAb it is nearly 2% a year. In our study the elevated concentrations of TPOAb were found in 31.5% of patients with TSH concentrations > 2.5 mIU/l, while in those with TSH concentrations > 4.05 mIU/l higher TPOAb were registered in 25.6% (OR 1.33, 95%CI 0.57-3.10; P=0.65).

**Conclusion**

Prevalence of subclinical hypothyroidism with TSH concentrations > 4.05 mIU/l and normal FT<sub>4</sub> among female residents of Andijan region, Republic of Uzbekistan, aged from 18 to 65 was found 12.4%. It confidently increased to 28.3% when TSH upper limit was reduced (> 2.5 mIU/l), the tendency preserving irrespective of the examinees’ age. Regardless of TSH upper limit subclinical hypothyroidism frequency is higher among women over 40 years of age than among those under 30. Elevated concentrations of TPOAb were found in 31.5% of patients with TSH concentration > 2.5 mIU/l, while in those with TSH concentrations > 4.05 mIU/l higher TPOAb were registered in 25.6%.

**References**


Surks, M., Ortiz, E., Daniels, G., Sawin, C., Col, N., Cobin, R. et al., 2004. “Subclinal thyroid disease: scientific review and guidelines for diagnosis and management”, JAMA, Vol.291, pp.228-238, http://dx.doi.org/10.1001/jama.291.2.228


