Comparison of the Clinical Profile of Elderly and Young Patients with Hyperthyroidism Admitted at St. Luke’s Medical Center from 2005 to 2008

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Abstract

Background: Hyperthyroidism is observed in approximately 2% of the elderly population versus 0.05 to 1.3% in young adults. It can be missed because the symptoms are often atypical or subtle. It is associated with significant morbidity and mortality if left untreated. Previous studies have confirmed the paucity of clinical signs of hyperthyroidism in elderly.

Objective: This retrospective case-control study was undertaken to compare the clinical profile of hyperthyroidism in elderly patients, ≥ 60 years old, with that of younger hyperthyroid patients, ≤ 50 years old, admitted at St. Luke’s Medical Center from January 2005 to December 2008.

Results: A total of 55 elderly hyperthyroid patients were included in the study. Fifty-five younger hyperthyroid patients were the control group. Mean age of elderly patients was 67.4 ± 7.2 years. Mean age of younger patients was 35.2 ± 7.3 years. Male to female ratio of elderly patients was 1:4 while that of younger patients was 1:3.6. Tremors, excessive sweating and hyperdefecation were seen more frequently in the younger group (p<0.05). Majority of elderly patients had either non-palpable or nodular goiter while majority of younger patients had diffuse goiter (p<0.001). Mean FT₄ levels were higher in the younger group (52.40 ± 27.69 pmol/L versus 32.05 ± 23.42 pmol/L; p=0.009). Thyrotoxic periodic paralysis was found in 9.1% of younger patients. Elderly patients had longer duration of hospitalization (5.4 ± 3.9 days versus 2.9 ± 1.4 days; p<0.001). There were no significant differences in terms of palpitation, weight loss, easy fatigability, shortness of breath, insomnia, mean TSH, atrial fibrillation and treatment modalities used in both groups.

Conclusion: This study demonstrated that the typical clinical manifestations of hyperthyroidism may be absent, subtle or may be obscured in the elderly which makes them at risk for being misdiagnosed as having purely cardiac pathology.

Keywords: Hyperthyroidism, elderly

Introduction

Aging has several effects on the thyroid gland. It may result in a decrease in the metabolic clearance rate of L-thyroxine (T₄) due to a primary reduction in its metabolic disposition due to the age-related reduction in lean body mass. However, there is also decline in the production rate of T₃, with the net result that the plasma T₃ concentration remains unchanged. A small decline in plasma triiodothyronine (T₃) concentration is also noted due to a decrease in its production rate with metabolic clearance rate of T₃ being unchanged. The basal values of plasma thyroid stimulating hormone (TSH) in elderly persons are generally within the normal range for young adults, although in some cross-sectional studies the mean values tend to be somewhat higher than those in younger persons indicating some degree of primary thyroid dysfunction. However, responsiveness of the TSH secretory mechanism to thyrotropin-releasing hormone (TRH) may be dampened which may attenuate the expected increase in TSH levels.

These age-related changes often mask the manifestations of thyroid disorders in the elderly causing them to be associated with significant morbidity and mortality if left untreated. The prevalence of thyroid disorders is approximately twice that in younger individuals. Hyperthyroidism is observed in approximately 2% of the elderly population versus 0.05 to 1.3% in young adults. Similarly, hypothyroidism is observed in 2% to 7% of the elderly population versus 0.05 to 1.3% in young adults. In younger individuals, common manifestations of hyperthyroidism include palpitations, nervousness, easy fatigability, hyperkinesia, hyperdefecation, excessive sweating, heat intolerance, weight loss, goiter, exophthalmos and tachycardia. On the other hand, hyperthyroidism in the elderly, even in severe hyperthyroidism, can easily be missed because the symptoms are often atypical, may mimic other common diseases in this age group, may be absent, subtle, or may be obscured by coexisting diseases. Hyperthyroidism in the elderly may also be missed because the physical examination of the thyroid gland may not be helpful, as the gland is often shrunken and difficult to palpate. And so,
we need a high index of suspicion of thyroid dysfunction in the elderly in order to manage them accordingly. In 1996, a study by Trivalle, et al, showed that tachycardia, fatigue, weight loss, anorexia, atrial fibrillation were more commonly found in the elderly hyperthyroid patients. The mean number of clinical signs and symptoms found in the elderly group was significantly smaller than the number found in younger patients. This study confirmed the paucity of clinical signs of hyperthyroidism in older adults. In 2006, a study by Limpawattna, et al, showed that atrial fibrillation, weakness and anorexia whereas exophthalmos, goiter, heat intolerance and hyperhidrosis were not as frequent. These findings showed that unexplained atrial fibrillation, weakness and anorexia should warrant a consideration of hyperthyroidism in elderly patients even with paucity of typical clinical features.

This study was undertaken to compare the clinical profile of hyperthyroidism in elderly patients, 60 years old and above, with that of younger hyperthyroid patients, less than 50 years old, admitted at St. Luke’s Medical Center from January 2005 to December 2008. They were compared in terms of clinical presentation, management and outcome.

Methodology
This is a retrospective case-control study of elderly patients (60 years old and above) and younger patients (less than 50 years old) diagnosed with hyperthyroidism seen at St. Luke’s Medical Center from January 2005 to December 2008.

Subjects included in the study were based according to one or more of the following criteria:
- previously diagnosed to have hyperthyroidism
- biochemically hyperthyroid, as evidenced by TSH level of <0.465 mIU/mL (normal range 0.465 to 4.68 mIU/mL), and free \( T_4 \) (FT4) level >28.2 pmol/L (normal range 10.0 to 28.2 pmol/L)
- presently taking anti-thyroid medications

The charts and medical records of elderly and young patients with hyperthyroidism, admitted at St. Luke’s Medical Center, from January 2005 to December 2008, were reviewed. Demographic features, clinical manifestations, physical examination of the thyroid, thyroid function tests, complications of hyperthyroidism, treatment received and duration of hospitalization were gathered and recorded. All data collected were tabulated and analyzed at the end of the study. For the statistical analysis, the chi-square test was utilized to determine the significant difference between the two groups. For the TSH, \( T_4 \) levels and duration of hospitalization, the Wilcoxon test was applied to determine statistical significance.

Results
A total of 87 elderly patients referred to the Section of Endocrinology, Diabetes and Metabolism, from January 2005 to December 2008, for probable hyperthyroidism were assessed for possible inclusion in the study. Out of the 87 patients, 72 had their charts retrieved and reviewed (82.6%). Of these 72 patients, 55 (76.4%) fulfilled the inclusion criteria. Fifty-five younger patients diagnosed with hyperthyroidism by similar criteria (< 50 years old) were included in the study as the control group.

The comparison of the clinical profiles of the elderly and young patients with hyperthyroidism included in the study is summarized in Table I. Mean age of elderly patients included was 67.4 ± 7.2 years (range 60 to 87 years) while mean age of younger patients was 35.2 ± 7.3 years (range

<table>
<thead>
<tr>
<th>Clinical Profile</th>
<th>Elderlyb n (%)</th>
<th>Young n (%)</th>
<th>p value</th>
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<tbody>
<tr>
<td>Demographics</td>
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<tr>
<td>Age (years)</td>
<td>67.4 ± 7.2</td>
<td>35.2 ± 7.3</td>
<td>-</td>
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<tr>
<td>Sex (M:F)</td>
<td>1:4</td>
<td>1:3.6</td>
<td>-</td>
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<tr>
<td>Clinical Manifestations</td>
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<tr>
<td>Palpitation</td>
<td>29 (52.7)</td>
<td>31 (56.4)</td>
<td>0.70</td>
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<tr>
<td>Weight loss</td>
<td>14 (25.4)</td>
<td>21 (38.2)</td>
<td>0.15</td>
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<td>Tremors</td>
<td>9 (16.4)</td>
<td>22 (40)</td>
<td>0.006</td>
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<tr>
<td>Excessive sweating</td>
<td>6 (10.9)</td>
<td>22 (40)</td>
<td>0.001</td>
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<td>Easy fatigability</td>
<td>12 (21.8)</td>
<td>16 (29.1)</td>
<td>0.38</td>
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<tr>
<td>Hyperdefecation</td>
<td>3 (5.4)</td>
<td>12 (21.8)</td>
<td>0.012</td>
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<tr>
<td>Shortness of breath</td>
<td>8 (14.5)</td>
<td>6 (10.9)</td>
<td>0.57</td>
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<tr>
<td>Insomnia</td>
<td>2 (3.6)</td>
<td>4 (7.3)</td>
<td>0.40</td>
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<td>PE of the Thyroid</td>
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<tr>
<td>Non-palpable thyroid</td>
<td>35 (63.6)</td>
<td>11 (20)</td>
<td>&lt;0.001</td>
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<tr>
<td>Nodular goiter by palpation</td>
<td>16 (29.1)</td>
<td>2 (3.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diffuse goiter by palpation</td>
<td>4 (7.3)</td>
<td>42 (76.4)</td>
<td>&lt;0.001</td>
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<tr>
<td>Thyroid Function Tests</td>
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<tr>
<td>Mean TSH (mIU/mL)*</td>
<td>0.49 ± 1.04</td>
<td>0.23 ± 0.48</td>
<td>0.87</td>
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<tr>
<td>Mean FT4 (pmol/L)**</td>
<td>32.05 ± 23.42</td>
<td>52.40 ± 27.69</td>
<td>0.009</td>
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<tr>
<td>Complications</td>
<td></td>
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<tr>
<td>Thyrotoxic Periodic Paralysis</td>
<td>0 (0)</td>
<td>5 (9.1)</td>
<td>-</td>
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<tr>
<td>Atrial Fibrillation</td>
<td>14 (25.4)</td>
<td>4 (7.3)</td>
<td>0.15</td>
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<tr>
<td>Treatment Modalities</td>
<td></td>
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<tr>
<td>Anti-thyroid meds</td>
<td>55 (100)</td>
<td>53 (96.4)</td>
<td>0.10</td>
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<tr>
<td>RAI therapy</td>
<td>17 (30.9)</td>
<td>30 (54.5)</td>
<td>0.08</td>
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<tr>
<td>Thyroidectomy</td>
<td>4 (7.3)</td>
<td>2 (3.6)</td>
<td>0.14</td>
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<td>Outcome</td>
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<tr>
<td>Mean days of hospitalization</td>
<td>5.4 ± 3.9</td>
<td>2.9 ± 1.4</td>
<td>&lt;0.001</td>
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</table>

*NV of TSH = 0.465-4.68 mIU/mL
**NV of FT4 = 10.0-28.2 pmol/L
between the elderly and younger group. However, mean TSH level having diffuse goiter.

There was no significant difference in the mean TSH level compared to only 20% of younger patients compared to only 5% among the elderly.

In terms of physical examination, more than 60% of elderly hyperthyroid patients had non-palpable thyroid compared to only 70% of younger patients. In contrast, more than 70% of younger hyperthyroid patients had diffusely enlarged goiters. About one-third of elderly hyperthyroid patients had nodular goiter by palpation compared to only 3.6% among younger hyperthyroid patients.

Mean TSH levels were not significantly different in both age groups but mean FT<sub>3</sub> levels were significantly higher in the younger group (52.40 ± 27.69 pmol/L versus 32.05 ± 23.42 pmol/L; p = 0.009).

Thyrotoxic periodic paralysis was found in 9.1% of younger patients and none among elderly patients. Twenty-five percent of elderly patients had atrial fibrillation compared with only 7.3% among younger patients but this was not statistical significant.

There were no differences in the treatment modalities used for both the elderly and younger hyperthyroid patients but the elderly patients had significantly longer duration of hospitalization (5.4 ± 3.9 days versus 2.9 ± 1.4 days; p < 0.001).

Discussion

Similar to previous studies<sup>10</sup>, our results showed that hyperthyroidism is three to four times more common in female population than in male population both of age groups.

Our study did not show significant difference in terms of palpitation, weight loss, easy fatigability and shortness of breath. Other typical signs and symptoms of hyperthyroidism namely tremors, excessive sweating and hyperdefecation were significantly more common in the younger patients. The classic tremors seen frequently in younger patients are rarely seen in the elderly and, if present at all, are often coarse, not fine, as noted earlier in life.<sup>8</sup> Hyperdefecation is common in young hyperthyroid patients, while elderly patients may note a correction of preexisting constipation but will rarely complain of hyperdefecation or loose stools.<sup>8</sup> In addition, more than 60% of elderly patients did not manifest with an enlarged thyroid which may be due to the atrophy of the thyroid, in contrast to more than 70% of younger patients having diffuse goiter.

There was no significant difference in the mean TSH level between the elderly and younger group. However, mean FT<sub>3</sub> levels in younger age group was significantly higher than the older age group which may be due to the larger gland size in younger patients and relative atrophy of the thyroid in the elderly.

Thyrotoxic periodic paralysis (TPP) was seen only in the younger group. Interestingly, all 5 patients (9.1%) who had TPP were males. On the other hand, atrial fibrillation occurred more frequently in the elderly group and this was comparable with the study of Trivalle<sup>6</sup> in which atrial fibrillation was found in 35% of elderly patients. Because of their age, older individuals are more likely to be affected with thyrotoxic heart disease than the younger ones.<sup>11</sup>

Majority of elderly patients and all younger patients were discharged stable. However, the elderly patients had longer duration of hospitalization than the younger patients due to other comorbidities present in the elderly.

In conclusion, our study demonstrated that the typical clinical manifestations of hyperthyroidism may be absent, subtle or may be obscured or masked in the elderly which makes them at risk for being underdiagnosed or misdiagnosed as having purely cardiac pathology. It is therefore important to rule out hyperthyroidism in elderly patients manifesting with palpitation, weight loss, easy fatigability and shortness of breath, even in the absence of typical hyperthyroid signs and symptoms like tremors, excessive sweating, hyperdefecation and goiter.

References