Original article:

Study of signs and symptoms of cardiovascular involvement in thyroid diseases.

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Abstract:

Introduction: Thyroid hormones are like rainfall as excess as well as paucity of which will affect body metabolism. It mainly affects cardiovascular system and central nervous system along with other systems. With this view present work was planned to study signs and symptoms of cardiovascular involvement in thyroid diseases.

Materials and methods: 72 consecutive fresh cases of thyroid disorders including hypothyroidism and hyperthyroidism were studied for the cardiovascular manifestations attending Pad Dr. D. Y. Patil Medical College and Hospital, Pimpri, Pune. On clinical suspicion of thyroid dysfunction (hypothyroidism or hyperthyroidism) with or without thyroid enlargement, the patient was subjected to further clinical and laboratory evaluation.

Results: In this study, 9 patients had a history of chest pain. Out of them, all 9 patients showed ST-T changes suggestive of myocardial ischaemia. 4 of them had pericardial effusion on Echocardiography. The remaining 5 patients were normal with respect to Echocardiography. There were 6 other patients who had ST-T changes on electrocardiogram but who did not complain of chest pain. This study also corroborates with previous studies.

Conclusion: Incidence of congestive cardiac failure in hyperthyroidism and pericardial effusion in hypothyroidism appears to have diminished due to early detection of thyroid disorders.

Keywords: Thyroid disorders, cardiac manifestations

Introduction

Thyroid hormones are like rainfall as excess as well as paucity of which will affect body metabolism. It mainly affects cardiovascular system and central nervous system along with other systems. There are multiple systems on which thyroid hormone acts or hormone is supplementary to their functions but heart is the major target organ. Marked changes occur in patients with hypothyroidism and hyperthyroidism. Many symptoms and signs recognized in patients with overt hyperthyroidism and hypothyroidism are due to increased or reduced action of thyroid hormone on heart and vascular system. The most common
symptoms of hyperthyroidism include nervousness, fatigue and exercise intolerance, palpitations, weight loss, heat intolerance and congestive heart failure. Clinical findings include sinus tachycardia, atrial fibrillation, wide pulse pressure, hyperactive precordium, loud first heart sound and pulmonic component of the second heart sound and a third heart sound. An increased incidence of mitral valve prolapse has been associated with hyperthyroidism and in some cases there may be a midsystolic murmur heard best at the left sternal border with or without a systolic ejection click. A systolic scratchy sound, the 'Means Lerman Scratch' may occasionally be heard at the left second intercostal space and is thought to result from the rubbing of the hyperdynamic precordium against the pleura. Common signs and symptoms for hypothyroidism include lethargy, cold intolerance, weight gain, constipation, coarse dry skin, hair loss, hoarse voice, bradycardia and psychomotor retardation. It may be accompanied by weak arterial pulse, diastolic hypertension, cardiomegaly, distant heart sounds and pericardial effusion.

Materials and methods

72 consecutive fresh cases of thyroid disorders including hypothyroidism and hyperthyroidism were studied for the cardiovascular manifestations attending Pad. Dr. D. Y. Patil Medical College and Hospital, Pimpri, Pune. The diagnosis was suspected clinically and established by biochemical investigations. Out of these, 44 cases were of hypothyroidism and 28 cases were of hyperthyroidism. Clinically suspected thyroid disorders patients were subjected for the estimation of serum TSH, T4 and T3 levels. Biochemically confirmed thyroid dysfunction patients from both outpatient and inpatient departments were taken up for this study. Written consent was taken from all the patients. Detailed clinical examination was done of each patient according to the proforma prepared to facilitate a systemic study in all cases with special emphasis on cardiovascular involvement. In all confirmed thyroid disorder patients, necessary investigations were done where ever required.

Methods of collection of data

• Patients above the age of 13 years were included in this study.
• Patients of both sexes were studied.
• Newly diagnosed consecutive patients for thyroid disorders were included in this study.
• Indian patients from all socio-economic class, castes, and from rural and urban areas were studied.

Exclusion criteria:

1. Pre-existing heart diseases with subsequent thyroid disorders like Rheumatic heart disease, Ischemic heart disease, hypertensive heart disease and cardiomyopathy.
2. Thyroid dysfunction due to drugs used in cardiovascular disorders like Amiodarone.
3. Other pre-existing cardiovascular diseases like myocarditis due to viral, diphtherial and other infections.
4. Pre-existing or established ECG changes.
5. End stage renal disease and chronic kidney diseases.
On clinical suspicion of thyroid dysfunction (hypothyroidism or hyperthyroidism) with or without thyroid enlargement, the patient was subjected to further clinical and laboratory evaluation.

**Results:**

Table 1) Comparison of cardiac involvement in males & females with thyroid disorders.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total Cases</th>
<th>CVS Involved</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12</td>
<td>8</td>
<td>66%</td>
</tr>
<tr>
<td>Female</td>
<td>60</td>
<td>34</td>
<td>56.67%</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>42</td>
<td>58.33%</td>
</tr>
</tbody>
</table>

- There is no difference in susceptibility to CVS involvement in males and females with thyroid disorder.
- Out of all patients 58.33% showed cardiac involvement.
- Out of males, 66% had CVS involvement.
- Out of females, 56.67% had CVS involvement.

Table 2) Incidence of cardiac Symptoms in hypothyroidism (n = 44)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Male</th>
<th>Female</th>
<th>Total cases with symptoms</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>4</td>
<td>18</td>
<td>22</td>
<td>50%</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>3</td>
<td>12</td>
<td>15</td>
<td>34.09%</td>
</tr>
<tr>
<td>Chest Pain</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>20%</td>
</tr>
<tr>
<td>Palpitation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

- Fatigue and dyspnea were the commonest cardiac symptoms in hypothyroidism.
- Palpitation was not observed in any of the patient.
- Fatigue is commonest cardiac symptom is hypothyroidism and palpitation in hyperthyroidism patients.
- Significant number of Hyperthyroid patient also complained of fatigue.
- Dyspnea and chest pain had almost equal incidence in both.
Table 3) **Incidence of cardiac signs in Hypothyroidism (n = 44)**

<table>
<thead>
<tr>
<th>Signs</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>% age</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.P. &lt; 40 mm Hg</td>
<td>3</td>
<td>14</td>
<td>17</td>
<td>38.64%</td>
</tr>
<tr>
<td>Soft HS</td>
<td>4</td>
<td>12</td>
<td>16</td>
<td>36.36%</td>
</tr>
<tr>
<td>Diastolic H1N</td>
<td>3</td>
<td>10</td>
<td>13</td>
<td>29.5%</td>
</tr>
<tr>
<td>Sinus Bradycardia</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>27.27%</td>
</tr>
<tr>
<td>Cardiomegaly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>6.82%</td>
</tr>
</tbody>
</table>

**Discussion:**

It is well recognised that cardiovascular manifestations are frequent findings in thyroid disorders. The magnitude of these cardiac related findings lead early observers to wrongly postulate that thyrotoxicosis was a disease originating within the heart. But today there is a clear evidence for direct effects of these thyroid hormones on the myocardium in addition to indirect effects. The earliest description of thyrotoxicosis included reference to the rapid and occasionally irregular heart rate, warm skin, bounding pulses and hyperdynamic precordium. Hypothyroidism has equivalent but essentially opposite effects on the cardiovascular system. In this study fatigue (50%) was the commonest cardiac symptom in hypothyroid patients. Dyspnea (34.09%) was present in many of the hypothyroid patients. Chest pain was present in 9 patients i.e. (20%) Watanakunakom et al have reported fatigue in 70% and lethargy and weakness in another 25%. Dyspnea was found in 32% and chest pain in 8.25% Jangid et al reported the incidence of fatigue to be 62%. My study correlates with the above studies, though the chest pain is found in more number of patients. This may be due to small sample size. Many studies reported that reduction in cardiac output due to decreased myocardial contractility and reduction in oxygen consumption in hypothyroid patients at rest and during exercise causes increased fatiguability. Forfar et al studied the response of left ventricular function to exercise in hypothyroid patients. They conduced that with exercise though the left ventricular ejection fraction in hypothyroid individuals increased, it was still slightly less than the resting left ventricular ejection fraction in euthyroid states. As regards the chest pain, Steinberg noted that coronary artery disease was more prevalent in hypothyroid patients. Kahaly and Dillmann also suggested relation of hypothyroidism with coronary heart disease. This has been attributed to hypercholesterolemia of hypothyroidism, impaired coronary blood flow, atherosclerotic changes in coronary extreme of blood pressure, changes in blood itself such as anemia and autoimmune changes in Hashimoto's thyroiditis. In this study, 9 patient had a history of chest pain. Out of them, all 9 patients showed ST-T changes suggestive of myocardial ischaemia. 4 of them had pericardial effusion on Echocardiography. The remaining 5 patient were normal with respect to Echocardiography. There were 6 other patients who...
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**Conclusion:**

Incidence of congestive cardiac failure in hyperthyroidism and pericardial effusion in hypothyroidism appears to have diminished due to early detection of thyroid disorders.

**References:**

5. Jangid D R. An etiological profile of overt hypothyroidism in Indian population, JAPI. 1991; 99 : 753