Microalbuminuria in Hypothyroidism: A Case Control Study

Aditi Parimoo1, Shalija Kotwal2, Raju Kumar3, Suman Kumar Kotwal4

ABSTRACT

Background: Hypothyroidism is a disorder that affects multiple organ systems and its presentation is diverse. Recent research has shown that hypothyroidism is also independently associated with microalbuminuria.

Objective: We prospectively conducted this study to see the association of hypothyroidism with microalbuminuria.

Materials and Methods: This study was a single-center, prospective case-control study conducted on 100 cases. Age and gender-matched controls were enrolled simultaneously. Various demographic and biochemical parameters were recorded including age, sex, BMI, HB, serum urea, serum creatinine, thyroid functions and blood sugar, in both cases and controls. Spot urine samples were collected from all the subjects of study population to detect UACR.

Results: The mean age of the cases and controls in the study population was 36.85 ± 12.67 years and 39.46 ± 15.30 years respectively. The mean BMI of the cases and controls in the study population was 23.66 ± 3.04 and 22.68 ± 2.06. 76% of cases were women and amongst control population 53% were women. The odd’s ratio for having microalbuminuria in the hypothyroid population was 4.68 as compared to controls with p-value < 0.001.

Conclusion: Hypothyroidism is associated with an increased risk of microalbuminuria.

KEY WORDS

hypothyroidism, endothelial dysfunction, microalbuminuria

INTRODUCTION

Hypothyroidism is a common disorder affecting individuals worldwide. Thyroid hormones are essential for growth, neuronal development, reproduction and regulation of energy metabolism in humans1,2). Hypothyroidism is a disorder that affects multiple organ systems and its presentation is varied and manifest. Several studies have indicated that thyroid hormones are required for renal growth, maintenance of normal physiology and functions thus alteration of thyroid hormones levels will result in renal dysfunction3,4). Hypothyroidism is associated with increased transcapillary leaking of plasma proteins such as albumin, leading to mild proteinuria, microalbuminuria and generalized edema in these patients5,6). Microalbuminuria is itself associated with endothelial dysfunction and increased risk for cardiovascular morbidity and mortality in high risk populations7,8,9). Therefore, we conducted this study to prospectively determine the relationship between hypothyroidism and microalbuminuria.

Table 1: Demographic and biochemical profile of subjects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cases (n = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (women/men)</td>
<td>76/24</td>
</tr>
<tr>
<td>Age (years)</td>
<td>36.85 ± 12.67</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>23.66 ± 3.04</td>
</tr>
<tr>
<td>TSH(μIu/ml)</td>
<td>16.35 ± 26.19</td>
</tr>
<tr>
<td>Microalbuminuria (%)</td>
<td>39</td>
</tr>
<tr>
<td>Overt hypothyroidism (%)</td>
<td>38</td>
</tr>
<tr>
<td>Subclinical hypothyroidism (%)</td>
<td>62</td>
</tr>
</tbody>
</table>

Values are presented as mean ± SD, numbers (%)
TSH, thyroid stimulating hormone; BMI, bodymass index;

Table 2: Comparison between cases and control subjects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Cases (n = 100)</th>
<th>Controls (n = 100)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>36.85 ± 12.67</td>
<td>39.46 ± 15.30</td>
<td>0.55</td>
</tr>
<tr>
<td>Gender (women/men)</td>
<td>76/24</td>
<td>53/47</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>23.66 ± 3.04</td>
<td>22.68 ± 2.06</td>
<td>0.11</td>
</tr>
<tr>
<td>Microalbuminuria (%)</td>
<td>39</td>
<td>12</td>
<td>0.001</td>
</tr>
<tr>
<td>UACR (mg/gm)</td>
<td>104.20 ± 121.93</td>
<td>33.40 ± 53.37</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Values are presented as mean ± SD, numbers (%)
UACR, urinary albumin creatinine ratio; BMI, bodymass index;
*p-value significant if < 0.05

Received on October 12, 2020 and accepted on January 22, 2021
1) Department of Medicine, Govt. Medical College Jammu, India
2) Department of Pathology and Transfusion Medicine, ASCOMS Jammu, India
3) Department of Nephrology, Govt. Medical College Jammu India
4) Department of Endocrinology, Govt. Medical College Jammu, India
Correspondence to: Suman Kumar Kotwal (e-mail sumankk1230@rediffmail.com)
MATERIALS AND METHODS

Selection of study population: Patients with overt and subclinical hypothyroidism were enrolled. Those with diabetes mellitus, hypertension, renal dysfunction, pregnancy, malignancy, recent urinary tract infection, those having heavy exercise on the day before testing for microalbuminuria, not willing to participate in study and those on thyroxine replacement therapy were excluded from study. After receiving ethical clearance from institutional ethical committee, a total of 100 patients with a diagnosis of treatment-naive primary subclinical or overt hypothyroidism presenting to the endocrinology OPD were prospectively enrolled in this study. Age and gender-matched healthy controls were enrolled for comparison of prevalence of microalbuminuria. Informed consent was obtained from all the subjects prior to enrolment in the study. All the participants were subjected to detailed history and physical examination and demographic and biochemical parameters were recorded including age, sex, BMI, HB, serum Urea, serum creatinine and blood sugar and thyroid functions tests in both cases and controls.

Laboratory evaluation: serum TSH (thyroid stimulating hormone) levels and serum T3 and T4 values were obtained using chemiluminescence assay performed in the hospital laboratory. A patient with a serum TSH level between 5 to 10 microIU/ml and normal T3/T4 levels was labeled as having primary subclinical hypothyroidism13,14. A patient with a serum TSH more than 10 microIU/mL and reduced T3/T4 levels was labeled as having overt hypothyroidism15,16. Microalbuminuria was defined as urinary albumin excretion in the range of 30-299 mg/g of creatinine17. UACR (urine albumin creatinine ratio) were measured in spot urine using a urinary dipstick provided in micro albumin kit test using tetrabromophenol blue reagent method.

RESULTS

The mean age of the cases and controls in the study population was 36.85 ± 12.67 years and 39.46 ± 15.30 years respectively. The mean BMI of the cases and controls in the study population was 23.66 ± 3.04 and 26.19 and Mean ± SD UACR in cases and controls was 104.20 ± 75.90 and 121.93, 33.40 ± 53.37 respectively. (Table 1 and 2).

In our study, out of 100 cases population 62% had subclinical hypothyroidism and 38% were overtly hypothyroid. 39% of cases population were subclinical hypothyroidism and 38% were overtly hypothyroid. 39% of cases population 62% had subclinical and 38% were overtly hypothyroid. 39% of cases population and 12% of controls had microalbuminuria. Microalbuminuria was seen in 20 patients with overt hypothyroidism and 19 patients with subclinical hypothyroidism. The odd’s ratio for having microalbuminuria in the hypothyroid population was 4.68 as compared to controls with p-value < 0.05. Mean ± SD TSH in case population was 16.35 ± 26.19 and Mean ± SD UACR in cases and controls was 104.20 ± 121.93, 33.40 ± 53.37 respectively. (Table 1 and 2).

In this study 12% of control and 39% of hypothyroid population had microalbuminuria. The odd’s ratio for having microalbuminuria in hypothyroid patients was 4.68 which was statistically significant. Sridharan et al. and Chang et al. has also shown higher odd’s ratio of having proteinuria in hypothyroid patients17,18. Aljabri KS et al. has described that hypothyroidism was independently associated with higher likelihood of microalbuminuria in type 2 diabetes mellitus patients19.

CONCLUSION

This study demonstrated that hypothyroidism was significantly associated with an increased risk of microalbuminuria and thus could be associated with an increased risk of adverse cardiovascular outcomes.

ACKNOWLEDGEMENT

Thankful to patients and controls who consented for study.

REFERENCES