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# Hypertension in Hyperthyroidism: A Clinical Study

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**Abstract:** ***Aim: Aim is to study the association of hyperthyroidism with blood pressure. Subjects and Method: The present study was conducted in department of medicine, LN Medical college Bhopal.64 patients who were diagnosed to be hyperthyroid were taken and their blood pressure is correlate with their thyroid profile. Results and Conclusion: In the present study there is a significant increase in blood pressure (BP) in patient with hyperthyroidism with isolated systolic hypertension is the most common in our study.***

**Keywords:** Hyperthyroidism, TSH, Hypertension and Cardiovascular Risk

## 1. Introduction

Hypertension affects 26.4% of the global adult population remaining the leading preventable risk factor for premature death and disability worldwide [1,2]. Besides the majority of patients with primary (essential) hypertension, a subgroup of ~10% of patients is affected by secondary hypertension. Among the underlying diseases several are of endocrine origin and thyroidal impairments represent an even smaller percentage of the secondary hypertension cases; their incidence and form of presentation varies with age and studied population [3]. Hypertension may be the initial clinical presentation for at least 15 endocrine disorders [4], including overt and subclinical hyperthyroidism and hypothyroidism. The correction of thyroid dysfunction may normalize blood pressure (BP) in most cases, therefore checking thyroid function is essential during the workup for hypertension. Isolated systolic hypertension (≥140/<90 mm Hg) is the most common form of hypertension.[5] The treatment of systolic blood pressure (SBP) has received increasing attention over the past 10 years because of its impact on coronary heart disease, stroke, heart failure, end-stage renal disease, and total mortality.[6] Two trials, the Systolic Hypertension in the Elderly Program (SHEP)[7] and the Systolic Hypertension in Europe (Syst-Eur) trial,[8] have documented cardiovascular benefits for lowering blood pressure (BP) in patients with isolated systolic hypertension. The increase in SBP occurs with aging and is associated with loss of the elastic properties of the aorta.[5,9,10] This amplifies SBP and reduces diastolicBP.[11]Isolated systolic hypertension is the most common form of hypertension, especially among increases systolic blood pressure by decreasing systemic vascular resistance, increasing heart rate, and raising cardiac output. Potential cardiovascular consequences of hyperthyroidism include atrial arrhythmias (especially atrial fibrillation), pulmonary hypertension, left ventricular hypertrophy, and heart failure. The prevalence of hypertension is greater among hyperthyroid patients than euthyroid patients. Subclinical hyperthyroidism is defined as a subnormal serum TSH value accompanied by T4 and T3 within the normal reference range. The change in thyroid function needs to be evaluated and confirmed by a second laboratory measurement after 3–6 months.[12]The prevalence of subclinical hyperthyroidism can be detected more frequently in iodine depleted areas and increases with advancing age.[12]According to the Third National Health and Nutrition Examination Survey (NHANES III) 0.7% of 16,533 people were reported to have subclinical hyperthyroidism (TSH <0.1 mU/L); these subjects were not taking thyroid medication.[13] Subclinical hyperthyroidism can be classified into two categories: Grade 1, with a mild decrease of serum TSH (0.1–0.4 mIU/L), and Grade 2, with a more marked TSH decrease (TSH below 0.1 mIU/L).[14]The long exposure of the heart to subclinical hyperthyroidism leads to an altered cardiac morphology and function. As a consequence, left ventricular function changes: systolic function is enhanced, while diastolic function becomes impaired, a slowed myocardial relaxation is present resulting in an increase of left ventricular mass;[15] as well as increased heart rate and arrhythmias, such as atrial fibrillation.[16]

## 2. Material and Methods

The present study was conducted in medicine department, LN Medical College, Kolarroad, Bhopal. In the present study, 64 patients diagnosed to be hyperthyroid with duration of symptoms range from 6 months to 3 years without having any comorbid conditions and not on any drugs (thyroid medications, antihypertensives, blood thinning pills etc) were taken. All the patients were examined thoroughly and blood pressure (BP) of all the hyperthyroid patients were taken with the sphygmomanometer and thyroid profile of all the patients were done in laboratory.

## 3. Results

In the present study, among 64 hyperthyroid patient 55(85%) patients were found to be hypertensive and 9(15%) of 64 were found to have BP in normal range.*Among 55 hypertensive patients 43.6% were found to have isolated systolic hypertension and is most common in our study in patient with hyperthyroidism.23.6% of 55 were found to have moderate grade hypertension ,20% of 55 were found to have mild grade hypertension and 12.7 % were prehypertensive.*Grading of hypertension: Braunwald heart diseases:A textbook of cardiovascular medicine 11th edition,pg.918.

## 4. Discussion

In the present study there is a significant association of hypertension with hyperthyroidism patient. Isolated systolic hypertension in hyperthyroidism is most common in our study.

Studies which shows significant association of hypertension in patients with hyperthyroidism were Brandt F etal.study[17], Igelesia P etal.study[18] and Lillevang-Johansen et al.[19]study.

Brandt F et al. study of Hypertension and Increased Cardiovascular Risk in Overt Hyperthyroidism Hyperthyroidism is accompanied by cardiovascular complications (cardiac arrhythmias, hypercoagulopathy, stroke, and pulmonary embolism) in a significant number of cases, leading to an increase in short-term morbidity and long-term morbidity and mortality. Brandt et al. found a significant 20% increase in mortality in patients with hyperthyroidism in their meta-analysis based on seven studies.

In Igelesia P etal.study,[18] patients with hyperthyroidism and normal blood pressure during ambulatory blood pressure monitoring (ABPM) had higher systolic blood pressure than euthyroid normotensive participants. The successful treatment of hyperthyroidism resulted in normalization of systolic blood pressure. The nocturnal decrease in blood pressure did not differ from that of normal subjects.

In a study of Lillevang-Johansen et al.[19] investigated the association between hyperthyroidism and the occurrence of cardiovascular (CV) events among treated and untreated hyperthyroid patients.

In study of Gencer B etal,subclinical hyperthyroidism was associated with an increased risk of total mortality, heart failure, atrial fibrillation and coronary artery disease mortality in patients with Grade 2 subclinical hyperthyroidism.[20]

Besides the changes in the cardiovascular risk due to subclinical hyperthyroidism, prospective cohort studies by Völzke Hetal.[21]and Cai Y etal.[22] study failed to show significant association between subclinical hyperthyroidism and hypertension.

## 5. Conclusion

The present study found that as there is a significant increase in blood pressure in patients with hyperthyroidism there is a increase risk of coronary heart disease ,stroke ,heart failure and kidney disease and total mortality in these patients.

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