

## Analysis of Cardiovascular Changes in Hypothyroidism Patient's: An Institutional Based Study

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### ABSTRACT

**Background:** Hypothyroidism is a commonly occurring clinical condition with variable prevalence. It has profound effects on cardiovascular function that can impact cardiac contractility, vascular resistance, blood pressure, and heart rhythm. The present study was conducted to analyse the cardiovascular changes in hypothyroidism patients.

**Materials and Methods:** The present study was conducted in 230 hypothyroidism patients of age group between 30 and 60 years of age over the period of 6 months. The following investigations were done to diagnose hypothyroidism and with associated cardiac profile: complete blood count, FBS, 2hrPGBS, serum FT3, FT4, TSH, ECG, 2D Echocardiogram. Statistical analysis of the data was done using SPSS version 21.

**Results:** In the present study total sample size was 230 in which maximum were females (63.03%). Maximum patients suffering from hypothyroidism belongs to age group of 30-40 years. Cardiovascular symptoms like chest pain, effort intolerance was prevalent in males whereas breathlessness and chest pain was prevalent in females. Both systolic and diastolic hypertension was prevalent in females. ECG shows low voltage complexes in 38 females and 24 males. Echo

finding of diastolic function was present in maximum patients i.e 36 patients.

**Conclusion:** Present study concluded that cardiovascular symptoms like chest pain, effort intolerance was prevalent in males whereas breathlessness and chest pain was prevalent in females. Both systolic and diastolic hypertension was prevalent in females. ECG shows low voltage complexes in more number of females than males. Echo finding of diastolic function was present in maximum patients.

**Keywords:** Cardiovascular, Hypothyroidism, Echo.

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### INTRODUCTION

Hypothyroidism affects between 4% and 10% of the population, and the prevalence of subclinical hypothyroidism is reported to be as high as 10% in various studies.<sup>1-3</sup> Despite major advances in their prevention and treatment, cardiovascular (CV) diseases remain the single largest cause of death globally.<sup>4</sup> Recurrent ischemia resulting in adverse CV events following optimal treatment for an acute coronary syndrome occurs in approximately 10% of subjects in randomized controlled trials<sup>5</sup>, and this number nearly doubles in real-world registries.<sup>6</sup> It has long been recognized that some of the most characteristic and common signs and symptoms of thyroid disease are those that result from the effects of thyroid hormone on the heart and cardiovascular system.<sup>7-9</sup> Both hyperthyroidism and hypothyroidism produce changes in cardiac contractility, myocardial oxygen consumption, cardiac output, blood pressure, and systemic vascular resistance (SVR).<sup>10,11</sup> Although it is well known that hyperthyroidism can produce atrial fibrillation, it is less well recognized that

hypothyroidism can predispose to ventricular dysrhythmias.<sup>12</sup> The present study was conducted to analyse the cardiovascular changes in hypothyroidism patients.

### MATERIALS AND METHODS

The present study was conducted in Department of Medicine, Dr. S. N. Medical College, Jodhpur, Rajasthan (India) on 230 hypothyroidism patients of age group between 30 and 60 years of age over the period of 6 months. Before commencement of study ethical approval was taken from the ethical committee of institution and informed consent was signed by the patients. Patients with TSH >10micro IU/ml and low fT4 were considered overt hypothyroids, and TSH ranging (4.2-10) microIU /ml and normal fT4 were considered subclinical hypothyroids. The following investigations were done to diagnose hypothyroidism and with associated cardiac profile: complete blood count, FBS, 2hrPGBS, serum FT3, FT4, TSH, ECG, 2D Echocardiogram. Patients were

excluded from the study who had taken treatment for hypothyroidism, history of previous thyroid conditions, and pregnancy. Statistical analysis of the data was done using SPSS version 21.

## RESULTS

In the present study total sample size was 230 in which maximum were females (63.03%). Maximum patients suffering from hypothyroidism belongs to age group of 30-40 years. Cardiovascular symptoms like chest pain, effort intolerance was prevalent in males whereas breathlessness and chest pain was prevalent in females. Both systolic and diastolic hypertension was prevalent in females. ECG shows low voltage complexes in 38 females and 24 males. Echo finding of diastolic function was present in maximum patients i.e. 36 patients.

**Table 1: Distribution according to gender**

Gender	n(%)
Male	85(36.95%)
Female	145(63.03%)
Total	230(100%)

**Table 2: Distribution according to age group**

Age group	n(%)
30-40	85(36.95%)
41-50	74(32.17%)
51-60	71(30.86%)

**Table 3: Cardiovascular symptoms in study group**

Symptoms	Male	Female
Chest pain	18	0
Breathlessness	0	14
Effort intolerance	16	15
Palpitations	0	15

**Table 4: Prevalence of hypertension**

Type of hypertension	Male	Female
Systolic hypertension	37	60
Diastolic hypertension	39	60

**Table 5: Low voltage complex in ECG**

Gender	Present (%)
Male	24(10.43%)
Female	38(16.52%)

**Table 6: Echo findings**

Echo findings	N
Pericardial effusion	35
Systolic dysfunction	12
Diastolic function	36
IVS thickness	12

## DISCUSSION

Cardiovascular diseases account for the largest single share of morbidity among developed nations, and many developing nations including India. By combating modifiable risk factors through primary prevention, the burden of cardiovascular disease can be reduced. South Asians are known to be at increased risk for atherosclerosis even with comparable risk factor profile to Western counterparts.<sup>13</sup>

The current American Academy of Clinical Endocrinology consensus statements propose that only a TSH greater than 10 uIU/ml is an indication for treatment in view of possible elevated cardiovascular risk and higher risk of progression to overt hypothyroidism.<sup>14</sup>

In the present study total sample size was 230 in which maximum were females (63.03%). Maximum patients suffering from hypothyroidism belongs to age group of 30-40 years. Cardiovascular symptoms like chest pain, effort intolerance was prevalent in males whereas breathlessness and chest pain was prevalent in females. Both systolic and diastolic hypertension was prevalent in females. ECG shows low voltage complexes in 38 females and 24 males. Echo finding of diastolic function was present in maximum patients i.e 36 patients.

The study by Varma R et al, showed the prevalence of effusion to be 22.75%.<sup>15</sup> In a study by Varma R et al, it was seen that 27% of patients had diastolic dysfunction. Systolic dysfunction seen in 6.67% of patients.<sup>15</sup>

Behera BK concluded that Hypothyroidism was newly diagnosed more in females and maximum in age group of 17-47 years (69.9%). Cardiovascular symptoms were present in 12 (20%) patients. Bradycardia was observed in 7% patients. Stage 1 hypertension was noticed in 13.3% (diastolic high blood pressure). Low voltage complexes in electrocardiogram was present in 40% study group. Pericardial effusion was present in 26.7% patients. Tread mill test was positive for inducible ischaemia in 2 patients. Diastolic dysfunction was noticed in 26.6% study group.<sup>16</sup>

## CONCLUSION

Present study concluded that cardiovascular symptoms like chest pain, effort intolerance was prevalent in males whereas breathlessness and chest pain was prevalent in females. Both systolic and diastolic hypertension was prevalent in females. ECG shows low voltage complexes in more number females than males. Echo finding of diastolic function was present in maximum patients.

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