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Serum Urea, Uric Acid And Creatinine Levels In Thyroid Dysfunctions Patients In Gurgaon, India

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ABSTRACT: Thyroid disorder is a progressive metabolic disorder which affects entire body functions and presents with various clinical conditions. Thyroid dysfunctions potentially affect metabolism which may influence renal development, kidney structure, renal plasma flow, glomerular filtration rate, and nephron transport system. This may lead to change various biochemical constituents in patients. In the present study, relationship of serum urea, uric acid and creatinine was done with the serum T3, T4 and TSH in the patients who visited clinical laboratory in Gurgaon. We found significant increase in levels of urea, uric acid and creatinine in most of female hyperthyroidism cases. The present study further suggests and encourages the future researcher to find out the evidence for this reason.

KEYWORDS: Hypothyroidism; Hyperthyroidism; Urea; Uric Acid; Creatinine; T3; T4; TSH

I. INTRODUCTION

Thyroid disease consequences have been found increasing day by day affecting all age groups in both male and females. Thyroid hormones play a vital role in metabolic and physiologic homeostasis and regulate cardiac output, heart rate, ventilation rate, basal metabolic rate, effects of catecholamines, brain and endometrium development, catabolism of proteins and carbohydrates [1-2]. Hyperthyroidism and hypothyroidism conditions are mainly concerned with amount of T3 and T4 secretion in blood affecting the metabolism and biological functions. Abnormal thyroid activity has been found associated with disturbance in metabolism that affects renal plasma flow, glomerular filtration rate (GFR), concentration and dilution of urine, oxygen consumption, and re-absorption of phosphate, Ca^{2+} and Na^{+} [2-3]. Similarly, renal dysfunction in patients with systolic heart failure has been observed in hypothyroidism conditions [4,5]. Increased level of serum creatinine, urea and uric acid have been noticed in hypothyroidism conditions which is controversial with our present study [1, 6].

II. RELATED WORK

The thyroid gland dysfunction may lead to chronic kidney diseases. There would be lesser carrier proteins in blood which affect binding and storage of iodine and other minerals in the body. [7] This leads to abnormality of renal tubule dysfunction and sodium re-absorption which has been detected in hypothyroidism [8]. Cystatin C which is a novel marker of renal dysfunctions has been shown reduction in hypothyroid and elevation in hyperthyroid state. [9] Both hypocalcemia and hypermagnesemia affect renal functions have been seen in hyperthyroidism [10]. Normal TSH alters with circadian rhythm with declined clearance and augmented half-life of TSH. Monodeiodinase and hemodialysis also have been associated with thyroid hormones in blood [11]. T3 biosynthesis increases due to iodothyronine deiodinase that leads to toxic and nontoxic goiter in thyrotoxic patients [12]. TSH responds through thyrotropin-releasing hormone (TRH) that enhances extra-thyroidal conversion of T4 to T3 [13]. Hyperthyroidism testified *in vivo* have shown induced renal hypertrophy [14]. Hyper and hypothyroidism activities augment plasma renin activity (PRA) which inhibits angiotensin-converting enzyme and further affects cardiac hypertrophy [15]. There was no

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study about the relationship of serum urea, uric acid and creatinine in thyroid dysfunction patients in Gurgaon regions among different age and groups till date. Therefore, this study was planned and targeted the people visiting a clinical lab in Gurgaon to know the status of these levels.

III. MATERIAL AND METHODS

This prospective study was carried out on 117 patients. This study was carried out on incidence of hyperthyroidism and hypothyroidism in both gender, which performed in Gurgaon Path Laboratory from February 2017 to April 2017. The inclusion criteria was only adult patients aged between 20 years to 90 years and suffering with only thyroid dysfunction. The exclusion criteria: Patient who were not adult and suffering with other than thyroid dysfunction. The blood sample reports of the patients were analyzed and interpreted. Throughout the investigations, all standard operating procedures were followed with quality controls.

Patients consent was obtained before collection of the specimen, all other details were also collected. The provided specimen was analyzed using Backman AU 680 for the test like urea, creatinine and uric acid whereas for thyroid function test was performed by using Sysmex HISCL-5000. The provided data was studied using Microsoft Office excel 2013.

IV. RESULT

In the selected 117 patients, 61 were male patients and 56 females (Table 1). Further segregated into two age groups (20-55 yrs) and (56-90 yrs). The study shown highest number of male and female patients noticed were in the age group between 20 to 55 years (Table no 1).

The study shown that male patient (20-55 yrs group), having combined increase in uric acid and TSH level was observed in 10% and 23% cases respectively, whereas in female no such relationship was noticed. Both male and female in these groups shown hypothyroidism pattern (Line Chart 1).

In females of age 56-90 yrs, considerable increase in creatinine, uric acid, T4 and TSH were seen whereas in male patient no such pattern were noticed. Some females in these group had shown hyperthyroidism pattern (Line Chart 2).

Age Group (Yrs)	Male	Female
21-55	31 (51%)	29 (52%)
56-90	30 (49%)	27 (48%)

V. DISCUSSION

The main purpose of this study was to analyze the occurrence of hyperthyroidism and hypothyroidism and find relationship with the evidence of abnormal level of serum urea, creatinine and uric acid.

In a previous study it is noted that both TSH and serum uric acid are correlate with hyperuricaemia in hypothyroidism condition [16]. Increased serum uric acid results hyperthyroidism in Grave's disease patients [17]. Both hyper and hypothyroidism considered as reduction factors of renal function [18]. Serum creatinine may elevates when there is increase basal metabolic rate in hyperthyroidism [19]. Blood urea also rise in similar patho-physiological conditions may also influence renal functions [20-21].

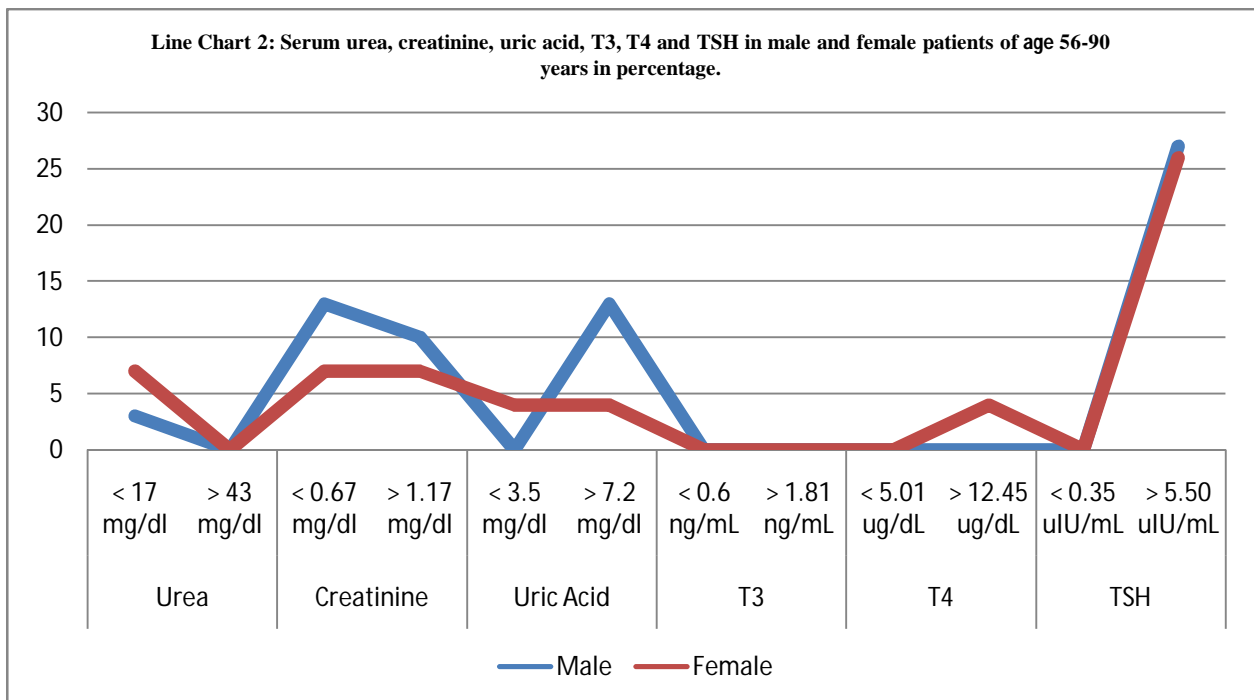
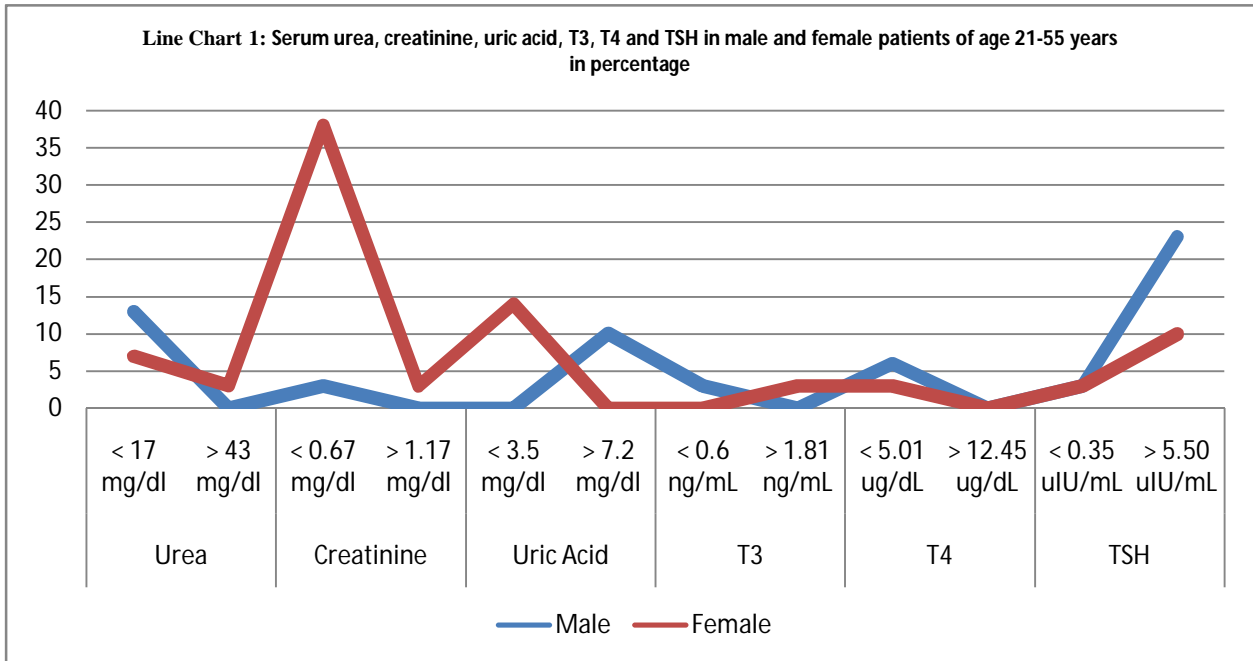
However, our study revealed that serum creatinine, blood urea and uric acid levels were significantly raised in patients of hypothyroidism. And these levels were raised mildly in about 12% of hyperthyroid patients as well. Previous studies conducted by different scholars corresponds with our study except that serum creatinine, blood urea and uric acid are raised in the patients of hypothyroid and hyper thyroid cases studied.

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VI. CONCLUSION

This study indicates the influence of thyroid hormone on physiology of human body is significant. A thyroid dysfunction patient may get affected with various health problems as it is related directly and indirectly with many metabolic activities. Therefore the evaluation of serum urea, uric acid and creatinine ranges are more important in thyroid abnormal patients periodically. Limitations of our study is that we could not identify the mechanism involved in pathophysiology. Further study is required to determine pathophysiology or mechanism of various biochemical constituents related to thyroid dysfunction in patients.

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