



A STUDY OF THYROID FUNCTIONS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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ABSTRACT

Chronic kidney disease is the final common pathway of irreversible loss of nephrons finally resulting in alteration of "milieu interior" affecting every system in the body including thyroid hormonal system. The aim of this study was to evaluate thyroid functions in patients with chronic kidney disease. Material and method: This cross sectional study was conducted on 100 patients, who was diagnose to have chronic kidney disease and on conservative management, being admitted in Department of Medicine, JLN medical college & hospital, Ajmer, during the period of Oct. 2018 to April 2020. Detailed history and investigations were done. Quantitative determination of T3, T4 and TSH was done by Enzyme Linked Immunosorbent Assay. Result: Age ranges from 18-68years. Male patients were predominating accounting 68% and female patients were accounting 32%. Duration of chronic kidney disease symptoms ranges from 4 months to 30months. Creatinine clearance ranges from 6ml/min – 32ml/min. Blood urea values varied from 45-184mg/dl, the mean being 102.12. Serum creatinine levels varied from 2–14mg/dl, the mean being 7.34. Serum calcium level found to be low in 20 patients, normal in 56 patients and high in 24 patients. Serum phosphorous level found to be below in 24 patients and remaining 76 patients are in normal range. The study range of serum T3 was 0.2–2.0ng/ml, the mean being 0.67 (normal range 0.6–2.1ng/ml), serum T4 was 0.9–8.5µg/dl, the mean being 5.65 (normal range 5-13µg/dl) and serum TSH was 0.6–38µU/ml, the mean being 6.49 (normal range 0.4-5.6µU/ml) In this study 58% patients had low T3 syndrome, 24% patients had low T4 syndrome and 8% patients had hypothyroidism. Conclusion: Thyroid function tests investigations will provide new insights in our understanding of the biological significance of thyroid hormone changes in patients with kidney diseases.

KEY WORDS : Chronic Kidney Disease, Thyroid function test, serum, low t3 syndrome

INTRODUCTION

The functions of thyroid and kidney are interrelated 1-3. The thyroid hormones are essential for growth and development of the kidney and for maintaining electrolyte and water homeostasis. On the other hand, kidney has its vital role in metabolism and elimination of thyroid hormones.

In CKD patients reduction of renal function leads to change in the synthesis, secretion, metabolism and elimination of thyroid hormone. And also treatment strategies of one organ affect the other organ. The aim of this study was to evaluate thyroid functions in patients with chronic kidney disease.

MATERIAL AND METHOD

This cross sectional study was conducted on 100 patients, who was diagnose to have chronic kidney disease and on conservative management, age group range from 18-68 years, being admitted in Department of Medicine, JLN medical college & hospital, Ajmer, during the period of Oct. 2018 to April 2020. Detailed history, clinical examination and investigations for chronic kidney disease were done. Quantitative determination of T3, T4 and TSH was done by Enzyme Linked Immunosorbent Assay.

Exclusion criteria

1. Patients on peritoneal dialysis or hemodialysis
2. Nephrotic range of proteinuria
3. Hypoalbuminemia
4. Patient who was previously diagnosed case of thyroid illness and on medication.
5. Other conditions like acute illness, diabetes, trauma, recent surgery, burns, liver diseases, drugs altering thyroid profile like amiodarone, beta blockers, estrogen pills, iodine containing drugs.

RESULT

Age ranges from 18-68years. 70% were between 30-60 years age

group. Male patients were predominating accounting 68% and female patients were accounting 32%. Duration of chronic kidney disease symptoms ranges from 4 months to 30months. Creatinine clearance ranges from 6ml/min – 32ml/min. Blood urea values varied from 45-184mg/dl, the mean being 102.12. Serum creatinine levels varied from 2–14mg/dl, the mean being 7.34. Serum calcium level found to be low in 20 patients, normal in 56 patients and high in 24 patients. Serum phosphorous level found to be below in 24 patients and remaining 76 patients are in normal range. The study range of serum T3 was 0.2–2.0ng/ml, the mean being 0.67 (normal range 0.6–2.1ng/ml), serum T4 was 0.9–8.5µg/dl, the mean being 5.65 (normal range 5-13µg/dl) and serum TSH was 0.6–38µU/ml, the mean being 6.49 (normal range 0.4-5.6µU/ml)

Table 1: Shows distribution of T3 among various level of TSH

TSH level	LOW T3	NORMAL T3	High T3
Normal	58	34	0
High	8	0	0
Low	0	0	0
Total	66	34	0

Table 2: shows distribution of T4 among various level of TSH.

TSH level	LOW T4	NORMAL T4	HIGH T4
Normal	24	68	0
High	8	0	0
Low	0	0	0
Total	32	68	0

In this study 58% patients had low T3 syndrome, 24% patients had low T4 syndrome and 8% patients had hypothyroidism.

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DISCUSSION

Chronic kidney disease is associated with thyroid function abnormalities leading to low levels of serum total and free T3 concentration and normal reverse T3 and free T4 levels. The TSH levels are almost normal in most patients and found to be in euthyroid state. CKD patients may have various symptoms and signs suggestive of hypothyroidism like cold intolerance, dry coarse skin, sallow complexion, lethargy, fatigue, edema, reduced basal metabolic rate, alopecia, hyperreflexia and asthenia. So it is difficult to exclude thyroid function abnormality in patients with chronic kidney disease merely on clinical background.

In this study 58% patients had low T3 syndrome, 24% patients had low T4 syndrome and 8% patients had hypothyroidism.

In our study of CKD patients with low T3 syndrome, the mean TSH value in several stages of renal failure are found to be in normal range. TSH values did not show any linear correlation with glomerular filtration rate in our study.

One similar study showed similar results which was conducted by Spector et al⁴ and Ramirez et al⁵ Dudani et al⁶, Karunanidhi et al⁷. These studies depicted abnormality in hypothalamic mechanism of TSH release in uraemic patients as the TSH response to the TRH was blunted.

Another study which was conducted by Joseph et al⁸ and Hardy et al⁹ revealed low T3 T4 level with high TSH level suggesting maintenance of pituitary thyroid axis.

CONCLUSIONS

Kidney and thyroid function and dysfunction are interrelated through several mechanisms. Thyroid function tests investigations will provide new insights in our understanding of the biological significance of thyroid hormone changes in patients with kidney diseases.

REFERENCES:

1. Andrews Levey, Josef Coresh, Ethan Balk, Annamaria T. Kausz, Ronald D. Perrone. National Kidney Foundation Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification. *MD Ann Intern Med.* 2003; 139:137-147.
2. Joanne M. Bargman, Karl S. Korecki. Chronic kidney disease. In: Dan L. Lango, Anthony S. Fauci, Dennis Kasper et al. *Harrison's Principles of Internal Medicine, Vol. 2, 18th edn.*, 2011; McGraw Hill, USA, pp. 2289-2293; 2308-2313.
3. Feinstein EI, Kaptein EM, Nicoloff JT & Massry SG. Thyroid function in patients with nephrotic syndrome and normal renal function. *American Journal of Nephrology* 1982; 27:676.
4. Spector DA et al. Thyroid function and metabolic state in chronic renal failure. *Ann Intern Med.* 1976; 85: 724-30.
5. Ramirez G et al. Thyroid abnormalities in renal failure. A study of 53 patients on chronic dialysis. *Ann Internal Medicine*, 1973; 79: 500-4.
6. Dudani RA et al. Thyroid dysfunction in Ureaemia. *J Assoc Physicians India.* 1981; 29: 1037-40.
7. Karunanidhi A et al. Thyroid function in patients with chronic renal failure. *Indian J Med Research*, 1979; 69: 792-7.
8. Joseph LJ et al. Measurement of serum thyrotropin levels using sensitive immunoradiometric assays in patients with chronic renal failure alterations suggesting an intact pituitary thyroid axis. *Thyroidology*, 1993; 5: 35-9.
9. Hardy MJ et al. Pituitary Thyroid function in chronic renal failure assessed by a highly sensitive thyrotropin assay. *J Clin Endocrinol Metab.* 1988; 66: 233-6.