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Original Research Paper

Clinical Research

RFT AND CKD PATIENTS ASSOCIATION WITH HYPOTHYROIDISM.

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ABSTRACT In general population, hypothyroidism has been associated with various adverse cardiovascular outcomes. CKD patients have a 7 to 10-fold higher cardio vascular diseases risk compared to controls .50controls and 50 CKD patients were analyzed for HT and CKD .Half of the patients showed higher RFT with normal TSH while the other half had high TSH with normal RFT.

KEYWORDS : RFT,CKD,

INTRODUCTION

Thyroid functional disorders are commonly observed in chronic kidney disease (CKD) patients.[1] Primary hypothyroidism, which is typically identified by biochemical tests including elevated serum thyrotropin (TSH) level in conjunction with a low or normal thyroxine (T4) (defined as overt and subclinical hypothyroidism, respectively),[2] is disproportionately more prevalent in patients with advanced kidney dysfunction compared to those with normal function.[3] In addition, various thyroid functional test abnormalities are frequently seen in CKD patients, resulting from alterations in thyroid hormone synthesis, metabolism, and regulation.[1, 4] While early studies hypothesized that thyroid function deficiency may be adaptation in kidney disease patients,[5] contemporary data have demonstrated that hypothyroidism is associated with higher risk of cardiovascular disease and death in this population.[1, 6–9] While a greater emphasis has been placed upon other endocrine disorders (e.g., secondary hyperparathyroidism(HT), DM), large observational studies show that HT is highly prevalent in CKD patients. Among 14,623 participants in the Third National Health and Nutritional Examination Survey, there was an incrementally higher prevalence of HT with increasing severity of kidney dysfunction and 23% with estimated glomerular filtration rates. A high prevalence of hypothyroidism has also been observed in dialysis patients. Recent studies also showed CKD who underwent serum TSH testing had hypothyroidism (defined as TSH >5.0 mIU/L or receipt of exogenous thyroid hormone replacement).[10] It was also found that there was an increasingly higher prevalence of subclinical hypothyroidism with lower levels of kidney function. [11] In US and Asian hemodialysis and peritoneal dialysis cohorts, the prevalence of hypothyroidism has ranged from 13 to 25%. [12-14] Despite these data, hypothyroidism remains under-recognized in many advanced CKD patients, likely due to symptom overlap with uremia.

Some of the epidemiological studies have corroborated an association between hypothyroidism and kidney function. In a cross-sectional analysis of 461,607 US veterans who underwent repeated measures of serum TSH and creatinine tests are identical.

Limited studies have shown that with mild subclinical HT and CKD, thyroid hormone replacement may ameliorate kidney disease progression.[15-16]

MATERIALS AND METHODS.

50 controls and 50 CKD patients were analysed for RFT and TSH .25 patients with normal GRF and high TSH and another 25with normal RFT and high TSH.

RFT measured in automated Siemens analyzer using flexes.TSH was measured in i1000SR Architect of Abbott US.

RESULT

Two types of CKD patients were observed. Normal TSH with high urea, uric acid and creatinine as compared to controls. Another 25 with high RFT with normal TSH .Thus subclinical HT with high RFT and normal RFT with hypothyroidism .Then it is not correct to state that CKD leads to HT.

DISCUSSION

In general population HT has been associated with various adverse cardiovascular outcomes[17]. Given that in end stage renal diseases patients have a 7 to 10 fold higher mortality risk .(40% of the deaths due to cardiovascular disease) compared to the general population. There has been increasing interest in HT as an under-recognized cardiovascular risk factor in advanced CKD.[1] To date, most studies of thyroid function and cardiovascular endpoints in this population have focused upon low T3 as the thyroid functional test metric, which has been associated with endothelial dysfunction, atherosclerosis, vascular calcification, impaired systolic function, increased left ventricular mass, and abnormal ventricular conduction.[18] There have been comparatively fewer studies of thyroid function ascertained by TSH and cardiovascular outcomes in CKD. In a cross-sectional study of 51 ambulatory peritoneal dialysis patients, subclinical hypothyroidism was associated with impaired left ventricular function.[7] In a recent study of 97 end-stage renal disease patients selected to undergo living donor kidney transplantation, low TSH, free T3, and free T4 levels (interpreted as markers of non-thyroidal illness) were inversely associated with higher coronary artery calcification scores.[19] Under normal circumstances, thyroid hormone synthesis is under the regulation of the hypothalamic-pituitary-thyroid axis. Thyrotropin-releasing hormone (TRH) produced by the hypothalamus incites the release of TSH from the anterior pituitary, which in turn stimulates the synthesis and secretion of T4, and to a lesser degree T3, by the thyroid gland .T3 is produced by the peripheral conversion of T4-to-T3 by type 1 and 2 5′-deiodinase enzymes. In a multi-loop feedback system, T4 and T3 exert negative feedback inhibition of TRH and TSH.

CKD patients may experience alterations in regulation of the hypothalamic-pituitary-thyroid axis. In addition, as the kidney is involved in the metabolism, degradation, and excretion of certain thyroid hormones and their metabolites, various thyroid functional test alterations may occur in CKD.[1,4]

The benefit of thyroid hormonal supplement therapy is controversial .Some studied found it to be beneficial while other do not .Further studies are needed to determine the underlying mechanistic pathway by which HT is linked with mortality. Lastly, rigorous studies of exogenous thyroid treatment, including dosing and biochemical targets, and kidney disease progression, cardiovascular disease, and

mortality are needed to better understand the causal implications of hypothyroidism in CKD patients.

In the present study contradictory results are observed .In half of the patients the levels of urea creatinine and uric acid levels were higher as compared to control but with normal TSH levels. In the otherhalf the RFT was normal with hypothyroidism. Larger population studies alone can point out the pathophysiology of HT in CDK patients. In general population, hypothyroidism has been associated with various adverse cardiovascular outcomes.

Table - I

Sl No	Urea (mg/dl)	Creat (mg/dl)	Uric acid (mg/dl)	TSH mIU/L
1	125	6.7	0.7	1.56
2	323	1.3	5.3	1.9
3	17	0.6	4.2	5.8
4	24	1.2	4.1	4.2
5	32	1.1	4.6	2.4
6	39	1	2.3	3.3
7	20	1	5.8	2.6
8	24	0.7	4.1	2.6
9	26	1	4.5	5.3
10	31	1.4	4.8	3.6
11	26	1	4.5	5.3
12	37	1.4	4	6.6
13	31	1.4	4.8	3.5
14	17	0.7	3	4.6
15	39	1.4	5.7	4.7
16	35	1.1	3.7	2.8
17	40	1	4.1	2.5
18	27	1.3	4.9	2.6
19	27	0.7	5.5	1.4
20	21	0.8	5.6	3.3
21	25	1.1	3.7	2.8
22	40	1	4.1	2.5
23	27	1.3	4.9	2.7
24	17	1.4	3.1	3.3
25	27	0.7	4.4	2.3
26	21	0.8	4.6	3.2
27	27	0.9	5.8	0.7
28	18	0.7	5.5	1.4
29	13	0.7	5.6	2.4
30	24	1	5.4	2.9
31	20	0.8	7.3	0.3
32	21	4.5	1.3	3.1
33	29	2.9	4.8	4.5
34	28	0.7	4.4	3.4
35	25	1.3	5.2	1.6
36	28	1.2	3.9	4.5
37	40	3.9	3.9	4.5
38	32	1.2	5.9	2.3
39	30	1.4	4.8	3.3
40	27	0.7	4.9	1.2
41	39	0.9	4	2.3
42	35	0.8	3.9	0.8
43	26	1.1	5.4	1.5
44	28	1.2	0.9	0.9
45	32	1.2	5.9	2.3
46	30	1.4	4.8	3.3
47	27	0.9	4.9	1.8
48	40	1	4.8	1.5
49	33	0.9	4.6	3.3
50	29	0.9	4.2	4.6

Fifty normal subjects were analyzed for serum urea, serum Creatinine, serum uric acid and TSH

Table - II RFT and TSH in 25 CKD patients

Sl No	Urea (mg/dl)	Creat (mg/dl)	Uric acid (mg/dl)	TSH mIU/L
1	22	1.2	5.2	4.2
2	111	6.2	5.8	9.7
3	219	6	5.8	4.3
4	47	6.5	8.2	7
5	206	7.5	6.8	0.3
6	69	2.5	6.8	1.1
7	70	6.2	9	2.3
8	62	5.8	8	3.1
9	82	6.2	7.8	1.8
10	52	5.6	7.6	2.1
11	57	3.8	7.4	3.1
12	58	3.1	8.1	2.8
13	70	6.1	8.1	3
14	66	5.8	9	2.5
15	92	6	8	4.1
16	81	5.8	7.6	4.1
17	74	6	8.2	3.4
18	70	5.2	5.8	3.2
19	58	3.1	7.2	4.9
20	62	4.1	8.1	4.3
21	57	4.5	5.5	3.3
22	58	4.9	5.6	5.6
23	48	3.5	6.6	3.9
24	56	4.8	7.2	4.9
25	62	5.2	8.1	5.6

25 CKD patients with high RFT and normal TSH

Table - III RFT and TSH in 25 CKD patients

Sl No	Urea (mg/dl)	Creat (mg/dl)	Uric acid (mg/dl)	TSH mIU/L
1	39	1.8	6.1	12.2
2	40	1.4	5.9	10.3
3	27	1.3	5.3	9.9
4	39	1.3	5.4	12
5	38	1.5	5.4	11.9
6	38	3.5	5.4	11.8
7	34	1	2.6	11.6
8	25	2.1	4.6	15.1
9	28	3.1	5.6	14.8
10	31	2.8	6	13.5
11	35	1.4	6.5	10.5
12	30	1.5	6.8	11.4
13	32	1.6	6.8	12.5
14	30	1.5	6.2	14.6
15	29	1.3	5.3	12.8
16	30	1.4	6.2	9.7
17	17	1.6	6.8	10.2
18	22	1.4	7.2	12.5
19	30	1.6	7.1	13.5
20	17	3.1	5.8	12.9
21	13	1.1	5.8	14.2
22	19	1.3	6.3	10.1
23	25	1.4	7.1	14.6
24	30	1.3	7	13.6
25	28	1.1	6.9	12.8

25 CKD patients with normal RFT and hypothyroidism

CONCLUSIONS

There are many remaining gaps in knowledge with required to interaction between thyroid and kidney disease. In the present study no association between CDK and HT since in half of the patients RFT was elevated with normal TSH while in the other half RFT normal with high TSH.

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