Low Triiodothyronine Syndrome is Associated with High Beta 2 Microglobulin in Hemodialysis Patients

Hong Joo Lee

Department of Nephrology, Seoul Red Cross Hospital, Seoul, Korea

BACKGROUND

- Low circulating triiodothyronine (T3) levels, known as the low T3 syndrome, are the most frequently encountered thyroid functional test derangement in end end-stage renal disease (ESRD) patients on hemodialysis.
- It has been suggested that low T3 may be a marker of malnutrition, inflammation, and comorbidity burden in the ESRD patients with ESRD.
- Beta Beta-2 microglobulin (β2M) is a prototypical middle molecule uremic toxin that that has been associated with a higher risk of deathmortality in hemodialysis patients.
- Hence, we conducted our a study to elucidate the interacting factors betweenfactors including β2M associated withand a low T3 level in ESRD patients on hemodialysis.

METHODS

Study population

- All hemodialysis patients in Red Cross Hospital within a period of one year were included in the study.

Colleting data

- The participants were divided into two groups based on the level of T3.
- We evaluate relationships between T3 level and the variables showing malnutrition, inflammation, comorbidity, and β2M.

Statistical analysis

- using the statistical package SPSS version 15.0 (SPSS Inc., Chicago, IL, USA).
- $p < 0.05$ was considered statistically significant

SUMMARY

- Among the 56 cases, 44.6% of the patients were having had the low T3 syndrome.
- The Patients with the low T3 syndrome had lower BMI and longer HD duration than the patients with normal T3 level.
- In addition, the T3 level was associated meaningfully significantly with the level of sodium, potassium and β2M.
- We observed a negative correlation between the level of T3 and β2M.
- However, blood urea nitrogen, creatinine, and lipid profiles including total cholesterol, high density lipoprotein and low density lipoprotein cholesterol, and triglyceride were not related with to the level of T3.

CONCLUSION

- Our results show that the patients with the low T3 syndrome may be associated with variables such as BMI, HD duration, sodium, potassium and β2M.

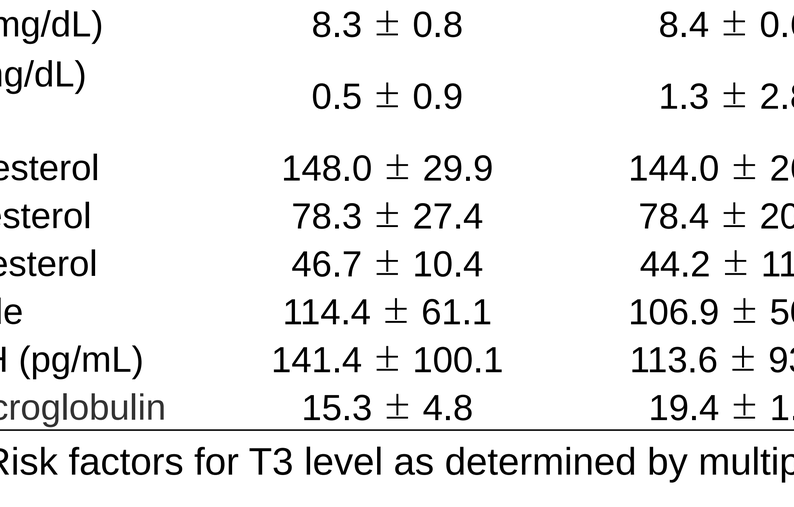
RESULTS

Table 1. Dermographic characteristics and laboratory findings in patients with normal free T3 and low T3 syndrome.

Parameters	Normal free T3 (n=31)	Low T3 syndrome (n=25)	*p*
age (year)	65.1 ± 14.4	62.5± 12.0	0.469
Gender (male %)	22(70.96%)	19(76.00%)	0.767
Cause of ESRD (%)			0.054
Diabetes	15(48.4%)	17(54.8%)	
Glomerulonephritis	1(3.2%)	2(8.0%)	
Hypertension	9(29.0%)	1(4.0%)	
others	0(0.0%)	2(8.0%)	
unknown	6(19.4%)	3(12.0%)	
HD duration (Day)	1191.7 ± 1221.2	2038.8± 1698.9	0.035
BMI	24.5 ± 4.6	21.7 ± 2.6	0.006
Hypertension	26(83.9%)	24 (96.0%)	0.210
Diabetes	17(54.8%)	18 (72.0%)	0.268
Previous CV history	11(35.5%)	10 (40.0%)	0.786
Laboratory data			
Hemoglobin (g/dL)	10.9 ± 1.7	10.8 ± 1.2	0.882
BUN (mg/dL)	45.2 ± 14.6	55.1 ± 23.6	0.073
Creatinine (mg/dL)	7.1 ± 3.3	8.6 ± 2.4	0.055
Protein (mg/dL)	6.6 ± 0.5	6.6 ± 0.4	0.575
albumin (mg/dL)	3.7 ± 0.5	3.8 ± 0.4	0.287
Sodium (mg/dL)	139.0± 2.0	136.6± 3.5	0.004
Potassium (mg/dL)	4.4 ± 0.5	4.9 ± 0.7	0.003
Phosphorus (mg/dL)	4.1 ± 1.2	4.0 ± 1.1	0.681
Calcium (mg/dL)	8.3 ± 0.8	8.4 ± 0.6	0.483
hsCRP (mg/dL)	0.5 ± 0.9	1.3 ± 2.8	0.181
Total cholesterol	148.0 ± 29.9	144.0 ± 26.9	0.606
LDL-cholesterol	78.3 ± 27.4	78.4 ± 20.3	0.987
HDL-cholesterol	46.7 ± 10.4	44.2 ± 11.6	0.391
Triglyceride	114.4 ± 61.1	106.9 ± 50.1	0.625
Intact PTH (pg/mL)	141.4 ± 100.1	113.6 ± 93.3	0.292
Beta 2 microglobulin	15.3 ± 4.8	19.4 ± 1.3	0.000

Table 2. Risk factors for T3 level as determined by multiple regression analysis in hemodialysis patients

Covariate	Exp(B)	*p*
Body mass index	3.153	0.042
Sodium	0.147	0.207
Potassium	2.314	0.158
HD duration	0.525	0.415
Beta 2 microglobulin	0.315	0.037



Figuer 1 Correlation of the level of circulating T3 and β2M

- And Moreover, the level of circulating T3 had the negative correlation with the level of β2M.
- Therefore, the intensive hemodialysis for clearing β2M may have an advantage for normal T3 in hemodialysis patients.

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