

Thyroid dysfunction and ultrasonographic abnormalities in uremic patients undergoing conservative management and haemodialysis

A. Mataradzija¹, H. Resic² and E. Kucukalic-Selimovic³

¹Nephrology Department, ²Center for Haemodialysis, ³Nuclear Medicine Department, Clinical Center, University of Sarajevo

Abstract

Morphologic abnormalities of thyroid gland are ordinary in a form of thyroid nodules, goiter or thyroid carcinoma in patients with chronic renal failure (CRF). The aim of our study was to examine the prevalence of morphologic and functional abnormalities of patients with CRF at conservative management and haemodialysis.

The study was conducted in 81 patients (40 with CRF, 31 haemodialysis patients and 10 healthy controls). All patients were evaluated by ultrasonography of the thyroid gland and blood sample was drawn for a various biochemical parameters of thyroid function. The duration of the study was 12 months.

The study cohort with mean age $56,20 \pm 11,80$ years, was predominated by female patients (61.7%), on a conservative treatment (72.5%). Disease duration at conservative management was significantly longer in comparison with patients on haemodialysis (11.3 ± 6.46 vs. 8.45 ± 5.61 years). Ultrasound revealed an irregular assessment of thyroid gland in 52.1% of the patients. Significantly lower mean values of thyroid hormones was obtained in the evaluated groups as compared with the controls.

A substantial number of our patients have been presented with changes of one or both lobules of thyroid gland. The mean values of serum thyroid hormones were significantly lower in patients with CRF at conservative management and haemodialysis treatment in compare with patients of control group.

Key words: thyroid dysfunction, dialysis, ultrasonography

Results

All results are presented within the following tables and figures.

Introduction

Many authors have agreed that morphologic abnormalities of thyroid gland are ordinary in a form of thyroid nodules, goiter or thyroid carcinoma in patients with chronic renal failure than in the general population (1-5). In the same time, we found out lower serum thyroid hormone values, and these patients were clinically euthyroid. Modern literature describes these phenomena as "Sick euthyroid syndrome" (12,13).

The aim of the study was to examine the prevalence of morphologic and functional abnormalities of patients with chronic renal failure (CRF) at conservative management and haemodialysis.

Patients and methods

Patients

This study totally involves 81 patients. 40 patients with CRF at conservative management, (with clearance creatinine in a range of 80-10 ml/min), 31 patients at haemodialysis treatment (clearance creatinine underlying 10 ml/min), and 10 healthy patients with regular kidney and thyroid function used as control group.

Methods

All patients were evaluated by ultrasonography of the thyroid gland (Siemens ultrasonograph with linear sonde of 70 MHz). Free and total serum thyroid hormone values have been calculated using Radioimmunoassay methods, and FT3, FT4 by Chemiluminescent technique. Duration of study has been 12 months, using standard statistical methods for manually elaboration of information, with no use of computer.

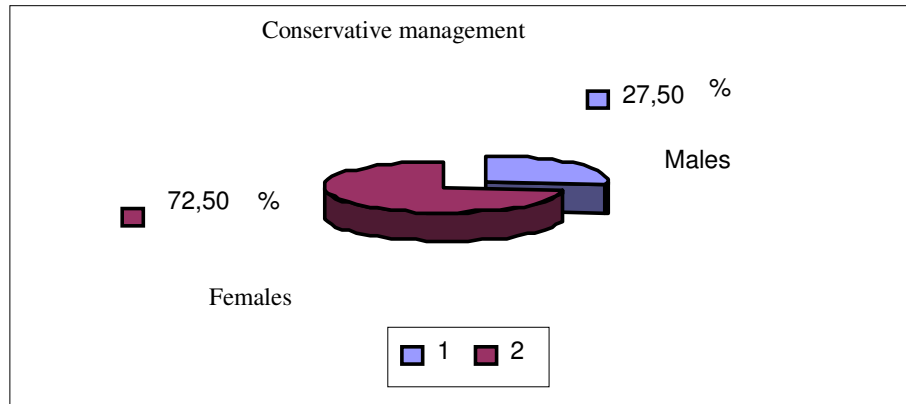
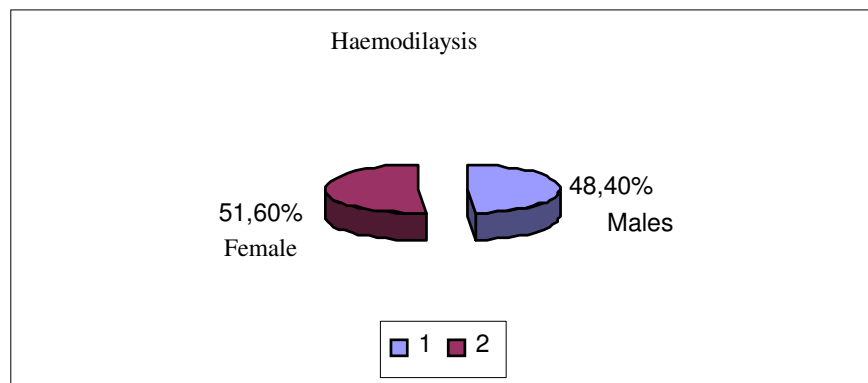
Table 1. Gender distribution

Therapy type	Number of males	Number of females	Males in percentages	Females in percentages	Total number	p-values
Conservative management						
I degree	1	8	11,10%	88,90%	9	n.s.
II degree	2	5	28,60%	71,40%	7	n.s.
III degree	8	16	33,30%	66,70%	24	n.s.
Total	11	29	27,50%	72,50%	40	n.s.
Haemodialysis	15	16	48,40%	51,60%	31	n.s.
Control group	5	5	50%	50%	10	n.s.
Total	31	50	38,30%	61,70%	81	p< 0,001

Demographic data (61,7% patients were females and 38,3% were males out of total 81 patients)

Correspondence to:

A. Mataradzija, Nephrology Department, Clinical Center, University of Sarajevo, Bosnia and Hercegovina

Fig 1a In a group of patients at conservative management, female population was predominant**Fig 1b.** The same pattern of female predominance was observed also in haemodialysis treatment**Table 2.** Average age

Therapy type	Number of patients	Mean age in years	Standard deviation	Standard omission	p-values
Conservative management					
I degree	9	62,44	9,96	3,32	n.s.
II degree	7	57,57	12,37	4,68	n.s.
III degree	24	58,71	9,00	1,84	n.s.
Total	40	59,35	10,03	1,59	n.s.
Haemodialysis	31	51,55	11,78	2,12	p<0,01
Control group	10	58,00	13,59	4,3	n.s.
Total	81	56,20	11,80	1,31	n.s.

The average age of patients was $56,20 \pm 11,8$ years, indicating significant difference ($p < 0.001$) in the age structure between patients on hemodialysis vs conservative treatment

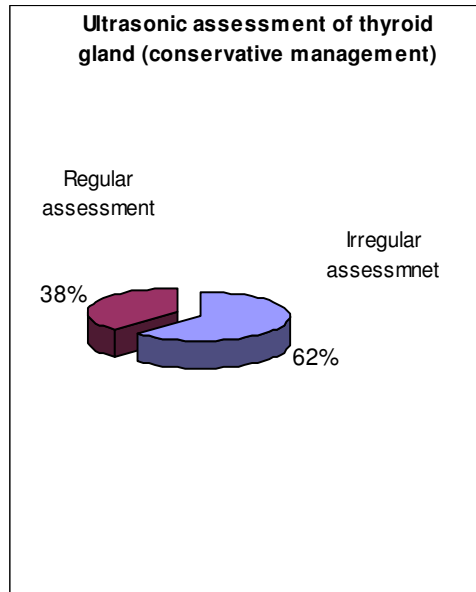
Table 3. Duration of the disease

Therapy type	Number of patients	Average duration of disease	Standard deviation	Standard omission	p-values
Conservative management					
I degree	9	12	6,02	2,01	n.s.
II degree	7	12,3	7,55	2,86	n.s.
III degree	24	10,7	6,21	1,27	n.s.
Total	40	11,3	6,46	1,02	p<0,06
Haemodialysis	31	8,45	5,61	1,01	n.s.
Total	71	10,06	6,26	0,74	n.s.

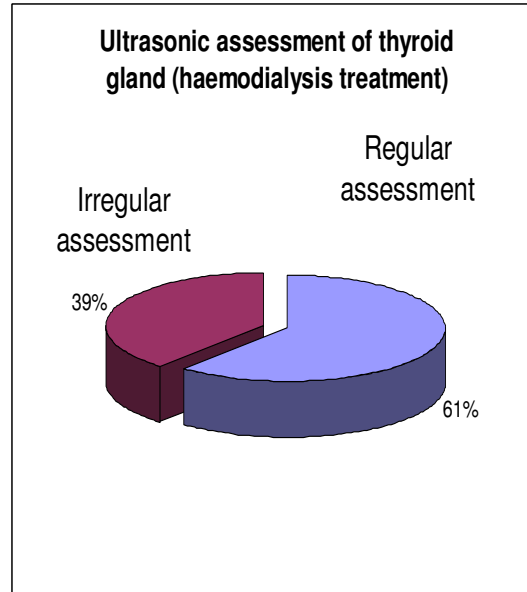
The average duration on conservative management was $11,3 \pm 6,46$ years and on haemodialysis treatment was $8,45 \pm 5,61$ years. Disease duration at conservative management was significantly longer in comparison with patients on haemodialysis treatment

Table 4. Ultrasonic assessment of thyroid gland

	Regular assessment of thyroid gland	%	Irregular assessment of thyroid gland	%	Total number of patients	%
Conservative management						
I degree	2	22,2	7	78,8	9	100
II degree	3	42,9	4	57,1	7	100
III degree	10	29,4	24	70,6	34	100
Total	15	37,5	25	62,5	40	100
Haemodialysis	19	61,3	12	38,7	31	100
Total	34	47,9	37	52,1	71	100

**Fig 2a**

Ultrasonic assessment was irregular in 62% of patients at conservative management (Figure 2a), and in 39% patients at haemodialysis treatment (Figure 2b)

**Fig 2b****Table 5.** Average values of thyroid hormone in different groups of patients

	TT4 nmol/l	TT3 nmol/l	FT4 pmol/l	FT3 pmol/l	TSH mIU/l	TBG mg/l	Total proteins
I degree	128,00±38,59	2,18±0,82	15,43±3,49	4,43±1,02	2,48±1,32	26,87±2,3	70,22±3,91
II degree	123,40±57,23	2,33±0,93	15,40±2,65	4,62±1,43	1,96±0,90	23,51±3,5	72,14±5,59
III degree	99,42±28,62	2,09±0,47	13,43±2,36	4,23±0,84	3,03±1,67	20,58±7,8	73,71±4,48
Total	110,10±26,86	2,15±0,67	14,25±2,76	4,28±1,01	2,72±1,54	22,51±6,8	72,65±4,79
Hemodialysis	93,13±23,94	2,11±0,76	11,86±2,29	4,35±1,02	2,13±1,45	22,55±7,6	72,32±4,95
Control group	123,09±3,51	2,94±0,14	17,72±1,59	5,66±0,21	2,54±0,87	23,22±3,4	75,70±4,24
p values	P<0,001	p<0,001	p<0,001	p<0,001	n.s.	n.s.	p<0,05

Significantly lower average values of serum hormones TT4, TT3, FT4, FT3 of evaluated groups in comparison with control group (p<0,001), total proteins (p<0,05). There are no significant differences in average values of TSH and TBG serums

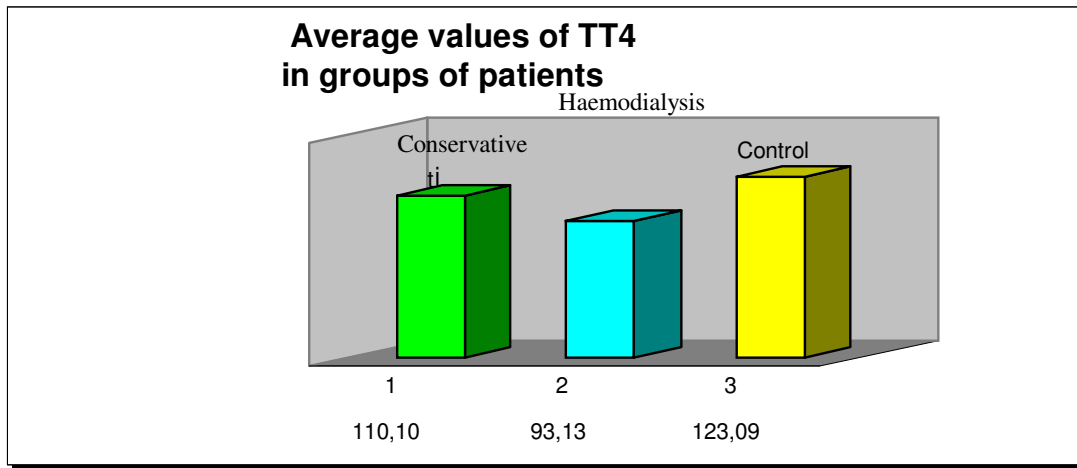


Fig 3. Significantly lower average values of hormones TT4 in evaluated groups of patients at conservative management and haemodialysis in comparison with the control group

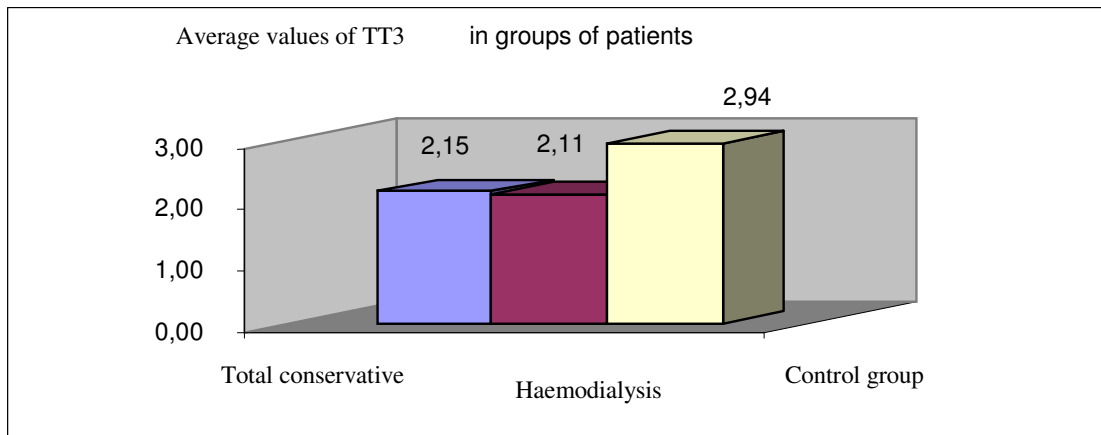


Fig 4. Significantly lower average values of TT3 in evaluated groups of patients in comparison with the control group

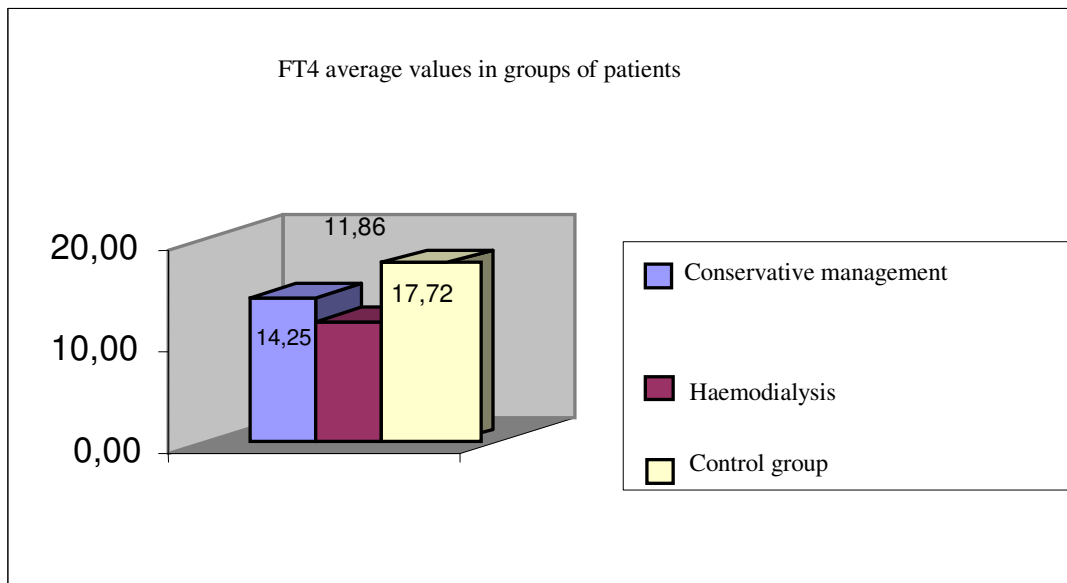


Fig 5. Significantly lower value of serum hormone FT4 in evaluated groups in comparison with the control group

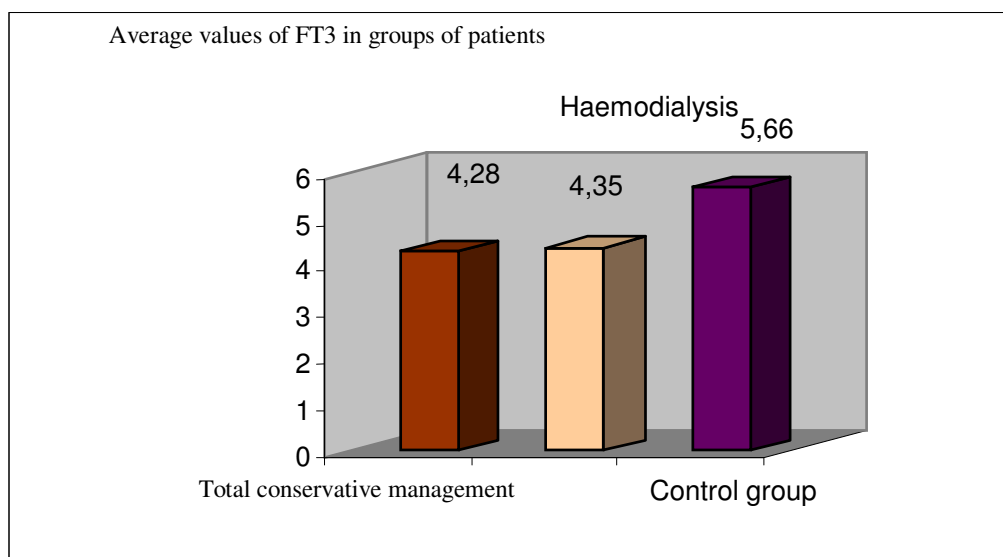


Fig 6. Significantly lower values of serum hormone FT3 in patients at conservative management and haemodialysis treatment in comparison with the control group

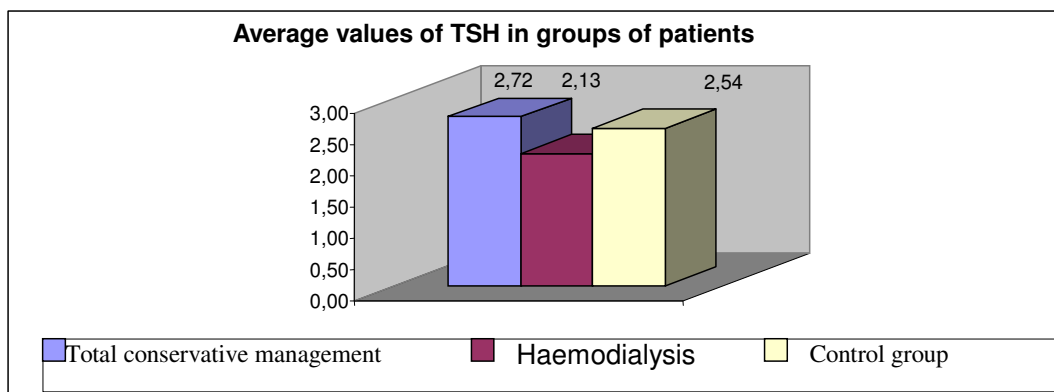


Fig 7. TSH value was not significantly lower in evaluated groups in comparison with the controls

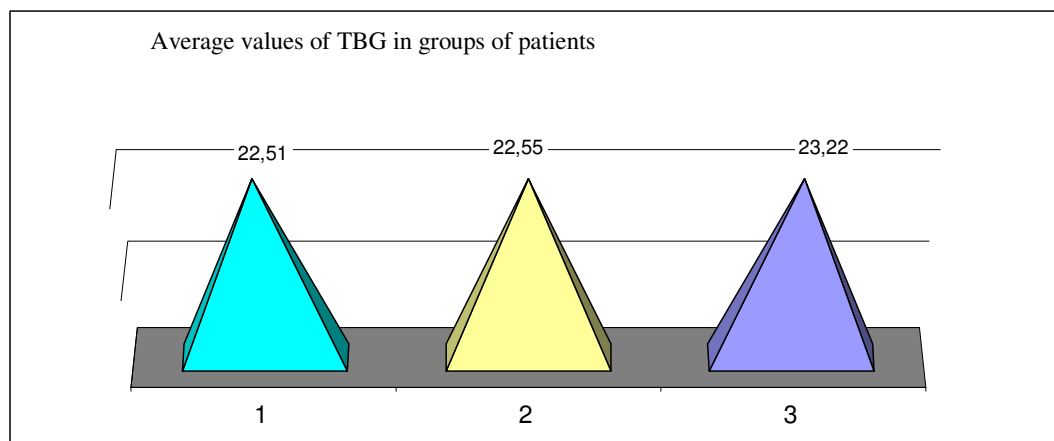


Fig 8. There are no significant differences between TBG values in evaluated groups of patients in comparison with controls

Discussion

Higher rates of goiter, hypothyroidism, thyroid nodules and thyroid carcinoma could be more typical at CRF patients than at general population (1-5). In our study 62,5% patients of conservative management and 38,7% of haemodialysis treatment had thyroid nodules in one or both thyroid lobes.

All patients of evaluated groups had lower serum values of total proteins in compare with control group (6-11), confirming theory of malnutrition (6,7). Patients were clinically euthyroid, which corresponds to the "Sick euthyroid syndrome", according to available literature (12,13). Average ages of patients in evaluated groups correspond to world information and its amount is 59 yrs.

Conclusions

Ultrasonic nodules changes one or both lobules of thyroid gland were recorded at 52,1% of examined patients. Average values of serum concentrations TT4, TT3, FT4, and FT3 were significantly lower in patients with CRF at conservative management and haemodialysis treatment in compare with patients of control group. Duration of haemodialysis treatment is inversely proportionally serum value TT3 in evaluated patients. Serum concentrations TSH and TBG were same in patients of evaluated groups in compare with control group. Serum value of total proteins was significantly lower of tested patients in compare with control group. 3% out of total number of 71 patients with CRF had clinically hypothyroidism, and required substitutive therapy. 97% were clinically euthyroid ("Sick Euthyroid syndrome").

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