STUDY OF RENAL TUBULAR DEFECT IN GRAVE'S DISEASE OR THYROID MALIGNANCY PATIENTS WITH AND WITHOUT KIDNEY DISEASE TREATED BY RADIOACTIVE IODINE-131 (^{131}I)

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ABSTRACT:

Background: *Thyroid diseases are the most common endocrinopathies to occur. Thyroid cancer is considered the most evalent endocrine tumour and is growing in most nations. RAI-131 is the most comfortable and cost-effective therapy for Graves' disease or toxic nodular goitre. Since the 1940s, it has been employed because thyroid follicular cells may concentrate sodium-iodide. RAI-131 works physiologically. This research concentrates on RAI-131's impact on renal tubules after treating thyrotoxicosis or thyroid cancer.*

Aim of the work: *To study the possible hazardous effect of Radioactive Iodine-131 (RAI-131) on renal tubules in patients with and without kidney disease.*

Patients and Methods: *This is a prospective observational study was conducted on 30 candidates with Grave's disease or thyroid malignancy treated by RAI-131 and they were selected by endocrinology and oncology doctors at El-demerdash hospital during the period from October 2019 to March 2021. All patients were subjected to the following: Medical sheet taken in Ain-shams university hospitals, General examination. Laboratory investigations: Estimation of Thyroid function (measured by radioimmunoassay): To detect associated hypothyroidism or hyperthyroidism. TSH, FT3 and FT4, Serum creatinine, Blood urea, eGFR, Urine analysis and Urinary β_2 microgloglobulin as a marker of tubular damage. Renal function assessment were done before RAI-131 administration, and then it will be repeated one week later after the dose. Investigations were repeated after 2 months for patients with deterioration of kidney function tests.*

Results: *A total of 30 patients included in this study, mean age of them was 34.33±7.71 years, 90% of them were females. Diabetes mellitus was reported in 56.7% of patients, while 43.3% of them had hypertension. Majority of the studied patients had grave's disease (93.3%), had picture grave's disease. Also, 50% of the studied patients had chronic kidney disease and 50% hadn't chronic kidney disease. Serum creatinine showed statistically significant increase after one week and two months of RAI-131 dose compared before dose ($p<0.001$). While, eGFR MDRD was showed statistically significant decrease after one week and two months of RAI-131 dose compared before treatment ($p<0.001$). Additionally, there were highly statistical significant differences between the studied patients regarding presence of WBCs cast in urine after 2 months ($p <0.001$)). Also, β2 microglobulin in urine was increased after RAI-131 dose than before*

it (p <0.001). In addition, from the Non-CKD group, 5 patients (33.3%) developed impaired renal functions after 2 months of RAI-131 dose.

Conclusion: *RAI-131 affects directly the renal tubular functions as detected by statistically significant increase of urinary β2 microgloglobulin in all study group after 1 week (p 0.002) and 2 months (p <0.001).*

Key words: *Radioactive Iodine-131, kidney disease, renal tubules*

INTRODUCTION:

Thyroid diseases are the commonest endocrinopathies, that may be presented either by Graves' disease (thyrotoxicosis) or thyroid malignancy. However, the rate of incidence of thyroid cancer, the most common endocrine malignancy, is also increasing in most countries[(1)].

There are three major treatment options are currently available for treatment of hyperthyroidism: anti-thyroid drugs, radioactive iodine-131 (RAI-131) and surgery, each of which have its advantages and restrictions. For more than a century, thyroidectomy was as the most accepted definitive treatment for hyperthyroidism caused by Graves' disease. Over that time, other treatment option with RAI-131 and anti-thyroid medications have been developed and were used as the primary treatment choice for hyperthyroidism[(2)].

Total thyroidectomy followed by RAI-131and thyroid hormone suppressive drugs improves the survival of patients with medium to high risk differentiated thyroid carcinoma. RAI-131 is considered as the most economical and comfortable approach for treatment of hyperthyroidism caused by Graves' disease or toxic nodular goiter. Since the 40s, it has been used as the thyroid follicular cells are able to capture and concentrate iodine through the sodium-iodide transporter [(3)].

It is the most commonly used in thyrotoxicosis and thyroid cancer nowadays. The aim of therapy is to treat hyperthyroidism by destroying adequate thyroid tissue to make the patient in either euthyroid or hypothyroid state. RAI-131 is a beta & gamma emitting radionuclide, with a maximum energy of 0.61 MeV (Mega Electron Volts), an average energy of 0.192 MeV, and an effective range in tissue of 0.8 mm up to 2 mm. Because of its long half-life that can reach over 8 days, it remains the preferable radionuclide choice for therapy[**(4)**].

RAI-131 have a physiological mechanism of action. Iodine is the precursor of thyroxine. The radioactive form of it, is taken up by iodide transporter of the thyroid the same way as natural iodine and is processed is a similar way. The β- particle destroys the follicular cell, leading to gradual reduction of volume and control of the thyrotoxicosis[(5)]**.**

It is administrated orally & excreted principally in urine through the renal system (about 80-90% of the activity is excreted in the first 48 hours), it will be concentrated in thyroid follicular cells or differentiated thyroid cancer cells. Adjuvant therapy of differentiated thyroid cancer with RAI-131 is the standard procedure for post-surgical thyroid tissue remnant ablation and for treatment of iodine avid metastases [(6)].

It has been shown to reduce the possibility of relapse and to improve the survival. On the other hand, consider that patient hospitalization and isolation for a few days is a very important issue according to radiation protection rules. To our knowledge, there is no adequate data in literature is published presenting the effect

of RAI-131 on renal tubules during or after treatment of different thyroid disease. Experimental studies revealed that an ablative RAI-131induced renal toxicity was seen at 5th day of therapy after a single dose in form of cast formation and tubular damage [(7)].

In an experimental study on albino rats after exposure to RAI-131, renal biopsies assessed the glomeruli, tubules, interstitium and blood vessels. The only visible damage was seen on renal tubules, also intraluminal protein casts were found in some of renal tubules [(19)]. So, this study will be focused on the effect of RAI-131on renal tubules after treatment of different thyroid diseases whether thyrotoxicosis or thyroid malignancy.

AIM OF THE WORK:

To study the possible hazardous effect of Radioactive Iodine-131 (RAI-131) on renal tubules in patients with and without kidney disease.

PATIENTS AND METHODS

This is a prospective observational study was conducted on 30 candidates with Grave's disease or thyroid malignancy treated by RAI-131 and they were selected by endocrinology and oncology doctors at El-demerdash hospital during the period from October 2019 to March 2021.

The studied patients were divided into two groups:

Group I: 15 patients with chronic kidney disease (CKD).

Group II: 15 patients with normal renal functions.

CKD and Non-CKD was based on Serum Creatinine (0.6 – 1.4 mg/dL for non-CKD, > 2 mg/dL for CKD), BUN (7 – 20 mg/dL for non-CKD, > 20 mg/dL for CKD), eGFR (using MDRD equation) (Stage II (60-89 mL/min), Stage III (30-59 mL/min), Stage IV (15-29 mL/min) , presence of WBCs cast in urine and urinary β2 microgloglobulin (>0-0.3 µg/mL) as a marker of tubular damage.

Inclusion Criteria: Ages > 18 years, both sexes, Patients diagnosed with Grave's disease or thyroid malignancy with chronic kidney disease (stages II, III & IV) or normal renal functions and Patients with no history of previous thyroidectomy.

Exclusion Criteria: End stage renal disease (ESRD), other causes of high β_2 microglobulin in urine: Hereditary e.g. Wilson's disease, Fanconi's syndrome, cystinosis, Heavy-metal poisoning e.g. cadmium, mercury, cis-platinum, Drug toxicity e.g. aminoglycosides, cyclosporin and Pyelonephritis

All patients were subjected to the following: Medical sheet taken in Ain-shams university hospitals, General examination including Physical examination and Local examination.

Laboratory investigations: Estimation of Thyroid function: TSH (Thyroid-stimulating hormone) (normal value = 0.40–4.50 mIU/mL), FT3 (Free tri-iodothyronine) (normal value = 2.3–4.1 pg/mL) and FT4 (Free thyroxine) (normal value = 0.9–1.7 ng/dL), Estimation of Renal functions: Serum creatinine, BUN, eGFR (using MDRD equation), Urine analysis (for WBCs cast and/albumin) and Urinary β_2 microgloglobulin (normal value = 0-0.3 µg/mL) as a marker of tubular damage.

Investigations for renal function assessment were done before RAI-131 administration, and then it will be repeated one week later after the dose.

Investigations for renal function assessment were repeated after 2 months for patients with deterioration of kidney function tests.

Radioactive Iodine131 (RAI131): Ranging from 10 – 15 Mci in Grave's disease and from 80 – 100 Mci for thyroid cancer was given for both Non-CKD and CKD patients.

Ethical Approval:

The study was approved by the Ethics Board of the University and an informed written consent was taken from each participant in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Conflict of interest: The authors declare no conflict of interest.

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Author contribution: Authors contributed equally in the study.

Statistical Analysis:

IBM-SPSS version 24 was used for data analysis (May 2016). Student t test and paired t test, x2 square test and McNemar test are done when indicated, as well as Spearman's correlation and logistic regression analysis, were used to determine the statistical significance. Each variable was analysed (parametric or not), based on the type of data contained in each variable. We considered results statistically significant if the P-values were less than 0.05.

RESULTS:

Table (1): Baseline characteristics of the studied patients (n=30)

Variables	Studied patients (n=30)	
Age (years) • Mean ±SD • Range	34.33±7.71 26 -60	
	No.	**%**
Sex • Male • Female	3 27	10.0 90.0
Residence • Urban • Rural	30 0	100 0
Diabetes Mellitus • Yes • No	13 17	43.3 56.7
Hypertension • Yes • No	13 17	43.3 56.7

Table (1) shows, a total of 30 patients included in this study, the mean age of them was 34.33±7.71 years, 90% of them were females. Diabetes mellitus was reported in 43.3% of patients, and 43.3% of them had also hypertension.

Table (2): Descriptive data of the studied patients (n=30) in relation to thyroid disease and thyroid functions

Variables	Studied patients (n=30)	
	No.	**%**
Thyroid diseases • Grave's disease • Thyroid carcinoma	 28 2	 93.3 6.7
Variables	Studied patients (n=30)	
	Grave's (n=28)	**Carcinoma (n=2)**
Thyroid diseases • T3 (pg/mL) • T4 (ng/dL) • TSH (mIU/mL)	 8.7 ± 2.38 6.4 ± 1.69 0.1 ± 0.06	 3.1 ± 0.2 1.2 ± 0.1 1.45 ± 0.5

Table (2) shows that, majority of the studied patients had grave's disease (93.3%) and 6.7% of patients had thyroid carcinoma.

Table (3): Laboratory data before and after RAI-131 among the studied patients (n=30)

Variables	Studied patient n=30			*P1*	*P2*
	Before (n=30)	After 1 week (n=30)	After 2 months (n=30)		
Serum creatinine (mg/dL) – Mean ±SD	1.98±0.1	2.1±1.1	2.3±1.1	0.002*	0.007*
BUN (mg/dL) – Mean ±SD	20.97 ±10.96	25.5±10.5	30.57±13.6	<0.001*	<0.001*
eGFR (mL/min) – Mean ±SD	78.24± 11.32	69.91 ±12.61	54.48 ±10.85	0.011*	<0.001*
WBCs cast in urine – Absent – Present	 25 5	 10 20	 8 22	 <0.001*	 0.573
β2 microglobulin in urine (µg/mL) – Mean ±SD	0.27±0.12	0.54±0.23	0.88±0.17	0.002*	<0.001*

*****Statistically significant, P1=paired t-test between before and after 1 week, P2 = paired t-test between after 1 week and 2 month

Table (3) shows that, serum creatinine showed statistically significant increase after one week compared to before RAI-131 dose (p_1 0.02) and after two months compared to 1 weeks after the RAI-131 dose (p_2 0.007). While, eGFR MDRD showed statistically significant decrease after one week compared to before RAI-131 dose (p_1 0.011) and after two months compared to 1 weeks after the RAI-131 dose (p_2 <0.001). Also, β2 microglobulin in urine showed statistically significant increase after one week compared to before RAI-131 dose (p_1 0.002) and after two months compared to 1 weeks after the RAI-131 dose (p_2 <0.001). Additionally, there were highly statistical significant differences between the studied patients regarding presence of WBCs cast in urine. On the other hand, no significant difference was found between the studied patients regarding BUN before and after RAI-131 dose.

Table (4): State of patients before and after RAI131 dose (n=30)

Variables	Studied patients (n=30)			
	Before (n=30)		**After (n=30)**	
	No.	%	No.	%
State of patient*				
– Impaired renal functions	15	50.00	20	66.7
Normal renal functions	15	50.00	10	33.3

Table (4) shows that, there was increase in total number of CKD from 15 patient (50%) to 20 patients (66.7%) among the studied patients before and after 2 months RAI-131 dose.

Table (5): Comparison between patients with and without CKD regarding Co-morbidities, thyroid diseases and thyroid function tests (n=30).

Variables	Studied patient (n=30)				P value
	Non-CKD N=15		**CKD N= 15**		
	N	%	N	%	
Thyroid diseases					
– Grave's disease	14	93.3	14	93.3	
– Thyroid carcinoma	1	7.7	1	7.7	1
Diabetes Mellitus					**0.01 ***
– No	12	80	5	33.3	
– Yes	3	20	10	66.7	
Hypertension					
– No	8	53.3	9	60	
– Yes	7	46.7	6	40	0.7

CKD: Chronic Kidney Disease, P-value= X^2**:** Chi square test, *****significant

Table (5) shows that, no significant differences were found between patients with and without CKD regarding thyroid diseases and thyroid function tests (p>0.05). as regard patients with CKD , 13 patients had DM , while 13 patients had HTN.

Table (6): Comparison between patients with and without CKD regarding laboratory data before and after dose (n=30).

Variables	Studied patient (n=30)				P value
	Non-CKD N=15		CKD N= 15		
	N	%	N	%	
Before					
Serum creatinine (mg/dL) Mean ± SD	1±0.16		2.94±0.5		<0.001*
BUN (mg/dL) Mean ± SD	11.4±2.8		30.5±6.7		<0.001*
eGFR (mL/min) Mean ± SD	74±6.3		45.6±7.6		<0.001*
WBCs cast in urine					<0.001*
– Absent	15	100	10	66.7	
– Present	0	0	5	33.3	

β2 microglobulin in urine (µg/mL) Mean ± SD	0.24±0.09		0.32±0.07		0.011*
After 1 week					
Serum creatinine (mg/dL) Mean ± SD	1.2±0.3		3.1±0.6		<0.001*
BUN (mg/dL) Mean ± SD	16.8±4.1		34.2±7		<0.001*
eGFR (mL/min) Mean ± SD	66.6±9.6		41.2±7.6		<0.001*
WBCs cast in urine – Absent – Present	10 5	 66.7 33.3	1 14	6.7 93.3	<0.001*
β2 microglobulin in urine (µg/mL) Mean ± SD	0.41±0.14		0.67±0.17		<0.001*
After 2 months					
Serum creatinine (mg/dL) Mean ± SD	1.3±0.4		3.3±0.5		<0.001*
BUN (mg/dL) Mean ± SD	18.8±6.2		42.3±7.1		<0.001*
eGFR (mL/min) Mean ± SD	64.2±11.3		39.7±7.1		<0.001*
WBCs cast in urine – Absent – Present	 9 6	 60 40	 0 15	 0 100	 <0.001*
β2 microglobulin in urine (µg/mL) Mean ± SD	0.74±0.19		0.98±0.20		<0.001*

BUN: Blood urea nitrogen**, eGFR MDRD:** Estimated glomerular filtration rate Modification of Diet in Renal Disease **CKD:** Chronic Kidney Disease, *****significant**.** Positive = Presence of WBCs Cast and albumin.Negative = Absence of WBCs cast and albumin.

T**able (6) shows that,** serum creatinine was significantly increased among CKD patients than non-CKD patients before, and after dose. While, eGFR (MDRD) was significantly decreased among CKD patients than non-CKD patients before, and after dose (p<0.001). Also, there were significant differences between the studied groups regarding BUN after dose (p<0.001).

. Also, there were highly significant differences between the studied groups regarding presence of WBCs cast in urine (p<0.001)and β2 microglobulin in urine after dose, (p<0.001).

Table (7): Demographic data of patients with and without renal tubular affection according to level of β2 microglobulin in urine after RAI-131 dose (n=30)

Variables	Studied patients (n=30)		*P value*
	High β2 microglobulin in urine	**Normal β2 microglobulin in urine**	
No of patients	20	10	
Hypertension – Yes – No	 10 10	 3 7	0.3
Diabetes mellitus – Yes – No	 12 8	 1 9	**0.01***

Table (7) shows that, 20 patients had high β2 microglobulin in urine and 10 patients had normal β2 microglobulin in urine after 2 months of RAI-131 dose. Also, there were significant differences between the studied groups regarding diabetes mellitus (P = 0.01*), while hypertension was not significant (p = 0.3).

Table (8): Correlation between Serum creatinine, BUN, eGFR MDRD and β2 microglobulin in urine after 2 months

	Serum creatinine		BUN		eGFR MDRD	
	r	P-value	r	P-value	r	P-value
BUN	0.452	0.012*				
eGFR MDRD	-0.935	<0.001*	-0.460	0.010*		
β_2 microglobulin in urine	0.927	<0.001*	0.410	0.024*	-0.926	<0.001*

Table (8) shows that There was statistically significant and positive correlation between Serum creatinine and BUN when r was (0.452) with p-value <0.05*. Highly statistically significant and positive correlation between Serum creatinine and β2 microglobulin in urine when r was (0.927) with p-value <0.001*. Highly statistically significant and negative correlation between Serum creatinine and eGFR MDRD when r was (-0.935) with p-value <0.001*

- Statistically significant and negative correlation between BUN and eGFR MDRD when r was (-0.460) with p-value <0.05*. Statistically significant and positive correlation between BUN and β2 microglobulin in urine when r was (0.410) with p-value <0.05*.

-Highly statistically significant and negative correlation between eGFR MDRD and β2 microglobulin in urine when r was (-0.926) with p-value <0.001*.

DISCUSSION:

Thyroid diseases are considered the most common endocrinopathies that may be presented either by thyrotoxicosis (Graves' disease) or thyroid malignancy. However, the incidence rate of thyroid cancer, the most common endocrine malignancy, is increasing now in most countries**.** Currently, there are three major treatment modalities available for treatment of hyperthyroidism: anti-thyroid medications, radioactive iodine-131 (RAI-131) and surgery, each of which have its advantages and restrictions **(Ferrari, et al., 2017)**[10]**.**

RAI-131 is a beta & gamma emitting radionuclide, with an average energy of 0.192 MeV, a maximum energy of 0.61 MeV (Mega Electron Volts) and an effective range in tissue of 0.8 mm up to 2 mm. Because of its long half-life that can extend over 8 days, it remains the preferable radionuclide of choice for therapy **(Fazeli et al., 2018)**[11]**.**

So, this study was aimed to evaluate the possible effect of Radioactive Iodine^{131} (RAI-131) on renal tubules in patients with and without kidney disease. This prospective observational study was conducted on 30 candidates with Grave's disease or thyroid malignancy at El-Demerdash Hospital was treated by RAI-131.

Our study showed that, all of the studied patients hadn't previous treatment with radioactive substance and immunological disorders. Serum creatinine was increased after one week of RAI-131 dose than before dose. While, eGFR was significantly

decreased after one week of RAI-131 dose, there was no significant difference between the studied patients regarding BUN.

In the same line, the study by **Alevizaki et al., (2006)**[12] found that, none of the patients did experience any short-term side effects, while all of them had undetectable thyroglobulin levels on the first post therapy evaluation of thyroxine. ^{131}I elimination in the first hemodialysis was about 60%. There were insignificant staff incidental exposure and I^{131} contamination.

On the other hand, the study by **McAninch and Lagari, (2015)**[13] revealed that, after one month, blood pressure was 116/76 and repeated lab tests showed: Serum Creatinine 1.82 mg/dL, Blood Urea Nitrogen (BUN) 25 mg/mL, and eGFR 39 mL/min/1.73m2. Lab tests remained similar with an eGFR ranging from 57 to >60 mL/min/1.73 m2, this showed that there were no significant differences in serum creatinine, eGFR and BUN (p=<0.05).

The present study showed that, diabetes mellitus was significantly increased among CKD group than non-CKD patients.

The study by **Zhang et al., (2017)**[14] revealed that, DM is the most common cause of CKD, and nearly 20–30% of patients with type II DM suffer from moderate to severe renal function impairment. In urban Chinese areas, about 21.3% of DM patients have CKD, 635 of these patients, also had DM (CKD with DM, 18.14%) while 2864 did not have DM (CKD without DM, 81.86%).

The current study showed that, serum creatinine was significantly decreased among CKD patients than non-CKD before, and after the dose. While, eGFR was significantly increased among patients with CKD before, and after the dose than non-CKD patients.

In the same line, the study by **Hataya et al., (2013)**[15] found that, the lower initial eGFR group shows more improvement of the eGFR and increased about 30 % in CKD patients (47.5 ± 7.7 vs. 62.1 ± 9.5 ml/min/1.73 m^2, P<0.01). Moreover, eGFR was significantly increased in CKD patients with mild to moderate hypothyroidism compared to eGFR in non-CKD patients. There were not any patients included in the study with eGFR 30 ml/min/1.73 m^2. Serum Free T3 and Free T4 were found to be significantly lower in the CKD group than in the non-CKD group (FT3: 1.79 ± 0.81 vs. 2.28 ± 0.76 pg./ ml, P<0.05; FT4: 0.45 ± 0.20 vs. 0.63 ± 0.27 ng/dl, P<0.01). Serum TSH was found to be significantly higher in the CKD group than in the non-CKD group (P<0.05). Concerning age, subjects were significantly older in the CKD group than those in the non-CKD group (65.3 ± 14.0 vs. 54.7 ± 18.7 years, P<0.05). Also, the study by **Capasso et al., (1999)**[16] revealed that, decreased eGFR was corrected after using thyroid hormone in treatment which may indicate that renal dysfunction is caused mainly by functional changes rather than histological damage.

Another study by **Gosmanov et al., (2014)**[17] reported that, around 30% of American adults with CKD were found to have elevated spot urine albumin excretion measurements of over 30mg/g creatinine, and 19.3% of them have eGFRs below 60 mL/min/1.73 m2. The clinicopathological characteristics of CKD patients are more complicated. Moreover, the study by **Gorman et al., (2016)**[18] revealed that, despite both Creatinine and BUN values can be "masked" by the increased glomerular filtration rate (GFR) associated with hyperthyroidism, the creatinine seems to be higher and therefore has less value in the hyperthyroid cat. In other words, despite elevated BUN, it is possible that the creatinine may found to be normal (≤1.8 µg/dl) in the face of thyroid disease. The underlying mechanism is not clear, but contributing factors may include: decreased muscle mass leading to lower creatinine levels, or increased consumption of food can result in higher BUN levels.

The current study showed that, there were highly significant differences between patients with and without renal tubular affection after RAI^{131} dose regarding CKD. While, no significant differences were found between the studied groups regarding thyroid diseases and thyroid function tests. In line with **Aktoz et al., (2012)**[19] found a significant ablative ^{131} I induced renal toxicity that was noticed at the 5th day of therapy after a single dose of 185 MBq; the chief histopathological change was seen as tubular damage, while changes on renal cast formation were not found at significant levels. The principal route of I^{131} excretion after the administration is the renal excretion and renal toxicity is the limiting factor. The main histopathological change was tubular damage whereas cast formation was not seen at significant levels, but elevated levels of β_2 microglobulin after ^{131} I administration was seen indicating occurance of tubular damage.

On the other hand, **Hataya et al., (2013)**[15] demonstrated GFR improvement even in chronic kidney disease (CKD) patients with GFR 30–60 mL/min/1.73m^2 within a six-month treatment period for primary hypothyroidism.

Myssayev et al., (2020)[20] revealed that, Women suffering from Graves' disease represent the major part of these cases, although cases of toxic nodular goitre also contribute to the incidence of that condition. Hyperthyroidism could be treated by antithyroid drugs, despite their toxicity (e.g. granulocytopenia) in patients with CKD, especially propylthiouracil, which can occur much higher. Using antithyroid medications in this group of patients can cause tubulointerstitial nephropathy and in consequence both acute kidney injury and progression of CKD.

Also, in **Hoe et al., (2018)**[21] study, no statistical association were found between the protocol groups and race, sex, renal function additionally body mass index in relation to whole-body retention of ^{131}I.

Furthermore, **Yang et al., (2018)**[22] reported that, the cure rate of I^{131} therapy in patients with Grave's disease depends on the thyroid weight, FT4, and the time of antithyroid druds withdrawal before administration RAI. Other factors presented in **Yang et al., (2020)**[23] study, including age, sex, antithyroid antibody were less associated to successful rate as reported by previous studies. In **Margaret et al., (2012)**[24] study, based on the Modification of Diet in Renal Disease (MDRD) study equation, women had a greater prevalence of eGFR <60ml/min/1.73 m^2 compared to men,

There were some limitations of this study. First, this was a prospective study with a small sample size. Second, as in many other studies, we used creatinine-based estimates of GFR.

Conclusion

RAI-131 affects directly the renal tubular functions as detected by statistically significant increase of urinary β2 microgloglobulin in all study group after 1 week (p 0.002) and 2 months (p <0.001).

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Author contribution: Authors contributed equally in the study.

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دراسة تأثير استخدام اليود المشع-١٣١ فى علاج مرضي زيادة نشاط أو أورام الغدة الدرقية الذين يعانون أو لا يعانون من قصور كلوي على اعتلال الأنابيب الكلوية

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المقدمة: من المعروف أن أمراض الغدة الدرقية تعد أكثر أمراض الغدد الصماء شيوعا و في الكثير منها يتم استخدام اليود المشع-١٣١ فى العلاج، و تعد أورام الغدة الدرقية هى أكثر أورام الغدد الصماء حدوثا. يعد اليود المشع-١٣١ هو أكثر الوسائل العلاجية المستخدمة فى علاج حالات زيادة نشاط الغدة الدرقية سواء كان جريفس أو جويتر و أكثرها تأثيرا و أقلها تكلفة.وقد تم استخدام اليوم المشع -١٣١ منذ اربيعينات القرن الماضي وذلك نظرا لتركيز حويصلات الغدة الدرقية لليود المشع -١٣١ و ذلك بطريقة فسيولوجية مباشرة.ويركز هذا البحث على آثار استخدام اليود المشع-١٣١ على الأنابيب الكلوية و اعتلالها فى علاج حالات زيادة نشاط الغدة الدرقية و أورامها، فى المرضي الذين يعانون أو لا يعانون من قصور كلوي مزمن.

الهدف من البحث: دراسة التأثيرات الضارة لليود المشع-١٣١ على نسيج الكلى فى المرضة الذين يعانون ولا يعانون من قصور بوظائف الكلي.

المرضي و الطرق و الحالات: دراسة مقارنة و ملاحظة على عدد ٣٠ مريض بمرض جريفس أو أورام الغدة الدرقية، تم اختيارهم عن طريق أطباء الغدد الصماء و علاج الأورام بمستشفي الدمرداش فى الفترة من أكتوبر ٢٠١٩م حتى مارس ٢٠٢١م. تم خضوع كل المرضي للآتي: تصنيف طبقا لما هو وراد بشيت العلاج بمستشفيات جامعة عين شمس و فحص عام (التاريخ المرضى و التقييم الإكلينيكي). تحاليل معملية: قياس هرمونات الغدة قياس نسبة الكرياتينين.، قياس نسبة البولينا، قياس معدل الترشيح الكلوى، تحليل بول، قياس بيتا٢ ميكروجلوبيولين فى البول كدلالة على تأثر الأنابيب الكلوية.

تم عمل تحاليل أدوات البحث قبل إعطاء المرضي جرعة اليود المشع-١٣١ وإعادتها بعد أسبوع من تناول الجرعة، ثم إعادة التحاليل بعد شهرين للمرضى الذين ثبت وجود قصور بوظائف الكلي.

النتائج: بينت النتائج تأثر الأنابيب الكلوية بجرعات اليود المشع-١٣١ المختلفة والتي تم إعطاءها لعلاج مرضي الغدة الدرقية موضوع البحث مما دل على اعتلال الأنابيب الكلوية بعد اليود المشع-١٣١.