Study of Serum Uric Acid in a Group of Insuline Dependant Diabetes Mellitus Iraqi Patients .

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ABSTRACT:

BACK ROUND:

The long duration of insulin dependant diabetes mellitus eventually ends with complications like renal impairment especially if it was badly controlled ,the first sign of renal involvement is the elevation of serum uric acid above or near upper normal values(1).

OBJECTIVE:

One hundred and thirty type1 diabetic patients were enrolled in the study, they represent a selected sample of patients who attend the Specialized Center for Endocrinology and Diabetes (Baghdad Russafa Directorate) during the period from November 2006 to April 2007 compared with forty healthy individuals as control group of similar age group.

METHOD :

The determination of fasting blood sugar ,uric acid and blood urea were done by enzymatic colorimetric test following the Procedure performed by manufacturers.

RESULTS:

The level of serum uric acid and blood urea were normal in all cases of juvenile diabetes but as the duration of the disease increases the values of the serum uric acid started to raise and could be the first sign of renal impairment in diabetic patients even before albuminuria..

CONCLUSION:

The concentration of uric acid in the blood is an independent marker of failing kidneys and may even play a causative role in the decline of renal function.

***KEYWORDS*:** serum uric acid, IDDM, blood urea)

INTRODUCTION:

Diabetes mellitus is a group of disorders characterized by persistently raised blood glucose level: (hyperglycemia) which in occasion with elevated blood lipids, leads to many complications [(1)]. Two disease entities are recognized: type 1 [insulin dependent],(lDDM) & type 2 [non insulin dependent],(NIDDM) .The most important form of DM are due to decreased production of insulin, or decreased sensitivity of body tissues to insulin [(2)].The former requires insulin injection, while the later is generally managed with oral medication and only requires insulin if the tablets are ineffective [(3)].The reserve of insulin is related to reduced occurrence of diabetic long – term complications, such as retinopathy, neuropathy and nephropathy [(4,19)]. Type 1 DM, is a chronic auto immure disease, causes destruction of insulin-producing B-cell over a period of years [(5,6,7)]. The sequence of this process is still mostly unknown, and it may take years before β-cell destruction has proceeded so far that the disease becomes overt [(8,9)]and the percentage of type1 is between (5-15%), a condition is characterized by abrupt onset at any age but most commonly around the age of puberty [(10,11)] Urea is the major nitrogen –containing metabolic product of protein catabolism in human ,accounting for more than 75% of the non protein nitrogen eventually excreted ;urea is biosynthesized from deamination of amino acids by hepatic enzymes of urea cycle[(12,13)] more than90% of urea is excreted by kidneys with significant tubular absorption occurs[(14,15)].

Uric acid is the major catabolic product of purine nucleosides ,the large part of the filtered uric acid is reabsorbed by the proximal convoluted tubules and then reabsorbed by the distal tubules ,so the net urinary uric acid is 6%-12% of total amount filtered[(16,17)] .Patients with type 1 diabetes often had a decline in kidney function that is usually thought

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to begin when albumin in the urine reaches a certain level[18,19].
butsuch a decline may begin even earlier, when the urinary albumin levels are normal or near-normal[20,21].

SUBJECT AND METHOD :

One hundred and thirty type1 diabetic patients were enrolled in the study, they represent a selected sample of patients who attend the Specialized Center for Endocrinology and Diabetes (Baghdad Russafa Directorate) during the period form November 2006 to April 2007. Their ages range from (2.5-18) years Various parameters were studied: age, sex, fasting blood glucose , the mean duration of the DM for each group in relation to blood urea and uric acid. As a control, forty apparently healthy persons, their ages ranged from (3-18) years, were included in this study. were included in this study. All volunteers were healthy with normal fasting blood glucose level and were symptoms free with no history of systemic disease and with a negative family history of diabetes

Blood Sampling:

Blood samples were collected by vein puncture using (5m1) disposable syringes, and was placed in the Eppendroff plain tube left to clot for (30 min.) at room temperature and then separated by serum centrifugation at (3000) rpm for (10 min), used for biochemical assay of blood glucose ,blood urea and serum uric acid.

The detection of uric acid :

Principle: the determination of uric acid done by enzymatic colorimetric test following the Procedure performed by manufacturers and the normal range in females was148-357umol/l and in males=180-420 mmol/ L.[16]

The detection of blood urea Principle: the determination of blood urea was done by enzymatic colorimetric test following the Procedure performed by manufacturers and the normal range2.5-7.5mmol/l .[14]

Statistical Analysis:

The suitable statistical methods were used in order to analyze and assess the results; they include SPSS program (version-10) to detect the
t- value at α-level of significance.

RESULTS:

The mean of the fasting blood sugar ,blood urea &serum uric acid was shown in(table 1) and the relation was highly significant at p value =0.001 for the uric acid and also significant for blood urea at p value =0.014.

The level of the blood urea was normal for all the patients as compared with the control (table 2) the results were divided into three groups, 51.5% of (patients) and 77.5%of the(control), were ranging from 2-3.5 m mol/L and 23.1% (patients) &15 % of the (control)were between 3.6-4.5 m mol/L, while 26.4% of the (patients) and 7.5% of the(control) were with in the upper normal limits above4.6 m mol . As the duration of the disease increases the blood urea level tends to be more elevated.

The level of the uric acid was with in normal for all the ID DM-I patients as shown in (table 3) as 66.9% of patients and72.5% of the control were ranging from 100-200 m mol/L ,29.2% of patients and27.5% of the control between 201-300 m mol/L, while 3.8% of the patients and non of the control are with in the upper normal limits above300.m mol , Pearson correlation coefficient between the blood urea and FBS was significant r=0.215 and for uric acid r=0.353 and the relation was highly significant at a value of 0.0001 as shown in table 4.

Table 1:The relation between the blood urea & serum uric acid Levels means of with F.B. Sugar among studied group

Parameters	Studied group	N	Mean	Std. Deviation	Std. Error	P-value
F.B. Sugar m mole/L	Control	40	4.427	0.72	0.11	HS/ 0.001
	Patient	130	13.58	3.93	0.34	
	total	170				
Serum uric acid m mole/L	Control	40	250	20.72	0.11	HS/ 0001
	Patients	130	210	12.86	0.25	
	total	170				
Blood urea m mole/L	Control	40	3	0.40	0.53	S/ 0.014
	Patients	130	4.5	0.85	0.25	
	total	170				

The relation between the duration of the disease and the level blood urea and serum uric acid was positively correlated and significant {r=+0.187,sig.= 0.033} and &{r=+0.175 sig= 0.027}respectively so, as the duration of the disease increases the serum uric acid level tends to be elevated as well before any change in urinary albumin excretion rate.

Table 2: Distribution of blood urea in diabetic patients in relation to the duration of DM in each group.

Blood urea m mol/L	Duration of the DM	patients	percentage	control	percentage
2-3.5	1month-2years	67	51.5%	31	77.5%
3.6-4.5	3-5years	30	23.1%	6	15%
above 4.6	6-12years	33	26.4%	3	7.5%
TOTAL		130	100%	40	100%

Table 3: The distribution of the serum uric acid in diabetic patients in relation to the duration of DM in each group.

Serum uric acid m mol/L	Duration of the DM	patients	percentage	control	percentage
100-200	1month-2years	87	66.9%	29	72.5%
201-300	3-5years	38	29.2%	11	27.5%
301-400	6-12years	5	3.8%	non	0%
Total		130	100%	40	100%

Table 4: The correlation between parameters (Duration of disease, blood urea and serum uric acid.

Duration (Year)	Pearson correlation coefficient	BLOOD UREA	URIC ACID
	r	0.187	0.175
	Sig.	0.033	0.047
	C.S	S	S
Blood urea	r		0.194
	Sig.		0.o27
	C.S		S
F.B.S	r	0.215	0.353
	Sig.	0.014	0.0001

DISCUSSION:

The survival of patients represents by long disease duration which inversely proportionate with the disease complications such as nephropathy, high blood pressure and diabetic foot.

Some diabetic patients develop kidney failure before the age of 30 years and this could be due to sustained hyperglycemia ,recurrent UTI ,raised intraglomerular pressure with hypercholestolaemia[(1)].

Renal impairment could pass throw five stages 1st stage is the hyper filtration ,silent ,incipient, overt and sever kidney disease stage ; in the first two stages the damage is trivial and could be reversed by good glycemic control and regular insulin intake ([1,19)].

Later in the third stage ;the patients with type 1 diabetes develop a slight elevation in the serum uric acid concentration , to be followed by micoalbominuria which could an early signal of kidney failure, in our study the serum uric acid and blood urea found to be elevated as the duration of the disease increases ,the above results agree with that of other studies abroad like Gross, Philips *et al* and Rosolowsky [(1,21,22)] .

The good control of DM before the overt stage will delay renal impairment ,so according to this findings the possibility of manipulating serum uric acids levels might help slow or prevent kidney deterioration in these patients also we should change the dietary habits of the patient toward reduction of protein contents .This discovery still needs more investigations but "we have the hope of having a means to thwart the loss of kidney function while function is still in a relatively preserved stage." [(21,22)].

CONCLUSION:

The concentration of uric acid in the blood is an independent marker of failing kidneys and may even play a causative role in the decline of renal function.

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