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Estimation the Levels Magnesium and Uric Acid in Patients with Femur Fractures and Their Risk Fracture Incidence

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ABSTRACT

The case control study was conducted in Baghdad city for the period from March 1, 2019 to June 1, 2019. This study aimed to evaluate why Uric acid and magnesium are necessary to monitored during and after femur fractures. The current study included a comparison of a total of patients with various femoral fractures (35 patients) with a group of healthy people (35 person) who did not show any symptoms of chronic diseases who were blood donors. Where all the information was collected from patients reviewing the fracture hallways in Yarmouk General Hospital in the city of Baghdad, such as the patient's age, gender, smoking and living conditions, as well as the body mass index and other information. Three ml blood samples were collected from all the healthy and healthy men in the study to estimate the levels of magnesium and uric acid using the tests available in the local market. The study demonstrated that elevated uric acid was found in 28.57% of patients with femur fractures while 57.14% of healthy individuals were with elevated level of UA with a significant difference (P<0.01). The study revealed that 46.66% of male patients with femur fractures affected by elevate UA compared with 15% of females (P<0.05). The study indicated that the serum magnesium level was elevated significantly in patients with femur fractures affected as compared with healthy ones (305.7±17.3 versus 221.7±10.2 Mg/dl) (P<0.01). The study found that Mg+ level was elevated more frequently in females wile uric acid was reduced in females and this lead to the knowledge that femur fracture was occurred more in females than in males. The study showed negative correlation between magnesium and uric acid in patients with femur fractures. It was concluded that elevated uric acid was found in low rate of patients with femur fractures Mg+ level was elevated more frequently in them.

Keywords: Magnesium; Uric acid; Femur fracture

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INTRODUCTION

The role of nutrition in bone health is quite important. Adopting a balanced diet, rich in nutrients, minerals, and vitamins, can contribute significantly to bone health. Proper nutrition is an essential parameter of skeletal health, participating in both the prevention and the treatment of bone diseases[(1)]. Uric acid (UA) is the end product from the breakdown of purines in humans[(2)]. Numerous studies have demonstrated that high serum UA is a relevant risk factor for a wide variety of diseases, including metabolic syndrome, cardiovascular disorders, etc[(3)]. Hyperuricemia is found to be associated with diabetes, obesity, and hypertension, which could contribute to an increasing risk of developing several poor health conditions, including disability and mortality[(1)]. Magnesium is an essential trace element that plays a key role in several cellular processes including nucleic acid synthesis, enzymatic reactions, and cell replication. It is also an important component of bone, with 67 percent of total body magnesium known to be found in the bone tissue [(5)]. A number of factors are known to play an important role in bone health and these include ageing, heritability, sex, physical activity, hormonal factors and nutrition [(6)]. Investigations of the effect of nutrition on bone health has mostly focused on specific dietary factors such as calcium and vitamin D. There have been suggestions that magnesium might also be linked with bone heath[(7)]. In bot human and animal experimental models, magnesium deficiency has been shown to be associated with decreased osteoclastic and osteoblastic activity, osteopenia and skeletal fragility [(8)]. More than 10 million individuals in the United States are estimated to have osteoporosis, and an additional 30 million have osteopenia [(9)]. Uric acid is the final product of purine metabolism in humans and higher primates, and has been postulated to play a role in antioxidation, although the relative importance of uric acid as antioxidant *in vivo* remains controversial [(10)]. [(3)]. This study aimed to evaluate why Uric acid and magnesium are necessary to monitored during and after femur fractures.

MATERIALS AND METHODS

The case control study was conducted in Baghdad city for the period from March 1, 2019 to June 1, 2019, The current study included a comparison of a total of patients with various femoral fractures (35 patients) with a group of healthy people (35 person) who did not show any symptoms of chronic diseases who were blood donors. Where all the information was collected from patients reviewing the fracture hallways in Yarmouk General Hospital in the city of Baghdad, such as the patient's age, gender, smoking and living conditions, as well as the body mass index and other information. Three ml blood samples were collected from all the healthy and healthy men in the study to estimate the levels of magnesium and uric acid using the tests available in the local market.

FINDING

Table 1: Classification of body mass index (BMI) by WHO.

BMI	Classification
<18.5	underweight

18.5-24.9	normal
25.0-29.9	overweight
30.0-34.5	Obesity(class I)
35.0-39.9	Obesity(class II)
>40	Extreme obesity (class III)

The study demonstrated that elevated uric acid was found in 28.57% of patients with femur fractures while 57.14% of healthy individuals were with elevated level of UA with a significant difference (P<0.01), Table 2.

Table 2: Relation of uric acid with femur fracture.

Sex	No.	Uric acid level (mg /dl)						*P.* value
		Decreased		Normal		Elevated		
		No.	%	No.	%	No.	%	
Patients	35	5	14.29	20	57.14	10	28.57	0.008
Control	35	5	14	10	28.57	20	57.14	

The study revealed that 46.66% of male patients with femur fractures affected by elevate UA compared with 15% of females (P<0.05), Table 3

Table 3: Distribution of uric acid level in O A patients according to their sex.

Sex	No.	Uric acid level (mg /dl)						*P.* value
		Decreased		Normal		Elevated		
		No.	%	No.	%	No.	%	
Male	15	0	0	8	53.33	7	46.66	
Female	20	5	25	12	60	3	15	0.031

The study indicated that the serum magnesium level was elevated significantly in patients with femur fractures affected as compared with healthy ones (305.7±17.3 versus 221.7±10.2 Mg/dl) (P<0.01), Table 4.

Table 4: Level of magnesium in patients with femur fractures and healthy control

	Study groups				*P.* value
	Patients with femur fractures		Control group		
	No.	Mean ± S.D	No.	Mean ± S.D	
Magnesium level (Mg/dl)	35	305.7±17.3	35	221.7±10.2	0.001 (HS)

The study found that Mg+ level was elevated more frequently in females wile uric acid was reduced in females and this lead to the knowledge that femur fracture was occurred more in females than in males, Table 5

Table 5: Relation of Mg+ and uric acid mean level with sex

	Sex				*P.* value
	Male		Female		
	No.	Mean ± S.D	No.	Mean ± S.D	
Uric acid level	15	6.087±0.190	20	4.577±0.81	0.001 (HS)
Magnesium level		291.7±19.5		331.7±20.1	

The study showed negative correlation between magnesium and uric acid in patients with femur fractures (Figure 1)

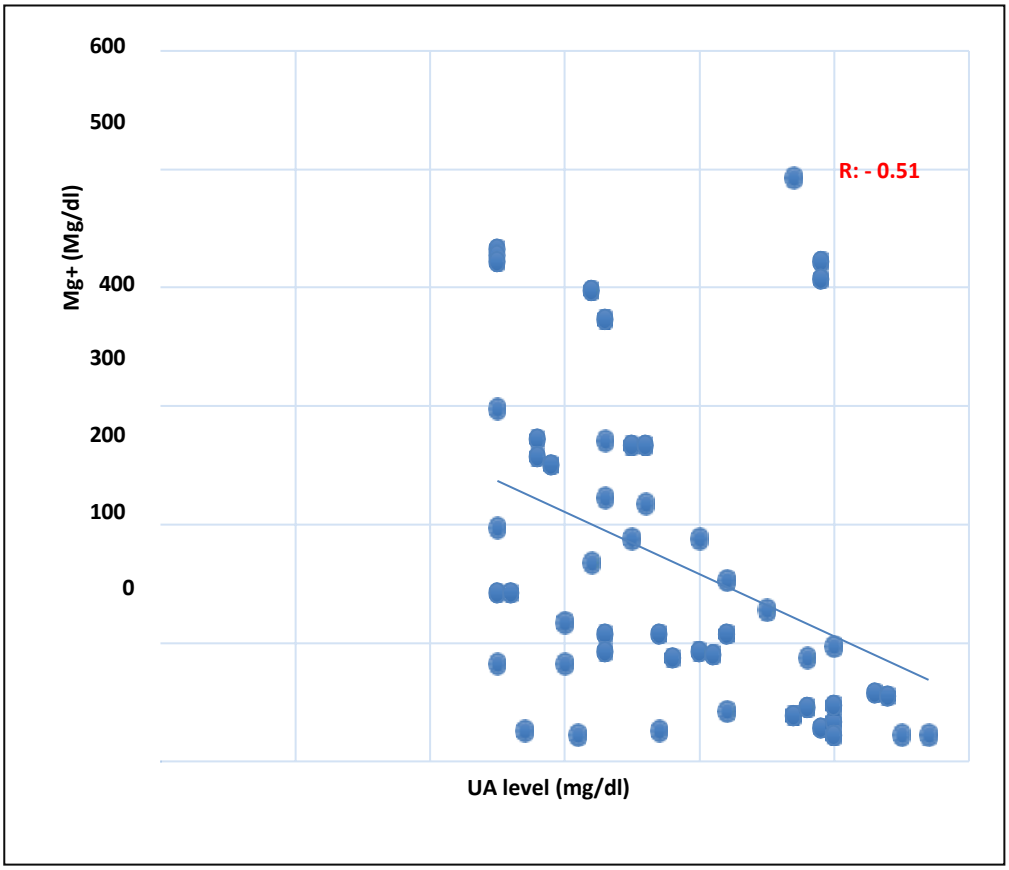

Figure 1: Correlation between magnesium and uric acid in patients with femur fractures

DISCUSSION

The current study found that the levels of magnesium and uric acid are different and opposite in patients with fractures of the thigh, as the level of uric acid was low or normal in most patients, while the level of magnesium was high in patients compared to the control group in the study.. Our study was consistent with many recent studies that It was conducted in different regions of the world. Where a previous study conducted in the past decade found that the level of uric acid was high in a small percentage of patients with fractures of the femur compared to healthy people (11). Another study found that the high level of uric acid was in a small percentage of patients with fractures of the femur and that most of these patients had normal results with regard to the level of uric acid (12). While other studies found that most of the people with fractures of the femur were female (13,14), while implicitly it is consistent with the results of our current study that concluded that 20 out of 35 patients were female. A previous study showed that the level of uric acid was normal or more low in females with fractures of the femur (14). While another study concluded that the high level of uric acid is of great importance in preventing the occurrence of fractures (15) and that its high level could be as a protection wall against fractures. Regarding the relationship of the magnesium level and femoral fractures, several studies have found that a high level of magnesium may lead to osteoporosis (16,17). Another study found that the level of magnesium was high in people with fracture of the femur compared to the control group and that most people with fractures with an increase in the level of magnesium were female (18). While a new qualitative study found thata low level of magnesium in people exposed to fractures may reduce their incidence in them, especially if their levels are adjusted to them through the regulation of their diet (19).

CONCLUSION

It was concluded that elevated uric acid was found in low rate of patients with femur fractures Mg+ level was elevated more frequently in them.

CONFLICT OF INTEREST

None

SOURCE OF FINDINGS

Self-findings.

ETHICAL CLEARANCE

This research was carried out with the patient's verbal and analytical approval before the sample was taken.

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