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Serum Level of Vitamin D in Patients with Kidney Transplantation in Gorgan (South East of Caspian Sea), Iran

[1]Mohammad Mojerloo, [2]Abdoljalal Marjani and [3]Maryam Bagheryan lamraski

[1]Department of Internal Medicine,
Gorgan Faculty of Medicine, Golestan University of Medical Sciences, Iran
[2]Department of Biochemistry and Biophysics, Biochemistry and Metabolic Disorder, Iran
Research Center, Gorgan Faculty of Medicine, Golestan University of Medical Sciences, Iran
[3]General Practioner, Gorgan Faculty of Medicine, Golestan University of Medical Sciences, Iran

Abstract: Patients who received kidney transplantation, vitamin D deficiency is probable due to deficient sun exposure and the lag between transplant and normal kidney function. In this study, serum level of vitamin D was assessed in patients with kidney transplantation and normal population. All transplant patients in 5 Azar hospital and clinics of Gorgan were recruited. The results show that among kidney transplant receivers and control subjects, 55.1% and 2% had significantly 25-hydroxyvitamin D deficiency, 42.9% and 63.3% significantly 25-hydroxyvitamin D insufficiency, respectively. In kidney transplant receivers, there was one person with normal 25-hydroxyvitamin D level. The time passed from the transplantation had no significant effects on serum level of vitamin D and was lower in those with higher time passed. It could be concluded that there is high prevalence of 25-hydroxyvitamin D insufficiency and deficiency after kidney transplantation (98% of our patients), without considering of transplantation time. In accord with recent informs, we suggest it very necessary that status of vitamin D deficiency/insufficiency are corrected in kidney transplant patients. Hence, supplementing of vitamin D appeared to be the only possible ways of making better and correcting vitamin D status in kidney transplant receivers.

Key words: Vitamin D • Kidney transplantation • Gorgan

INTRODUCTION

Vitamin D is a steroid hormone and shows a significant role in calcium metabolism. Levels of serum 25-hydroxyvitamin D express storages of body vitamin D and are used as an amount of vitamin D position in the body [1]. There are limited sources of vitamin D in Natural dietary, foods like fish and to a lesser degree meat, eggs, milk and dairy products are sources of vitamin D [2]. Deficiency of vitamin D is collaborated with elevated risk of cancer, type 1 diabetes mellitus, multiple sclerosis and cardiovascular unhealthiness in the number of people [3-4]. Vitamin D deficiency is very common in the number of people of the United States and in some countries that they are far from the equator with limited sunshine [4]. In People with chronic kidney disease or a person after transplantation, the risk of vitamin D deficiency is elevated. Kidney transplant receivers must keep away from exposure to sunshine for protection from skin cancer. Therefore, the increasing of risk of vitamin D deficiency in these patients may happen. One of the standard treatment alternatives in patients with end stage renal disease at this moment is Kidney transplantation, which can give chances for all patients [5, 6]. Measurements of 25-hydroxyvitamin D levels before kidney transplant revealed just approximately15% of kidney transplant receivers have sufficient vitamin D levels at the time of transplantation [7, 8]. Vitamin D deficiency stays a usual difficulty after kidney transplantation in kidney transplant receivers. They are informed to keep away from direct sun exposure. There is high risk of skin cancer in these patients [9]. Study of Querings *et al*. in 31 kidney

Corresponding Author: Abdoljalal Marjani, Gorgan Faculty of Medicine, Department of Biochemistry and Biophysics, Biochemistry and Metabolic Disorder Research Center, Gorgan Faculty of Medicine, Golestan University of Medical Sciences, Gorgan, Golestan Province, Iran.
Tel/Fax: +98(171)4421651 and 4440225.

transplant receivers showed that serum 25 hydroxyvitamin D levels were significantly lower in kidney transplant receivers when compared with an age- and sex-matched control subject [10]. Study of Stavroulopoulos *et al*. showed that insufficient amount of serum 25-hydroxyvitamin D to be present in 43%, deficiency in 46% and severe deficiency in 5% kidney transplant receivers [11]. The National Kidney Foundation has carefully planned clinical practice programs that imply that measurement of 25-hydroxyvitamin D is significant in patients with chronic kidney disease [12]. In chronic kidney disease patients, the prevalence of 25-hydroxyvitamin D deficiency and insufficiency is high and it is variable from70% to 80%, without considering of geographic locality [13, 14]. Increased risk for bone disease and other diseases like colon, prostate and breast cancer is also collaborated with vitamin D deficiency [15-17], because of these effects, it is necessary to screen for vitamin D deficiency in kidney transplant patients [18-20]. The present study aimed to assess the level of 25-hydroxyvitamin D in patients with kidney transplantation in Gorgan (South East of Caspian Sea), Iran.

MATERIALS AND METHODS

In this cross-sectional study, all transplant patients (49 adults) in 5th Azar Hospital and clinics of Gorgan were recruited. There were 18 males and 31 females kidney transplant receivers and 4 males and 45 females control subjects respectively. The transplantation time was less and more than 5 years respectively. The control subjects were healthy blood donors who referred to Gorgan blood transfusion center. Blood samples were obtained from both groups. Kidney transplant receivers had not been treated with Insulin, vitamin D and they had no history of hepatic disorder, acute illness, life-threatening, any other competitive illness, mental disorders and severe malabsorption. Serum 25-hydroxyvitamin D levels in kidney transplant receivers were analyzed and compared with an age- and sex-matched control subjects. Serum 25 hydroxyvitamin D levels were assessed with Elisa kit both in kidney transplant receivers and in the control subjects. BMI was calculated as weight in kilograms divided by height in meters squared [21]. The results of serum 25OHD analyzing were stratified as follows: 25-hydroxyvitamin D deficiencies (<25 nmol/mL) or insufficiency (25-75 nmol/mL) or normal (76-250 nmol/mL), according to Elisa kit. Data are presented as means±SD and percentiles. Serum levels of 25-hydroxyvitamin D in kidney transplant receivers and in the control subjects were compared using a Chi square, t-test and linear regression analysis. $P < 0.05$ was considered significant.

RESULTS

The mean age of the patients and control subjects were 35.59 ±10.4 and 35.06 ±13.4 years, respectively. A number of obvious differences between the two subjects is found. Data of Table 1 shows that the kidney transplant receivers are significantly lowers 25-hydroxyvitamin D than control subjects ($P< 0.05$). It was about one third in transplant patients. There was no significant difference in BMI in kidney transplant receivers and control subjects. Data of Table 1 shows that among kidney transplant receivers and control subjects, 55.1% and 2% had significantly 25-hydroxyvitamin D deficiency, 42.9% and 63.3% significantly 25-hydroxyvitamin D insufficiency, respectively. In kidney transplant receivers, there was one person with normal 25-hydroxyvitamin D level. The time passed from the transplantation had no significant effects on serum level of vitamin D and was lower in those with higher time passed. There was no correlation between 25-hydroxyvitamin D and transplantation time, age and BMI in kidney transplant receivers (Table 2).

DISCUSSION

This study was planned to examine the levels of 25-hydroxyvitamin D in the kidney transplant receivers and compared it with healthy subjects. The most of kidney receivers had low 25-hydroxyvitamin D levels: 55.1% showed a deficiency and 42.9% had an insufficiency. The healthy subjects had 25-hydroxyvitamin D levels: 2% showed a deficiency and 63.3% had an insufficiency. Our results are almost the same as reported by those studied from England by Stavroulopoulus *et al*. [11], in such a way 94% had 25-hydroxyvitamin D deficiency or insufficiency. Additionally, serum levels of 25-hydroxyvitamin D in our kidney transplant receivers were lower than those studied among healthy subjects. Our results recommended that vitamin D deficiency/insufficiency is nearly general, which is influencing number of people and also the kidney transplant receivers. Studies of Querings 10, Boudville [22] and Marecen *et al*. [23] showed that kidney transplant receivers had higher level of 25-hydroxyvitamin D deficiency or insufficiency when compared with healthy subjects. Our results are in agreement with the findings of some other studies [10, 22-23]. Additionally,

Table 1: Comparison of serum 25-hydroxyvitamin D between kidney transplant receivers and control subjects

Parameters	Kidney transplant receivers (n=49)	Healthy subjects (n=49)
Age (years)	35.59±10.4	35.06±13.6
Gender		
Males, n (%)	31 (63. 3%)	45 (91.8%)
Females, n (%)	18 (36.7%)	4 (8.2%)
BMI (kg/m²)	23.55±36.8	23.82±36.9
Serum 25(OH) D (nmol/ml)	19.23±27.63*	52.76±78.49
Serum 25(OH) D		
Deficiency, n (%)	27 (55.1%)*	1 (2%)
Insufficiency, n (%)	21 (42.9%)*	31 (63.3%)
Normal, n (%)	1 (2%)*	17 (34.7%)
Transplantation time more than 5 yearas		
Serum 25(OH) D (nmol/ml)	23.42±16.72	-
Transplantation time less than 5 yearas		
Serum 25(OH) D (nmol/ml)	29.86±20.23	-

*P<0.05, statistically significant

Table 2: Relationship between 25-hydroxyvitamin D and independent variable in linear logistic regression models

	Unstandardized Coefficients		
Parameters	SE	B	p-value
Transplantation time (year)	11.35	-1.437	0.212
Age (year)	2.89	-0.358	0.212
BMI (kg/m^2)	9.58	-0.508	0.598

in our transplant receivers, mean concentration of 25-hydroxyvitamin D were lower than those healthy people. In our study, we showed that kidney transplant receivers are at high risk for vitamin D deficiency/ /insufficiency and have significantly lower levels of 25-hydroxyvitamin D when compared with control subjects. There is general unanimity that the determination of serum 25-hydroxyvitamin D is the best way that indicate vitamin D status [1]. The range values for vitamin D deficiency/ insufficiency are comprehensively discussable in the different studies, principally due to differences in study populations and the vitamin D assays used. The reasons of low 25-hydroxyvitamin D levels are not completely clear. In these patients, lack of vitamin D could be as a result of decreased skin synthesis, losing by urine and elevated metabolic breakdown of 25-hydroxyvitamin D. In this study, we have not considered correlations of 25-hydroxyvitamin D levels with variables such as transplantation time, age and BMI. The results of our study may need to compare to other countries. Because of differences in the sunlight exposure, dressing habitual in this area, not consuming vitamin D supplementation and in the strengthening of milk products with vitamin D, prologue in differences in vitamin D status between different populations [24]. It could be concluded that there is high prevalence of 25-hydroxyvitamin D insufficiency and deficiency after kidney transplantation (98% of our patients), without considering of transplantation time. In accord with recent informs, we suggest it very necessary that status of vitamin D deficiency/insufficiency are corrected in kidney transplant patients. Hence, supplementing of vitamin D appeared to be the only possible ways of making better and correcting vitamin D status in kidney transplant receivers.

Conflict of Interests: Authors have no conflict of interests.

Authors' Contributions: Mohammad Mojerloo took part in study design, interpretation of the manuscript.

Abdoljalal Marjani took part in study design, statistical analysis,writing and interpretation of the manuscript. Maryam Bagheryan lamraski collected data. All authors have read and approved the content of the manuscript.

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