Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/cqn

Original Article

Graft function and nutritional parameters in stable post renal transplant patients

Anita Saxena [a,*], *R.K. Sharma* [b], *Amit Gupta* [c]

[a] *Associate Professor, Department of Nephrology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Raebarely Road, Lucknow, Uttar Pradesh 226014, India*

[b] *Head, Department of Nephrology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Raebarely Road, Lucknow, Uttar Pradesh 226014, India*

[c] *Professor, Department of Nephrology, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Raebarely Road, Lucknow, Uttar Pradesh 226014, India*

ARTICLE INFO

Article history:
Received 23 October 2013
Accepted 26 November 2013
Available online 19 December 2013

Keywords:
Bioelectrical impedance
Nutritional status
Renal transplant
GFR

ABSTRACT

Bioelectrical Impedance Analysis (BIA) is a noninvasive and bedside tool for assessment of nutritional status. It is expected that patients who have undergone successful renal transplant will have good nutritional intake and steadily the patient will return to normal health and have good nutritional status.

Objective: The aim of the study was to evaluate effect of graft function on nutritional status in post renal transplant patients with borderline to good allograft function using BIA.

Material and methods: For this study, 45 post-renal transplant patients with mean serum creatinine 1.42 ± 0.42 mg% and glomerular filtration rate (GFR) 45.1 ± 14.1 ml/min were subjected to bioimpedance analysis. Several parameters were evaluated. Based on BIA derived GFR, patients were divided into two groups (group 1: borderline graft function GFR < 40 ml/min, X = 27.34 ± 9.1 ml/min and group 2: good graft function GFR ≥ 40 ml/min, X = 51.60 ± 9.16 ml/min). Patient data were compared with 30 healthy individuals.

Results: There was significant difference between healthy controls and the post transplant patients. Based on GFR, there was significant difference in patient groups in body weight ($p = 0.01$), serum creatinine ($p = 0.005$), BMI ($p = 0.000$), fat free mass ($p = 0.003$), fat mass ($p = 0.003$), body cell mass ($p = 0.000$), dry weight ($p = 0.001$). Patients with borderline GFR had higher serum creatinine but significantly lower body weight, BMI, FFM, FM, and dry weight, indicating poorer nutritional status as compared to those with good graft function. Based on phase angle, there was significant difference between groups A and B in GFR ($p = 0.000$), extracellular water ($p = 0.015$), intracellular water ($p = 0.002$), plasma fluid ($p = 0.016$), interstitial fluid ($p = 0.016$), body cell mass ($p = 0.024$). SGA scores showed that transplant patients had normal nutritional status, but when compared with healthy individuals, there was significant difference in the fat mass, fat free mass and body cell mass as assessed by BIA.

* *Corresponding author*. Tel.: +91 9453019812; fax: +91 522 2668572.
E-mail addresses: anitimmy@sgpgi.ac.in, anitimmy@yahoo.com (A. Saxena).

http://dx.doi.org/10.1016/j.cqn.2013.11.010

Conclusion: Compared to patients with good graft function, patients with borderline GFR showed evidence of early nutritional depletion as picked up by BIA implying nutritional deficiency sets in with reduction in GFR (<40 ml/min) which may not be picked up by subjective global assessment but is objectively detected by BIA.

1. Introduction

Accurate nutritional assessment is becoming an integral part of the clinical evaluation of individuals with compromised organ systems. Calculations of biochemical and anthropometric indexes, immunological tests, as well as subjective assessments based on clinical examination are now being used to determine patients' nutritional status.[1,2] Use of conventional anthropometric indexes are questionable because of limitations inherent to technique and their poor inter- and intra-examiner reproducibility, variability in calibration of skin fold calipers, inconsistency in identification of the measurement site, and possible presence of generalized edema limit the performance of accurate anthropometry.[3] Bioelectrical Impedance Analysis (BIA) has been shown to be a safe, noninvasive, rapid, validated and reproducible method for assessment of body composition and nutritional status[4] both in health and disease. Patients with end-stage-renal-disease (ESRD) are worst affected in terms of nutritional intake. With a successful renal graft it is expected that nutritional intake of the patient improves and steadily the patient returns to normal health and nutritional status. Renal transplant patients have received little attention concerning nutritional markers and body composition. This study was undertaken to evaluate the effect of graft function on nutritional status in post renal transplant patients with borderline to good allograft function using BIA.

2. Patients and methods

Forty-five post renal transplant patients (male 41; female 4) were subjected to anthropometry and wrist-to-ankle multifrequency BIA using 915/916 Bioscan (Meltron, UK). The research project was approved by institute's ethics committee. Table 1 shows descriptive statistics of patients and controls. The subjective global assessment scoring was done for assessment of nutritional status of the patients. Patients had normal SGA scores. All the patients were on 2 or 3 immunosuppressive drug regimen (prednisolone, Azathioprine, MMF and/or CsA). Based on glomerular filtration rate (GFR ml/min) as calculated by Bioscan, patients were divided into two groups (group 1: borderline graft function GFR $<$ 40 ml/min and group 2: good graft function GFR $\geq$ 40 ml/min). Phase angle which is a good indicator of health is associated with cell death and catabolic processes. Phase angle more between 4 and 15 reflects good health. Based on BIA derived phase angle, patients with phase angle <4 were grouped as A (poor health group $n = 12$) and those with phase angle >4 as B (healthy group $n = 33$). Patients were compared with thirty healthy individuals (male 21; female 9). BIA parameters include phase angle, dry weight, total body water (TBW), extracellular water (ECW), intracellular water (ICW), fat free mass (FFM), fat mass (FM), body cell mass (BCM), muscle mass (MM) total body potassium (TBP), total body calcium (Ca) and glycogen, plasma fluid, interstitial fluid (Ints. fl.) and extracellular solids (ECS). Student's *t* test (SPSS version 10.0) was used to study the differences between groups.

3. Results

3.1. *Differences between patients and controls*

Student's *t* test showed that there was a significant difference in the parameters of controls and the post transplant patients (Table 2). Compared to controls, patients had low body weight, impedance, phase angle, resistance, reactance, BMI, BCM, FM, FM%, GFR, dry weight but high serum creatinine, ECM and FFM%.

3.2. *Differences between patient groups*

Table 3 shows differences in GFR based patients groups. Patients with good graft function had higher body weight, BMI, FFM, FM and BCM, TBW, ICW, ECW, TBP CA and glycogen compared to those with borderline graft function. Patients with borderline GFR had higher serum creatinine but significantly lower body weight, BMI, FFM, FM, BCM, total body potassium, calcium and glycogen and dry weight indicating poorer nutritional status as compared to those with good graft function.

3.3. *Differences in nutritional parameters in patient groups based on phase angle*

On analyzing data based on phase angle (groups A and B), there was significant difference in the nutritional parameters

Table 1 – Descriptive statistics of patients and controls.

Parameter	Post transplant ($n = 45$)	Normal ($n = 30$)
Age (years)	39 ± 10.2	42.6 ± 11.6
Sex	Male	Male 21; Female 9
Height (cm)	165.5 ± 5.94	163.4 ± 9.37
Weight (kg)	59.1 ± 8.67 kg	64.6 ± 9.54
BMI	21.5 ± 3.3	24 ± 2.3
Serum creatinine mg%	1.42 ± 0.42 mg%	0.95 ± 0.24
GFR ml/min	45.1 ± 14.1	69.7 ± 22.8
Immunosuppressive medication	2–3	Nil