



Visceral Adiposity and not Only Total Body Fat Content Should Be Viewed as a Critical Parameters in Health Prognosis in Renal Failure

Giorgos K. Sakkas^{1,2*}

¹ Institute of Human Performance and Rehabilitation, Centre for Research and Technology Thessaly, Larissa, Greece

² Department of Nephrology, School of Medicine, University of Thessaly, Larissa, Greece

ARTICLE INFO

Article type:

Letter to Editor

Article history:

Received: 07 Aug 2011

Revised: 16 Aug 2011

Accepted: 28 Aug 2011

Keywords:

Adiposity

Renal Insufficiency

Please cite this paper as:

Sakkas GK. Visceral Adiposity and not Only Total Body Fat Content Should Be Viewed as a Critical Parameters in Health Prognosis in Renal Failure. *Nephro-Urol Mon.* 2012; **4**(1):393-4. DOI: 10.5812/kowsar.22517006.2028

Copyright © 2012, Kowsar M.P.Co. All rights reserved.

Dear Editor,

Recently Molnar and Kalantar-Zadeh published a thought-provoking review article discussing the “obesity paradox” and its link to survival in dialysis patients and renal transplant recipients (1). The authors carefully examined the literature reporting on the reverse epidemiology of obesity in dialysis patients as well as the literature on the association between pre-transplant obesity and post-transplant outcome. The authors concluded that a higher BMI score appears to provide an advantage in dialysis patients’ survival while the data for the renal transplant patients are still unclear. They also convincingly argued that the BMI as a sole index of obesity does not represent a true body composition status, something critical for a patient since this index ignores significant parameters that affect survival such as total lean body mass and fat content. They concluded that further research is need to “better understand the association between obesity, muscle mass and body composition”.

Published and preliminary data from our group agree

with the authors’ conclusions, however, we believe that we have evidence that allows us to add further detail in the discussed association between obesity and survival in dialysis patients. We believe that the amount of total body fat is not as an important factor as the area of fat deposition is. For example, we have shown that dialysis patients with different BMI scores ($n = 43$, 23.5 ± 3 vs. 26.5 ± 4 , $P < 0.01$) showing no differences in per cent body fat assessed by DEXA (26.4 ± 12.8 vs. 26.3 ± 13.4 , $P = 0.910$) were revealed to present with different levels of visceral adiposity (VAT) when assessed by CT; the differences rising up to 70% (VAT/TAT, 0.3 ± 0.1 vs. 0.5 ± 0.1 , $P < 0.01$) between the examined groups (2). In our study these high levels of visceral adiposity were related to the presence and severity of the apnoea-hypopnea syndrome ($r = 0.734$, $P < 0.01$) and of low oxygen saturation during sleep ($r = -0.512$, $P < 0.01$) with both parameters known to significantly affect patients’ survival (2). Still, even more important is the recognition that visceral adiposity is associated with metabolic disturbances and the cardio-metabolic syndrome (3, 4).

In another study with dialysis patients, we showed that sleep apnea did not directly relate to BMI or to total body fat (5). This was the first study to show that the paradox of reverse epidemiology may also apply to obesity as a predictor of respiratory sleep disorders. We concluded that it was rather the increased visceral adiposity than

* Corresponding author: Giorgos K. Sakkas, Department of Nephrology, University Hospital of Larissa, Hemodialysis Unit, Mezourlo Hill, 41110, Larissa, Greece. Tel: +30-2410681667, Fax: +30-2410670242, E-mail: gsakkas@med.uth.gr

total body fat that became the strong predictor for sleep disturbances in this particular population ($r = 0.41$, $P = 0.02$) (5).

Similarly, in another instance, where we aimed to identify contributors to insulin resistance and to glucose intolerance in non-diabetic dialysis patients, we observed that only the amount of visceral adiposity (and intrahepatic fat content) and not the BMI or % of body fat seemed to be involved in the development of insulin resistance (6). Even though, the above mentioned studies do not have the bearing that large epidemiological studies have, they were carefully planned studies using gold standard methodology such as DEXA and Computer Tomography in order to assess body composition in detail.

We agree with Dr. Molnar and Professor Kalantar-Zadeh that BMI does not have any discriminatory power to differentiate between fat and lean body mass content and therefore, we agree that the use of BMI is not the best approach for estimating body composition and especially for the purposes of excluding patients from the transplantation waiting lists. Even techniques like DEXA cannot give us the information needed regarding fat distribution to the splanchnic area, information that can be provided by CT or by MRI. In the absence of the appropriate methodology to assess visceral adiposity and lean body mass, a simple waist to hip ratio measurement in combination with a functional test (a way to estimate muscle mass) can provide us with a rough estimation of the body composition status of the patients that will help to not discriminate them based solely on BMI.

From the above it is therefore clear that body composition plays an important role in ESRD patients' survival. Lean body mass and per cent body fat are important factors. However, we believe that the "total fat content" is not the only "bad guy" in this story. It remains to be seen by larger studies whether means of reducing visceral fat in dialysis patients would also improve mortality and morbidity as well as post-transplant outcomes.

References

1. Molnar M, Kalantar-Zadeh k. Body Composition and Outcomes in Dialysis Patients and Renal Transplant Recipients. *Nephro-Urol Mon.* 2011;**3**(3):155-63.
2. Sakkas GK, Gourgoulialis KI, Karatzaferi C, Liakopoulos V, Maridaki MD, Pastaka C, et al. Haemodialysis patients with sleep apnoea syndrome experience increased central adiposity and altered muscular composition and functionality. *Nephrol Dial Transplant.* 2008;**23**(1):336-44.
3. Arsenault BJ, Lachance D, Lemieux I, Almeras N, Tremblay A, Bouchard C, et al. Visceral adipose tissue accumulation, cardiorespiratory fitness, and features of the metabolic syndrome. *Arch Intern Med.* 2007;**167**(14):1518-25.
4. Alam I, Lewis K, Stephens JW, Baxter JN. Obesity, metabolic syndrome and sleep apnoea: all pro-inflammatory states. *Obes Rev.* 2007;**8**(2):119-27.
5. Sakkas GK, Karatzaferi C, Liakopoulos V, Maridaki MD, Lavdas E, Giannaki CD, et al. Polysomnographic evidence of sleep apnoea disorders in lean and overweight haemodialysis patients. *J Ren Care.* 2007;**33**(4):159-64.
6. Sakkas GK, Karatzaferi C, Zintzaras E, Giannaki CD, Liakopoulos V, Lavdas E, et al. Liver fat, visceral adiposity, and sleep disturbances contribute to the development of insulin resistance and glucose intolerance in nondiabetic dialysis patients. *Am J Physiol Regul Integr Comp Physiol.* 2008;**295**(6):R1721-9.