

## Letters to the Editor – Comments on published articles

# Is there any association between overhydration and inflammation in dialysis patients?

## ¿Hay alguna relación entre la sobrehidratación y la inflamación en pacientes en diálisis?

Dear Editor,

In a recent issue of *Nefrología*, we read the paper of Dr Vega and colleagues entitled “Study on overhydration in dialysis patients and its association with inflammation”.<sup>1</sup> We thank for their valuable research evaluating hydration status and body composition in patients on haemodialysis and its relation to inflammation. They found an association between hydration status and low prealbumin (transthyretin) levels. We want to make some comments on transthyretin (TTR) which was assessed in their study.

Serum TTR has been reported to be a reliable outcome predictor in patients with kidney disease.<sup>2</sup> Previous studies suggested that several factors can affect serum TTR levels. Disorders such as anorexia nervosa, bulimia nervosa, rheumatoid arthritis, ankylosing spondylitis, major depression, trauma, malignancy, protein losing enteropathy, Kawasaki disease, liver diseases, *Helicobacter pylori* infection and thyroid diseases were shown to alter serum TTR levels.<sup>3,4</sup> Vega et al. did not mention these contributing diseases in their paper.

Several drugs such as anabolic steroids, corticosteroids, progestational agents, estrogens, antithyroid drugs and non-steroidal antiinflammatory drugs can alter serum TTR levels.<sup>5,6</sup> Also, dietary supplements such as vitamin A, vitamin C, zinc and omega-3 fatty acids can alter these levels.<sup>7,8</sup> In this respect, the authors should define whether the participants use any of these drugs and dietary supplements. In addition, alcohol usage is another confounder that should be described whether the participants use.<sup>9</sup>

Lastly, we think that body position is essential to state while taking blood specimen. It is recommended that blood specimens for measuring plasma proteins be taken after nearly 15–20 min in the sitting position.<sup>5</sup> Otherwise, concentrations should be evaluated with consideration of position. Lower levels are to be expected in bedridden patients.<sup>5</sup> Therefore, interpretation of results with its current form seems problematic.

Mears and many researchers suggested that serum TTR concentration was not affected by hydration status.<sup>10</sup> In this respect, authors' claim as association between hydration status and low TTR levels seems suspicious irrespective of taking into account above contributing factors. Clarifying these concerns will provide clearer picture to the readers.

### Conflict of interest

The authors declare no conflicts of interest.

### REFERENCES

- Vega A, Quiroga B, Abad S, Ruiz C, Lopez-Gomez JM. Study on overhydration in dialysis patients and its association with inflammation. *Nefrología*. 2014;34:579–83.
- Chertow GM, Ackert K, Lew NL, Lazarus JM, Lowrie EG. Prealbumin is as important as albumin in the nutritional assessment of hemodialysis patients. *Kidney Int*. 2000;58:2512–7.
- Aguilera A, Codoceo R, Bajo MA, Diez JJ, del Peso G, Pavone M, et al. *Helicobacter pylori* infection: a new cause of anorexia in peritoneal dialysis patients. *Perit Dial Int*. 2001;21 Suppl. 3:S152–6.
- Sullivan GM, Mann JJ, Oquendo MA, Lo ES, Cooper TB, Gorman JM. Low cerebrospinal fluid transthyretin levels in depression: correlations with suicidal ideation and low serotonin function. *Biol Psychiatry*. 2006;60:500–6.
- Myron Johnson A, Merlini G, Sheldon J, Ichihara K. Clinical indications for plasma protein assays: transthyretin (prealbumin) in inflammation and malnutrition. *Clin Chem Lab Med*. 2007;45:419–26.
- Oppenheimer JH, Wener SC, Martinez M. Effect of prednisone on thyroxine-binding proteins. *J Clin Endocrinol Metab*. 1966;26:715–21.
- Gharekhani A, Khatami MR, Dashti-Khavidaki S, Razeghi E, Abdollahi A, Hashemi-Nazari SS, et al. Effects of oral supplementation with omega-3 fatty acids on nutritional

state and inflammatory markers in maintenance hemodialysis patients. *J Ren Nutr.* 2014;24:177-85.

8. Zhang K, Liu L, Cheng X, Dong J, Geng Q, Zuo L. Low levels of vitamin C in dialysis patients is associated with decreased prealbumin and increased C-reactive protein. *BMC Nephrol.* 2011;12:18.
9. Beck FK, Rosenthal TC. Prealbumin: a marker for nutritional evaluation. *Am Fam Physician.* 2002;65:1575-8.
10. Mears E. Outcomes of continuous process improvement of a nutritional care program incorporating serum prealbumin measurements. *Nutrition.* 1996;12:479-84.

Mehmet Agilli<sup>a,\*</sup>, Tolga Dogan<sup>b</sup>, Mustafa Ilker Inan<sup>c</sup>, Gonca Fidan<sup>d</sup>

<sup>a</sup> Department of Biochemistry, Agri Military Hospital, Agri, Turkey

<sup>b</sup> Department of Internal Medicine, Gulhane Military Medical Academy, Ankara, Turkey

<sup>c</sup> Department of Chest Diseases, Girne Military Hospital, Girne, Cyprus

<sup>d</sup> Department of Infectious Diseases and Clinical Microbiology, Agri Military Hospital, Agri, Turkey

\*Corresponding author.

E-mail address: [mehmetagilli@yahoo.com](mailto:mehmetagilli@yahoo.com) (M. Agilli).

0211-6995/© 2015 Sociedad Española de Nefrología. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

<http://dx.doi.org/10.1016/j.nefro.2015.04.001>

## Reply to the Letter to the Editor: Is there any association between overhydration and inflammation in dialysis patients?

### Respuesta a la carta al Editor: ¿Hay alguna asociación entre sobrehidratación e inflamación en los pacientes en diálisis?

Dear Editor,

We would like to thank Dr. Agilli for the comments and suggestions; we consider that they are interesting and in our opinion they improve the quality of our manuscript "Study of overhydration in dialysis patients and its association with inflammation".<sup>1</sup>

In our study, we have analyzed stable patients (as explained in the Methods) but it could have been explained with more detail.

Patient included had stable blood parameters to rule out other confounding factors. We did not include patients with active malignancy, major depression, anorexia nervosa, bulimia nervosa or any kind of inflammatory disorders. We did not take into consideration if patients had *Helicobacter pylori* infection or thyroid diseases, so we have to admit that this omission fact as a limitation in our study.

We do not usually prescribe dietary supplements such as vitamin C, vitamin A, zinc or omega-3 fatty acids; therefore in this study, patients were not receiving this type of treatment.

As we had excluded patients with inflammatory disorders, we cannot find a reason why patients had to receive corticosteroids agents. Progestational agents (Megestrol) are given to

patients with anorexia to stimulate appetite in. In our study those patients were excluded.

The use of alcohol was not recorded, this is another limitation.

Blood parameters were taken before their dialysis sessions and after bioimpedance. Patients had to remain supine position for at least 10 min to perform bioimpedance. It is unlikely that patients are bedridden since they come from their home three times per week for dialysis. Patients admitted at the hospital were not included in the study.

Serum transthyretin concentration is not necessary affected by hydration status. However, as shown in our manuscript, patients with inflammation are overhydrated.

#### Conflict of interest

The authors declare no conflicts of interest.

#### REFERENCE

1. Vega A, Quiroga B, Abad S, Ruiz C, López-Gómez JM. Study on overhydration in dialysis patients and its association with inflammation. *Nefrologia.* 2014;26:579-83.