Serum Angiotensin-Converting Enzyme Is Not an Indicator of Dialyzer Membrane Biocompatibility

D.		Docci ^a
F.		Turci ^a
L.		Baldrati ^a
C.		Dehecchio ^b

^aServizio di Nefrologia e Dialisi e ^bLaboratorio di Analisi, Ospedale Provinciale M. Bufalini, Cesena, Italia

Dr. Dino Docci, 1111-D, Servizio di Nefrologia e Dialisi, Ospedale Provinciale M. Bufalini, V. le Ghirotti 286, I-47023 Cesena (Italy)

Dear Sir,

We have read with interest the recent letter of Maher et al. [1] concerning the effect of dialyzer membrane biocompatibility on serum antiotensin-converting enzyme (ACE). In a similar study we found comparable findings.

The effect of different dialyzer membranes on serum ACE and white blood cells during hemodialysis was examined in 20 uncomplicated cases of uremia on regular dialysis treatment for 11–156 months (mean 71.8). They received a sequence of hemodialysis using hollow-fiber dialyzers with either cuprophane (Prima BL 612, Bellco, SpA, Mirandola, Italy), polymethylmetacrylate (Fil-tryzer B2–150, Toray Ind., Tokyo, Japan), or polyacrylonitrile (PAN-150, Asahi Medical, Co., Tokyo, Japan) membranes. Each dialyzer was given for a period of 1 week, i.e., 3 successive hemodialyses. Patients were then crossed over randomly to each of the other 2 dialyzers. Measurements were made on the day of the last hemodialysis of each weekly study period. Whole blood samples were drawn from the arterial side of the arteriovenous fistula immediately before and after hemodialysis and 15, 30 and 60 min into hemodialysis. Serum ACE levels were determined by a spectrophotometric assay developed by Laboratori Baldacci, S.p.A. (Pisa, Italy) using a synthetic tripeptide as substrate.

Hemodialysis with the cuprophane membrane was associated with a severe fall in the mean leukocyte count at 15 and 30 min after the initiation of treatment (–73.1% and –36.8%, respectively; $p < 0.001$). The use of the polymethylmetacrylate membrane resulted in a more attenuated form of leukopenia (–23.8% after 15 min, $p < 0.001$; –15.2% after 30 min, $p < 0.005$). In contrast, no significant change was observed at any time during hemodialysis with the polyacrylonitrile membrane.

All patients had predialysis serum levels of ACE within the normal range (57–129 nmol/min/ml). Con-

trary to Maher et al. [1], we noted that hemodialysis resulted in a significant ($p < 0.005$) increase in serum ACE at the end of treatment (240 min) that was of the same amount regardless of the membrane in use (+13.9% with the cuprophane membrane, +18.7% with the polymethylmetacrylate membrane, +15.1% with the polyacrylonitrile membrane). This increase was independent of the respective degree of leukopenia but significantly ($p < 0.001$) correlated

with the respective increase in serum proteins, suggesting that it most probably was a result of hemoconcentration.

These findings would imply that if an acute damage of the pulmonary vascular endothelium due to pulmonary leukostasis occurs during hemodialysis this is probably not of such a magnitude as to cause detectable changes in serum ACE. Therefore, in substantial agreement with the observations of Maher et al. [1], but contrary to the theoretic assumptions previously suggested by Nielsen et al. [2], we conclude that serum ACE analysis cannot be used as an indicator of dialyzer membrane biocompatibility.

References

Maher, E.R.; Bird, R.; Kyle, P.; Curtis, J.R.: Serum angiotensin-converting enzyme during hemodialysis: effect of membrane biocompatibility. *Nephron* 45:328 (1987).