Patient Survival on PAN/AN 69 Membrane Hemodialysis

To the Editor:

We have read with great interest the experience gathered by Chandran et al. (1) in treating uremic patients with the highly permeable PAN/AN 69 membrane over a 10-yr period. In their retrospective analysis, they present impressive results on patient gross mortality rate when compared with less favorable results collected by the U.S. Renal Data System. These results, in the range of those published in European countries and Japan, as indicated by the authors, question the underlying processes by which they appear better. Certainly, the choice of dialysis membrane is of importance, and recall that regular cuprophan does not clear off molecules of middle molecular weight, which may include uremic toxins as hypothesized by Scribner and Babb (2) many years ago. Removal of “middle toxic molecules,” side products of protein catabolism, may be one of the advantages of highly permeable membranes. In order to quantitate this effect, Babb and Popovich had proposed the vitamin B12 index (3), which was not further used because in vivo measurement of vitamin B12 clearance was difficult. Nevertheless, the middle molecule toxicity hypothesis may be credited for the development of synthetic, permeable membranes and new techniques such as hemofiltration and hemodialfiltration on the basis of convective transport.

In France, where the PAN/AN 69 was first issued, a large experience has been collected. However, all of the studies so far published are open and noncomparative, except for ours (4). We would like to comment further on the long-term clinical use of this membrane.

Our first comment refers to the usefulness of Babb and Scribner’s vitamin B12 index (or derived indexes). We have published a prospective study (4) in which such an index was used to define a priori the desired time of dialysis session. We were able to demonstrate, over a 5-yr study, in comparing two groups of patients randomly assigned to PAN/AN 69 or cuprophan membranes of the same surface area (1 m²), that with a similar index, i.e., the same dose of dialysis, dialysis session duration was 9.5 ± 0.2 and 16.4 ± 0.2 h for PAN/AN 69 and cuprophan, respectively (P < 0.001). Mortality was similar in both groups. Focusing on morbidity and more objectively on days of hospitalization, we found a significant (P < 0.001) difference: 4.9 ± 0.8 and 7.3 ± 1.3 days/yr for PAN/AN 69 and cuprophan, respectively (5).

Retrospectively, we point out that urea kinetic modeling could not have been used at that time, when the only technical solution to monitor ultrafiltration was the “big” volumetric Rhodiab system (6). This system consisted of a closed tank that contained 75 L of recirculating dialysate. As a consequence, the use of this limited volume of dialysate resulted in significantly higher predialysis and postdialysis blood urea levels in patients dialyzed with the most permeable membrane, whatever the time they stayed on dialysis, whereas these levels were lower in patients treated with cuprophan and an open-circuit machine.

Our second comment refers to the long-term use of a highly permeable membrane. In a prospective study including 197 patients treated with nonreused PAN/AN 69 membranes during 15-yr follow-up (7), we analyzed mortality rate and related risk factors. All of the patients were enrolled in the study since the beginning of dialysis, including those who died during the first 3 months. Using the Kaplan-Meier method, we calculated a survival rate of 62.12, 35.37, and 30.20% at 5, 10, and 15 yr, respectively. These results are in the same range as those indicated by Chandran et al. In these patients, we were unable to define an appropriate Kt/V index using the two-compartment model to calculate urea kinetics.

The concluding remarks of Chandran et al. are supported by our own data. Clinical experience remains valuable as far as a single index based on urea modeling is insufficient as a surrogate for the multivariable parameters of dialysis. Besides appropriate volumetric control, patient compliance, and sterile pure dialysate, the choice of dialysis membrane is mandatory. In this perspective, the risk to develop B2 microglobulin–derived amyloidosis in long-term dialysis patients has to be taken into account because the regular use of the so-called highly permeable and biocompatible PAN/AN 69 membrane delays or postpones the occurrence of dialysis amyloidosis when compared with cuprophan membrane (8,9).

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REFERENCES

1. Chandran PKG, Liggett R, Kirkpatrick B: Patient survival on PAN/AN 69 membrane hemo-


867–868.


Response

We appreciate the letter from Dr. J. Chanard. Our experience, gathered over a 10-yr time span, seems to be in keeping with his prospectively collected data published in 1982. We are grateful to him for making us aware of this. We must admit that there is likely to be an air of skepticism if one invokes the exclusive premise that “middle molecular” clearance precedes small solute clearance, under all circumstances.

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