The effect of vitamin E-coated membrane dialysers on inflammation and oxidative stress in maintenance haemodialysis patients

Sir,

The interesting paper by Kirmizis et al. [1] showed a significant beneficial effect of a 6-month treatment with a cellulose vitamin E-coated membrane (VEM) dialyser on markers of inflammation and oxidative stress in haemodialysis (HD) patients.

Studies on the potential anti-inflammatory and antioxidative effect of VEMs in HD patients have reported conflicting and inconclusive results, possibly as a consequence of differences in their designs and methodology, membranes’ biocompatibility or duration of follow-up. Moreover, the potential influence of this approach on hard end points, such as cardiovascular morbidity and mortality, remains largely speculative [2].

We have recently published the results of a study on the long-term effects of a regenerated cellulose VEM on markers of inflammation and oxidative stress in nine HD patients [3], reported in the paper by Kirmizis et al. [1], and we would like to make some comments.

In our study, nine stable HD patients dialysed with low-flux polysulphone membrane were switched to regenerated cellulose VEM [CL E 18 NL; Terumo Corp., (currently Asahi Corp.), Tokyo, Japan] for 3 months and then changed back to their initial dialysis membranes for six more months. The inflammatory markers we measured, high-sensitivity C-reactive protein and interleukin-6, decreased by the end of the 3-month treatment with VEM. This decrease continued and became significant by the end of the follow-up period (Month 9). In terms of the oxidative stress markers studied, superoxide dismutase activity increased significantly on the third month of treatment and its levels remained stable throughout the end of the study (Month 9). Reactive oxygen metabolites and derivatives showed a significant reduction only 6 months after the end of VEM use, while total antioxidant capacity increased under HD with VEM, but this increase became significant by the end of the study (Month 9).

These results suggest a long-lasting effect of treatment with VEMs on some markers of inflammation and oxidative stress and a delayed response in others. These findings could be due to various reasons, such as our small sample size and the inherent limitations of our study as well as the variability in our markers’ sensitivity. Indeed, the issue of an ideal marker of inflammation and oxidative stress remains as yet open and most investigators prefer using a panel of markers to minimize bias [4]. This variability of inflammatory and oxidative stress markers and its potential influence on research results was further confirmed in a recent study by our group on the impact of haemodiafiltration on markers of inflammation and oxidative stress [5].

Another difference of our study group with that in Kirmizis et al. [1] could be that both control and pre-VEM period groups were heterogeneously dialysed with mainly bioincompatible membranes in contrast to our patient group exclusively dialysed by polysulphone membranes. This membrane heterogeneity might often act as a potential confounding factor in this setting.

Although studies, such as those by Kirmizis et al. [1] and others [2, 3], support the beneficial impact of treatment with VEMs on inflammation and oxidative stress in HD patients in the long term and might provide some evidence for potential cardiovascular benefit, the issue of the biocompatibility advantage of VEMs, and in particular, their role in cardiovascular protection appears to be largely inconclusive. Indeed, no difference in oxidative stress parameters was found when VEMs were recently compared to biocompatible polysulphone membrane [6]. Further larger
and randomized controlled studies are definitely needed to elucidate the impact of VEMs on inflammation and oxidative stress and subsequently on atherosclerosis and cardiovascular disease.

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