Letter to the Editor

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Plasma Levels of Terminal Complement Complex in the Evaluation of Bioincompatibility

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Dear Sir,

Blood membrane interactions in hemodialysis have been shown to activate complement via the alternative pathway and to generate anaphylatoxins C3a and C5a [1]. As indicators of complement activation, anaphylatoxins (C3a, C5a) present methodological and interpretative difficulties. The fluid-phase terminal complement complex (TCC), consisting of components C5b, C6, C7, C8, C9, and S-protein, has been detected in human ethylene diaminotetraacetic acid (EDTA) plasma [2]. The complex inserts into membranes and exerts membranolytic effects [3, 4]. In this study, we examined that plasma TCC concentrations in 13 patients following initial hemodialysis (group I), and in 14 patients undergoing maintenance hemodialysis (group II) with cuprophan hollow-fiber, cuprophan plate and polysulfone hollow-fiber dialyzers.

Plasma samples for TCC assay were collected from patients before connecting to the extracorporeal circuit and 180 min after first contact of blood with the dialyzer membrane and stored at −70°C until assayed. The concentration of plasma TCC was determined using monoclonal antibody against TCC neoantigen by an ELISA system in patients dialyzed sequentially with cuprophan hollow-fiber, cuprophan plate and polysulfone dialyzers, respectively. Predialysis plasma TCC concentrations were not significantly different to those in the control group, namely 1.53 ± 0.59 AU/ml. A significant, though less pronounced, rise in TCC concentrations was noted when patients were dialyzed with polysulfone membranes. Cuprophan membranes induced intense TCC generation.

Increase in posthemodialysis TCC concentrations in patients undergoing their first hemodialysis therapy was statistically significant with respect to the other patients. Despite a different geometrical structure, the dialyzers with the same membrane material did not show statistically significant differences in terms of complement activation. The mean plasma TCC levels are summarized in table 1.

In this study, complement activation is shown to be a reliable marker for bioincompatibility. Fluid-phase TCC increases significantly due to blood membrane interaction during hemodialysis. This rise is more prominent in patients undergoing their first hemodialysis.

Table 1. Plasma SC5b-9 levels (AU/ml)

	Group I			Group II		
	predialysis	at 180 min	p	predialysis	at 180 min	p
Cuprophan hollow-fiber	1.71 ± 0.82	5.31 ± 1.99	<0.001	1.56 ± 0.61	3.01 ± 1.02	<0.01
Cuprophan plate	1.76 ± 0.77	4.98 ± 2.01	<0.001	1.61 ± 0.71	3.25 ± 1.27	<0.01
Polysulfone	1.88 ± 0.69	2.39 ± 0.73	<0.05	1.66 ± 0.90	2.13 ± 1.18	=0.05

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