Piracetam as a Potent Inhibitor of Plasma Thromboxane B₂ during Hemodialysis

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Dear Sir,

When blood comes into contact with hemodialysis membranes, several protein-mediated and cellular pathways are activated. Recent work has documented the significant activation of platelets by new cuprophane membranes leading to the release of β -thromboglobulin and thromboxane products. It was initially associated with complement activation in a manner similar to hemo-dialysis-associated leukopenia, but later it has been found that extracorporeal complement activation does not directly correlate with extracorporeal cyclo-oxyge-nase production [1]. However, it should be noted that arachidonic-acid metabolism plays an important part in many forms of cell stimulation during treatment with hemodialysis.

We report here the results of a preliminary study which was designed to assess the preventive effect of the new antithrombotic and antiplatelet agent piracetam (UCB, Belgium) on the interaction between blood and dialyzer membrane.

Twelve patients, 8 male and 4 female, aged from 26 to 70 years, were studied. They were on hemodialysis 4 h thrice weekly with cuprophane hollow-fiber dialyzers (Gambro 120M) and dialysate containing 35 mEq/l of acetate. One hour prior to the first dialysis session, a placebo was administered orally, while prior to the second dialysis session piracetam was given at a dose of 8 g. The heparin dose was not reduced during hemodialysis using QB 200 ml, QD 500 ml, but no ultrafiltration. Blood samples were taken from the arterial line before and at 15, 60 and 240 min after the beginning of each dialysis session. A plasma thromboxane B₂ assay was carried out using the kit (code 10554) of Biodata, Italy (normal range: 0.057–0.194 ng/ml). The results are shown in figure 1,

4.00-
3.60
3.20-
2.00-
2.40-
2.00
| 1-60-cn
i 1:20
m

**

% 0.80

■ Q 0.40

E

Γ-

15

0.00

60

240

Dialysis time, min

Fig. 1. Changes of plasma thromboxane B2 levels during both hemodialysis sessions, with placebo and piracetam. CG = Control group; PG = piracetam group. * $p < 0.01$, ** $p < 0.001$. expressed as mean $\pm$ SD, and statistical analysis was done using the paired t test.

In this study, we have estimated the liberation of thromboxane B2 during routine hemodialysis, and we have provided evidence that piracetam is a potent inhibitor of dialysis-induced synthesis of thromboxane B2. Our results are in agreement with Cheung et al. [2], who reported that the acute intravenous infusion of cupro-phane-activated plasma in animals caused an increase in pulmonary-artery pressure and plasma thromboxane concentration. Both of these increases could be inhibited by a specific thromboxane synthetase inhibitor.

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Thus, this present investigation provides evidence that thromboxane B2 inhibition by piracetam may improve the interrelationship between the patient and the therapeutic device during routine hemodialysis.

2 Cheung, A.K.; Baranowski, R.L.; Wayman, A.L.: The role of thromboxane in cuprophane-induced pulmonary hypertension. *Kidney int.* 31:1072–1079 (1987).

References

1 Mahiout, A.; Jörres, A.; Hiss, R.; Meinhold H.; Kessel, M.: Effects of blood-dialyser interaction on prostaglandins in urae-mic patients and in healthy man. *Nephrol. Dial. Transplant* 2: 546–550 (1987).