Effect of Oral Prostacyclin on Microclots in Tube Lines of a Hemodialysis System

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Dear Sir,

During the course of hemodialysis, the coagulation system is activated due to the contact of blood with artificial surfaces of dialyzer membranes and tubes [1]. In spite of adequate use of heparin during hemodialysis there is an increased coagulation of dialysis fibers in a subgroup of uremic patients. Platelet aggregation could be a causal factor in thrombus formation on artificial surfaces [2]. Prostaglandin I₂ (prostacyclin) has been reported to be a possible alternative to heparin in hemodialysis because of its powerful suppressive effect on platelet aggregation, but it has the disadvantage of chemical instability and may cause hypotension during use [3]. Beraprost sodium (Kaken Pharmaceuticals Co. Ltd., Tokyo, Japan) has been developed as a stable oral prostacyclin which has few side effects such as hypotension in clinical use [4]. In this study, we report the effect of this oral prostacyclin on blood clotting in dialyzer fibers and microclots detectable in the blood returning from the dialyzer, which are composed not only of blood platelets but also of leukocytes and erythrocytes (fig. 1,2).

A 56-year-old male was admitted to hospital with renal infarction. He has a past history of acute myocardial infarction 13 years ago, and remarkable renal dysfunction has been identified (serum creatinine 2.0 mg/dl and proteinuria). After onset of renal infarction, the patient showed marked azotemia (serum creatinine 16.7 mg/dl). He was immediately treated by hemodialysis with full-dose heparinization (initial dose, 1,000 U/ ml; maintenance dose, 1,000 U/h) with a dialyzer (cellulose triacetate). At the end of hemodialysis, more than half the fibers in

Fig. 1. Microclots in a tube line of the hemodialysis system.

Fig. 2. Morphology by light microscopy of microclots shown in figure 1. Microclots are composed of blood platelets, leukocytes and erythrocytes.

the dialyzer were clotted, and microclots were noted in the tube lines of the hemodialysis system (fig. 1 , 2). To prevent blood clotting, heparin was changed to another anticoagulant, namely low-molecular-weight heparin (Kissei Pharmaceuticals, Matsumoto, Japan). The hemodialyzer was changed to an other type of dialyzers (polymethylmethacrylate, regenerated cellulose, polysulfone). However, blood clotting in dialyzer fibers and microclots in tube lines did not disappear. Therefore, we gave acetylsalicylic acid (ASA) at the dose of 81 mg/day to this patient every day. Hemodialysis was performed 3 times a week. After administration of ASA for 2 days,

blood clotting in dialyzer fibers and microclots in tube lines of the hemodialysis system disappeared. However, after 2 weeks, he developed an allergic skin eruption which was caused by ASA. By stopping ASA, blood clotting in dialyzer fibers and microclots in tube lines of the hemodialysis system reappeared. Thus, instead of ASA, we administered Beraprost sodium at the dose of 120 µg/day to this patient every day. By administration of this prostacyclin analogue, blood clotting in dialysis fibers and microclots in tube lines of the hemodialysis system disappeared completely without any side effects such as skin eruption or hypotension.

In conclusion, Beraprost sodium, a stable prostacyclin analogue with a potent anti-platelet effect and less hypotensive effect, was suggested to be a potential antithrombotic which can be administered orally.

References

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