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Influence of the method of addition of nitric oxide during hemodialysis on its antithrombotic effect.

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Objectives : One potential complication of hemodialysis therapy is platelet activation due to contact between blood and artificial materials. It has been reported that the addition of nitric oxide (NO) during hemodialysis reduced blood coagulation and platelet activation. In the present study, we attempted to investigate the effects of two methods of NO addition on the antithrombotic effect of NO: addition through the dialysis membrane and via direct infusion into the blood.
Methods : Male SD rats undergoing extracorporeal circulation for 4 hours were divided into three experimental groups: the Control group, in which N_2 was added instead of NO through the dialysis membrane; the Membrane group, in which NO was added through the dialysis membrane, and the Direct-Infusion group, in which NO was infused at the same concentration as that in the Membrane group from the arterial chamber with replacement fluid. After the 4-hour circulation, residual blood clots in the dialyzers were visually evaluated and the hemoglobin (Hb) levels in the eluate of the residual blood clots were measured.
Results : In the Control and Direct-Infusion groups, the inlet pressure of the dialyzer tended to increase after 180 minutes of circulation. On visual observation, the dialysis membrane in the Membrane group showed the least amount of residual blood clots at the end of the 4-h circulation. The Membrane group (n=11) showed significantly lower levels of Hb in the eluate of the residual blood clots ($p<0.01$) with the Control group. (n=22). The Hb level was also lower in the Direct-Infusion group(n=6) than that in the Control group. These results suggest that NO is more effective when delivered from the membrane surface.
Conclusions : The antithrombotic effect of NO was more pronounced when NO was delivered through the dialysis membrane than by direct infusion into the blood.