Long-Term Intraperitoneal Application of Low Molecular Weight Heparin in a Continuous Ambulatory Peritoneal Dialysis Patient with Deep Vein Thrombosis

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Dear

Sir,

We read with interest the recent report of Ponce et al. [1] in this journal on the interference of heparin with peritoneal solute transport. It has shown that intraperitoneal application of standard heparin does not affect or only slightly affects systemic blood coagulation [1–3]. There are, however, no reports dealing with the intraperitoneal use of low molecular weight (LMW) heparin in peritoneal dialysis patients.

Several studies have demonstrated that LMW heparin has a powerful antithrombotic effect and high antifactor Xa activity with only a minimal anticoagulant activity as reflected by partial thromboplastin time (PTT) and thrombin time [4–6]. LMW heparin is also a good alternative in hemodialysis and has several advantages over standard heparin [7,8]. We have now been able to demonstrate the systemic effect of intraperitoneally applied LMW heparin Kabi 2165 (Fa. Kabi Vitrum, Sweden) in a 63-years-old male continuous ambulatory peritoneal dialysis (CAPD) patient with deep vein thrombosis of the right thigh and lower leg. Because of the patient's poor vein condition, the necessary anticoagulant therapy was performed exclusively by intraperitoneal use of LMW heparin.

A dose of 8,000 antifactor Xa units/2-liter dialysate bag was given 4 times/day. On the first day, a plasma heparin activity of 0.3 antifactor Xa units/ml was found (measured with the chromogenic substrate S-2222). The therapy was continued with this dose, and a heparin level between 0.5 and 0.8 antifactor Xa units/ml was found during the following 3 months (fig. 1), which in our experience constitutes the therapeutic range. In the 4th and 5th months, the heparin activity rose to 1.15 and 1.35 U/ml, respectively. Therefore the dose was reduced to 6,000 antifactor Xa units/bag, and the heparin activity decreased to 0.82 U/ml (fig. 1). The PTT values had

Fig. 1. LMW heparin doses per 2-liter dialysate bag (given 4 times/day) plasma heparin activity as measured with the chromogenic substrate S-2222 and PTT values in a 63-years-old male CAPD patient with deep vein thrombosis.

increased by 3–5 s only during the whole period, due to the low thrombin inhibition of LMW heparin. Bleeding or thrombotic complications did not occur during this 6-month treatment period. Urea, creatinine and hemoglobin were also unchanged.

It is therefore possible to perform a long-term anticoagulant therapy in peritoneal dialysis patients with thromboembolic complications without intravenous heparin infusions and without the following treatment with oral anticoagulants. This method may have some practical advantages with regard to handling, mobilization and side effects.

A reduction in bleeding complications as compared to the conventional treatment with heparin and oral anti-

84

Schrader/Tönnis/Scheler

coagulants also seems to be possible. It has been postulated that the antithrombotic effect of heparin is reflected by its anti-Xa activity, while a high PTT value is generally considered to reflect increased bleeding risk [4, 5, 10, 11]. Accordingly, LMW heparin should cause fewer bleeding complications than standard heparin. This could be confirmed in animal studies [12, 13]. Moreover, LMW heparin has only a marginal influence on thrombocytes in contrast to standard heparin; this should also lead to diminished complications [14, 15]. This is of importance for dialysis patients because of the well-known uremic thrombopathy. Finally, Hull et al. [9] reported fewer bleeding complications during the long-term treatment of patients with deep vein thrombosis in the heparin-treated group as compared to oral anticoagulants [9].

A prophylactic application of low doses of LMW heparin in the peritoneal dialysate must also be considered in patients of peritoneal dialysis procedures, since it has been shown that they have more marked hypercoagulability and diminished fibrinolysis compared with patients on hemodialysis and hemofiltration [16].

In conclusion it can be said that the intraperitoneal use of low doses of LMW heparin may be of some benefit in peritoneal dialysis patients with marked signs of hypercoagulability or peritonitis. Further studies are required to examine the effect of LMW heparin on solute transport and on the problems of peritoneal permeability changes during CAPD [17, 18].

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