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HEMODIALYSIS IN SMALL ANIMAL PRACTICE THE EFFECT OF DIALYSATE COMPOSITION OF HEMODYNAMICS

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To establish the effectiveness and safety of hemodiafiltration in small animal practice, the hemodynamic parameters at different dialysate sodium and glucose concentrations were investigated. Sodium and glucose concentrations are important for homeostasis, but are also thought to alter hemodynamics during hemodialysis.

Hemodialysis experiments were performed in seven normal dogs. Two methods were used: (i) using three different dialysate sodium concetrations: below 10 mEq/l, above 10 mEq/l, and one equal to the predialytic serum concetration, while their glucose concetrations were maintatined at 100 mg/dl; and (ii) using three different dialysate glucose concetrations: 0, 100, and 500 mg/dl while their sodium concentrations were left at a level equal to predialytic serum concentrations. The extracorporeal blood circulation without circulating dialysate was used as the control for the experiment. Concurrently, hemodynamic parameters; peripheral arterial pressure (AP), cardiac output (CO), heart rate (HR), total peripheral resistance (TPR), stroke volume (SV) and pulmonary arterial pressure (PAP) were monitored.

Compared with the control experiment, hemodynamic parameters, namely CO, TPR, and SV, were very changeable during dialysis in more than 50% of the experimental dogs, whichever dialysate was used. But AP was only slightly changeable to the above parameters, with an alteration range of less than 20%. A few experimental dogs remained hypotensive during dialysis, whichever dialysate was used. However, no significant changes in HR and PAP were observed during hemodialysis. Furthermore, no parameter was significantly different when comparisons were done between treatments with different sodium and glucose concentrations.

It was thus suggested that AP remained as stable as possible due to a compensatory mechanism by CO and TPR. It was therefore concluded that dialysate sodium and glucose concentrations used in this experiment were probably still within the acceptable range and thus do not have much effect on homeostasis so long as physical compensatory mechanisms occur during hemodynamic changes, at least in normal dogs. The effectiveness of high-sodium dialysates, which have been reported in previous studies to improve the stability of hemodynamics, could not be confirmed in this study.