APPLICATIONS OF HEMODIALYSIS TO THE SMALL ANIMAL CLINIC

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Studies were performed to establish the techniques of hemodialysis for small animals in four dogs with experimentally induced acute renal failure. Internal arteriovenous shunts were created in another three dogs to technical problems. Moreover, hemodialyses were performed in five dogs and two cats with renal failure and one cat with serious jaundice, which were admitted to the Veterinary Hospital, Hokkaido University.

$HgCl_2$ (2mg/kg) was given to four dogs into the cephalic vein. Three days later, hemodialyses were performed for 1 or 2 hours. Blood was withdrawn from the saphenous vein and returned to the cephalic vein. The flow rates were 35 or 50 ml/min and dialyzers with 0.1 to 0.5m^2 membrane size were used. The final extraction rates of blood urea nitrogen (BUN), creatinine (Cre) and inorganic phosphate (iP) were 13.0 to 32.1%, 13.3 to 31.3% and 9.9 to 34.1%, respectively.

Three types of internal arteriovenous shunts were created as follows: (A) the carotid arteries—the jugular veins (B) the median artery-the cephalic vein, and (C) the femoral artery-the femoral vein. Seven days postoperatively, only in case (A) was the blood flow rate obtained sufficient (25ml/min), however hemostasis at the shunt vessel was difficult to maintain because of the high pressure of the carotid arteries.

Hemodialysis techniques were applied 1 to 8 times to clinical cases. Blood was withdrawn from the jugular vein and returned to the cephalic vein. Blood flow rates were 17 to 100ml/min in dogs and 10 or 15 ml/min in cats and the dialyzers with 0.05 to 1.5m^2 membrane size were used in dogs and 0.1 or 0.15m^2 in cats. The final extraction rates of BUN, Cre, iP and total bilirubin (Bil) were 9.6 to 61.3%, 8.8 to 82.4%, 14.7 to 63.8% and 75.2%, respectively. In two cases, transformations of red blood cells (confetti-shaped) were observed after the 3rd or 4th hemodialysis.

Of the free amino acids in the blood, 36.3% of lysine was removed in cat, and 22.6% (mean) of methionine was removed in dogs after hemodialysis, but their losses were not serious as compared with extraction rates of BUN and Cre.

It is suggested that hemodialysis is an effective form of therapy for small animals with renal failure which do not respond to fluid therapy and medication.