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APPLICATION OF HEMODIALYSIS IN A SMALL ANIMAL CLINIC —INVESTIGATION OF BLOOD ACCESS AND THE METHOD OF ANTICOAGULATION—

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Experiments were performed in order to establish techniques for blood access and a method of anticoagulation on hemodialysis in small animal practice.

1. In order to obtain a higher flow rate, on 18G winged indwelling needle or a 19G indwelling needle with side-holes was inserted into the cervical vein, and each flow rate was examined in two dogs. By the use of the 19G indwelling needle with side-holes, a much higher flow rate of about 4 ml/kg/min was obtained. As a result of the experiment in four dogs, if the cephalic vein was unhurt in medium-sized dogs, it was possible to obtain a moderate flow rate, about 3 ml/kg/min, from the cephlic vein with the 19G indwelling needle with side-holes. The flow rate from the cephalic vein was lower than that from the cervical vein, but it was easy to restrain the animal during hemodialysis, and if hemodialysis was performed many times, it was possible to indwell the needle until the next hemodialysis. As a satisfactory flow rate was obtained by blood access of the V–V type, there was no necessity for blood access by surgical operation.

2. Investigation of anticoagulants in extracorporeal circulation was performed. The anticoagulant ability of nafamostat mesilate was not sufficient in small animals, in spite of using about two times the dose used in humans.

In order to establish the proper dose of heparin, hemodialysis was performed fifteen times using various doses of heparin in two normal dogs and in two dogs with experimentally induced renal failure. Measurements of activated partial thromboplastin time (APTT), blood heparin concentration and antithrombin III activity (AT–III activity) were performed. The proper dose of heparin was 75～80 IU/kg, including perfusate at the beginning and 50～60 IU/kg/h continually in hemodialysis. The heparin dose could be increased further, if AT–III activity was low.

The proper heparin dose could be determined by estimation of the dose according to the measurement of AT–III activity and regulation of the dose according to the blood heparin concentration and APTT. It was possible to compute the proper dose of protamine sulfate to neutralize heparin by measuring the blood heparin concentration.

3. Hemodialysis was used in three clinical cases of uremia in two dogs and one cat. In one dog with a large quantity of ascites, the extraction rate of uremic toxin in blood by hemodialysis was slight. In the others, with renal failure, the extraction rates were sufficient, and this suggested the usefulness of hemodialysis for such treatment.