EFFICIENCY OF HAEMODIALYSIS

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The concentration of NPN in the blood does not diminish evenly during haemodialysis; if an artificial kidney of large cellophane surface is used, the rate of diminution is highest in the first hour, less pronounced in the following hours, and hardly perceptible in the fifth hour.

The hourly harvest of NPN in the bath fluid is, on the other hand, fairly uniform; although the amount of NPN in the fluid is higher than that obtained during the later course of dialysis, the difference between the first and the fourth or fifth hour is unimportant.

A comparison of the decrease in the value of the serum NPN and the amount of NPN in the bath fluid (i.e. the quotient of the two values) makes it evident that, while the rate at which the NPN is eliminated from the blood is more or less uniform (or just slightly slower after the second hour), the rate of decrease in the NPN-level of the serum becomes slower from hour to hour. This phenomenon was particularly striking in the fifth hour when the decrease of NPN in the blood was negligible, whereas the rate at which NPN was passing from the blood to the bath fluid was not slower than before.

These observations justify the following conclusions:
1. When testing the efficiency of haemodialysis, and comparing artificial kidneys, it is better to measure the amount of NPN in the bath fluid and not the blood values.
2. The duration of dialysis should not be curtailed since it is useful to continue the treatment even at a time when the blood value of NPN has practically ceased to decrease.
3. Instead of shortening it, the duration of the dialysis should be prolonged provided the condition of the patient permits it. Led by such considerations, we have lengthened the duration of the treatment from 4 to 5 hours in our department.

Changes in the concentration of NPN in the blood during dialysis depend among others, on two factors: (i) the passage of NPN from the blood path to the bath fluid; (ii) the passage of NPN from the tissues to the blood path. It seems safe to assume that, during dialysis, outflow of NPN from the blood path occurs at a fairly uniform rate, whereas inflow of NPN from the extravascular compartment is variable. The amount of NPN gaining access to the intravascular compartment during the first one or two hours is less than that passing into the bath fluid; the consequence is a decrease in the serum level of NPN. Inflow from the extravascular space becomes more pronounced in the later course of dialysis so that its rate may reach that of the outflow: the consequence is a reduced rate of decrease or even a stabilization of the serum level of NPN.

Inducing acute experimental anuria in dogs, we found that, after ureteral ligation for 3 days, the NPN concentration in the striated and smooth muscles varied from 330 to 370 mg% against a mean value of 217 mg% in the serum, while the value in the liver averaged 576 mg%.

We think the phenomenon observed in the course of dialysis, described above, is mainly due to the uneven distribution of NPN between the intracellular and extracellular spaces.

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