SYMPATHETIC ACTIVITY (PLASMA-DOPAMINE-BETA-HYDROXYLASE) IN HAEMOFILTRATION AND HAEMODIALYSIS

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It has been claimed that control of hypertension in uraemic patients is more easily achieved by haemofiltration (HF) than with haemodialysis (HD) [1-3]. It has been speculated that easier control of hypertension is related to long term lowering of dopamine-beta-hydroxylase (DBH) [4]. DBH is released along with norepinephrine by exocytosis from sympathetic nerve terminals. In contrast to norepinephrine it is not subject to reuptake and enters the blood via lymphatic drainage. Thus it is believed to provide a useful index of peripheral sympathetic activity.

The present study was designed to determine whether in uraemic patients sympathetic counterregulation in response to volume loss is less intensive on HF than on HD.

Patients and Methods

Seven patients (4 normotensive, 3 hypertensive) were studied on HD. The patients were then changed to HF and studied after one week's interval. The conditions of HF were described previously [5]. External fluid balance was monitored electronically. Whole erythrocyte mass was measured with $^{111}$In labelled erythrocytes. Plasma DBH was estimated with the modified method after Nagatsu as described previously [6].

Results and Discussion

As indicated in Figure 1, reduction of body weight was identical with HD and HF. Blood pressure changes were not significantly different in HD and HF. DBH activity in the plasma rose both with HD (from 43.2 ± 27.5 to 50.7 ± 30.5 IU) and with HF (from 42.8 ± 24.3 to 55.1 ± 33.3 IU). If anything, the rise in (uncorrected) plasma DBH activity was even higher in HF than in HD ($p < 0.05$; Wilcoxon test for paired differences). Since the half life of DBH may exceed 1 hr [7] and since the volume of distribution of this molecule with a molecular weight of 290,000 daltons should be a
function of plasma volume, spurious elevations of DBH activity may conceivably be seen when plasma volume changes. When corrections for changes in plasma volume were made, based on total erythrocyte mass (as estimated with the $^{111}$In erythrocyte method) and peripheral hematocrit, no significant change in corrected DBH activity was found either during HF or HD.

To the extent that DBH provides an index for peripheral sympathetic activity, the results do not support the notion that in HF (as compared with HD) activation of peripheral sympathetic activity is less, at least in acute studies.

However, this investigation does not refer to long term changes of sympathetic activity with these two modalities of treatment.
References

7 Matthias, CJ, Smith, AD, Frankel, HL and Spalding, MK (1976) Cardiovascular Research, 10, 176