Progression of Renal Failure on Hemodialysis Treatment

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Sir,

Cr⁻¹ 0.085 -i

In 1976, Mitch et al. [1] showed by plotting sequential values of the reciprocal of serum creatinine concentration in mg/dl (Cr⁻¹) against time, a linear decline in most chronic renal failure patients, from an average initial serum level of 2.6 mg/dl to an average value of 14.8 mg/dl. The rate of change of Cr⁻¹ as an estimate of the rate of loss of renal function has been used to evaluate the influence of therapy on several nephropathies [2, 3]. Besides, in end-stage renal diseases on hemodialysis (HD) treatment the decline of the diuresis with time is a well-known fact [4], more or less rapid depending on many factors.

Serum predialysis levels of Cr and urea and residual diuresis were recorded in 106 patients on chronic HD, 3 × 4 h/week with cuprophane dialyzers of 1 or 1.4 m² (depending only on ultrafiltration needs), at 0, 3, 6, 12, 18 and 24 months, from the start of HD treatment. The dialysis schedule was kept constant throughout the study and was not modified by clinical or biochemical parameters. Creatinine clearance at the start of HD was always below 5 ml/min. The distribution of etiologies was: glomerular, 31; interstitial, 10; vascular, 5; cystic disease, 5; 55 patients had undetermined etiology (only strictly proven etiologies were categorized). None of them were anephric.

Mean serum Cr levels increased gradually with time (12.0–12.7–13.5–13.9–14.6–15.4 mg/dl), and correlation between Cr⁻¹ vs. time was highly significant ($r = 0.9729$, $p < 0.001$, fig. 1). Cr⁻¹ vs. time correlations were also found when patients were grouped by diseases: glomerular, $r = 0.979$, $p < 0.001$; interstitial, $r = 0.9498$, $p < 0.01$; vascular, $r = 0.9498$, $p < 0.05$; cystic disease, $r = 0.8634$, $p < 0.05$. However, only a few patients showed significant Cr⁻¹ vs. time correlation when individually considered. We did not find urea vs. time or urea vs. Cr correlations. Mean

n = 107

0.080 -

$\times = 110 - 1,376y$ $r = 0.980$ $p < 0.001$

0.075

0.070

0.065

0.060 J

I 1

Fig. 1. Mean serum Cr-1 levels against time on HD.

diuresis correlated negatively with time on dialysis ($r = 0.8543$, $p < 0.05$) and with Cr-1 ($r = 0.8912$, $p < 0.005$). During these first 2 years of HD treatment, mean predialysis body weight showed a decrement of 2,400 g. Consequently, in HD patients, considered as a group, on a constant dialysis schedule, there is a linear correlation between the reciprocal of mean serum creatinine and the time on dialysis. The decline rate seems to be dependent on underlying nephropathy. These data suggest that despite the great amount of factors theoretically acting on residual renal function in HD patients (blood pressure, calcium $\times$ phosphorus product, ultrafiltration, etc.), it seems to be a general decline rhythm depending mainly on underlying nephropathy. These facts should be considered when global HD strategies are planned and evaluated.

References

- Mitch, W.E.; Buffington, G.A.; Lemaun, L.; Walker, M.: A simple method of estimating progression of chronic renal failure. *Lancet* 1326–1328 (1976).
- Coggins, C.H. (CS AINS): A controlled study of short-term prednisone treatment in adults with membranous nephropathy. *New Engl. J. Med.* 301: 1301–1306 (1979).
- Donadio, J. V.; Kurtz, S.B.; Mitchell, J. C.; Istrup, D. M.; Holley, K. E.: Platelet inhibitor treatment of diabetic nephropathy (A). *Kidney int.* 16: 915 (1979).