

## **PROGRESSION OF CHRONIC RENAL FAILURE IS RETARDED WITH MORE FREQUENT CLINICAL FOLLOW-UP**

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### **Summary**

The frequency and quality of check-ups influence the progression of chronic renal failure. Improved blood pressure control may contribute to the retardation of decline in renal function. In prospective studies do not 1) compare groups of patients from different centres; 2) compare compliant with non-compliant patients; 3) use patients as their own controls if frequency and quality of check-ups are not identical before and after a low protein diet.

### **Introduction**

Results of numerous, mostly retrospective, studies suggest that protein restriction may retard the progression of chronic renal failure [1,2]. In most studies, however, the patients have been controlled more frequently after, as compared to before, institution of the low protein diet. Hence, there is a possibility that more rigorous controls with regard to hypertension, fluid balance, infection etc might have caused or contributed to the retardation of progression.

We have recently started a prospective study in which we follow renal function in patients with chronic renal failure with frequent clinical check-ups during one year before they are randomized into two groups, one continuing no protein restriction and the other being treated with a low protein diet.

The aim of the study was to compare the progression rate of renal failure before and after the patients entered the initial control period (without protein restriction) during which the clinical check-ups were more frequent and presumably of better quality than during the prior period.

### **Patients and protocol**

Seventeen patients, aged 20-70 (mean 51) years were studied. Creatinine clearance 12-66 (mean 34) ml/min.

The diagnoses were chronic glomerulonephritis 9, chronic pyelonephritis 5, post-obstructive nephropathy 1, polycystic kidney disease 3.

### *Retrospective phase*

Before entering the prospective study the patients had been controlled in our department for 341 days to more than four years.

Outpatient check-ups were performed on average 4.5 times per year (range 1.1–8.5).

### *Prospective phase*

The patients were followed prospectively with monthly check-ups in the outpatient clinic for 224–229 (mean  $\pm$  SD: 371 $\pm$ 69) days while on unrestricted protein intake.

The patients were interviewed by a nurse, who also measured blood pressure and collected blood and 24-hour urine samples. Results of blood pressure recordings and clinical chemical analyses were continuously reported to the physicians involved in the study.

Once every three months, or more frequently when required, the patients were seen by the same renal physician (one of the authors) for a clinical check-up.

We aimed to keep the blood pressure below 150/95mmHg, standard bicarbonate above 20mmol/L and serum phosphate below 1.7mmol/L, and to treat any infection or other intervening disease. Diuretics (most frusemide), anti-hypertensive drugs, sodium bicarbonate, allopurinol, antibiotics and other medications are prescribed as required.

### *Evaluation of renal function and progression rate*

The progression of renal failure is evaluated by plotting both the reciprocal of serum creatinine and endogenous 24-hour creatinine clearance against time. The progression was assessed from the regression coefficients (b-values).

## **Results**

The regression lines of the reciprocal of creatinine and creatinine clearance, respectively, against time are shown in Figures 1 and 2. In most of the cases the slopes decreased after the patients entered the prospective phase. The changes in regression coefficients were significant (Table I).

In some patients slower progression was associated with better blood pressure control. Two such cases are shown in Figures 3 and 4. The diastolic blood pressure (mean of all recordings in each individual) was significantly lower during the prospective phase than during the preceding retrospective phase (Table II).

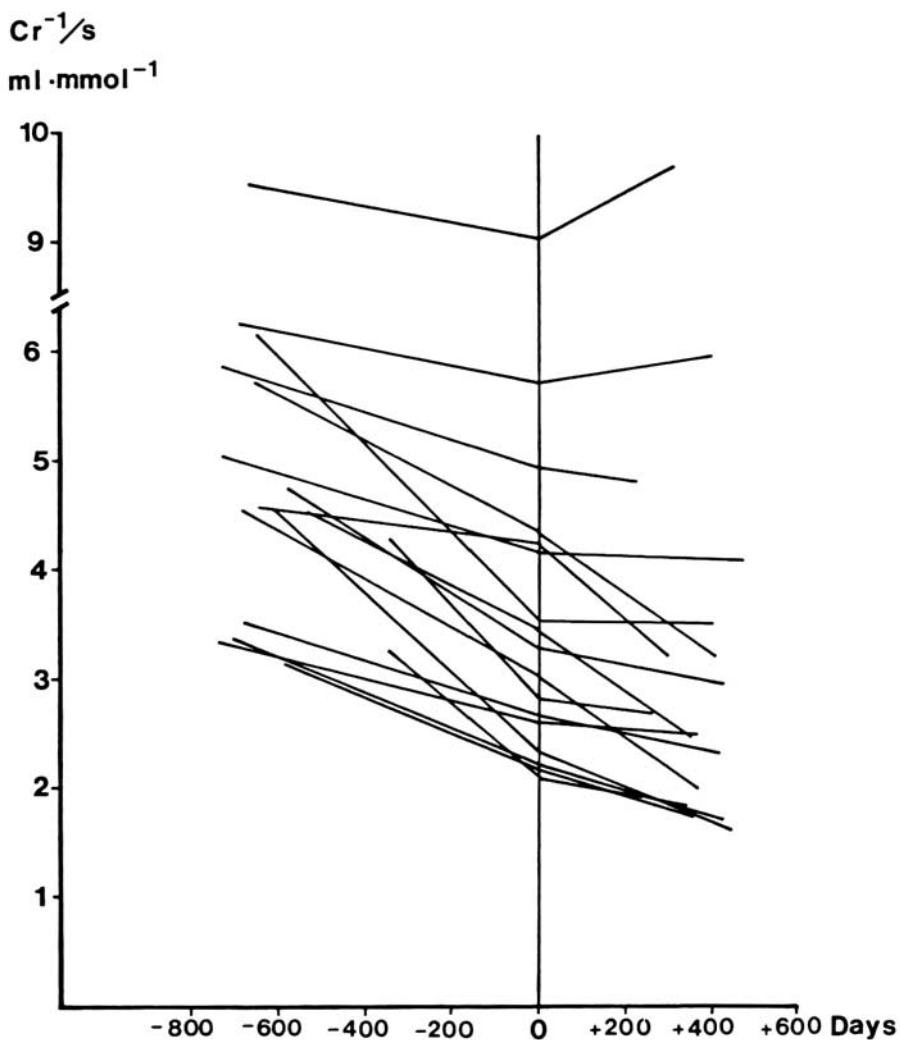


Figure 1. Regression of reciprocal of creatinine against time in 17 cases during the retrospective and prospective phases. (The patients entered the prospective phase at time zero)

## Discussion

Our results cast doubt on the relevance of earlier retrospective studies, including our own [3] about the beneficial effect of protein restriction. In none of these studies were the clinical check-ups as frequent before as after protein restriction was introduced. Hence, better care with respect to blood pressure control, fluid balance and compliance to medication might have influenced the progression rather than the low protein diet per se.

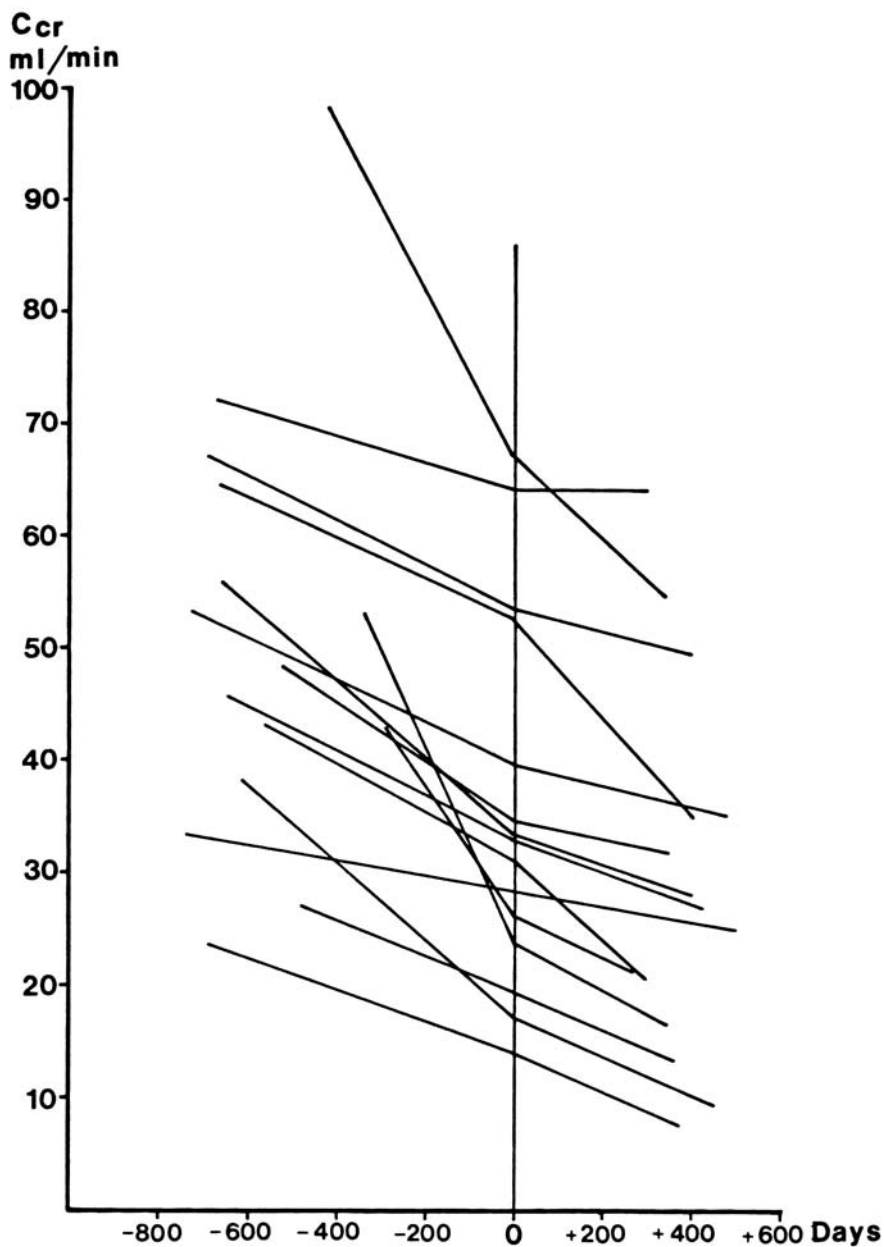


Figure 2. Regression of creatinine clearance against time in 16 cases during the retrospective and prospective phases. (The patients entered the prospective phase at time zero)

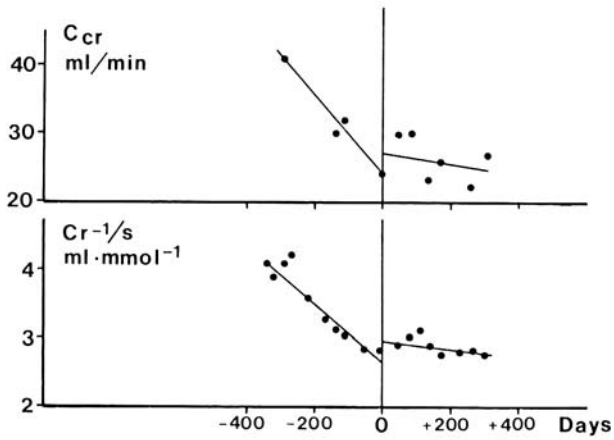


Figure 3. Progression of renal failure in a patient with post-obstructive chronic interstitial nephritis during the retrospective and prospective phases, respectively. In this patient slower progression during the prospective phase was associated with a decrease in blood pressure from 150/100 to 135/90 (mean values)

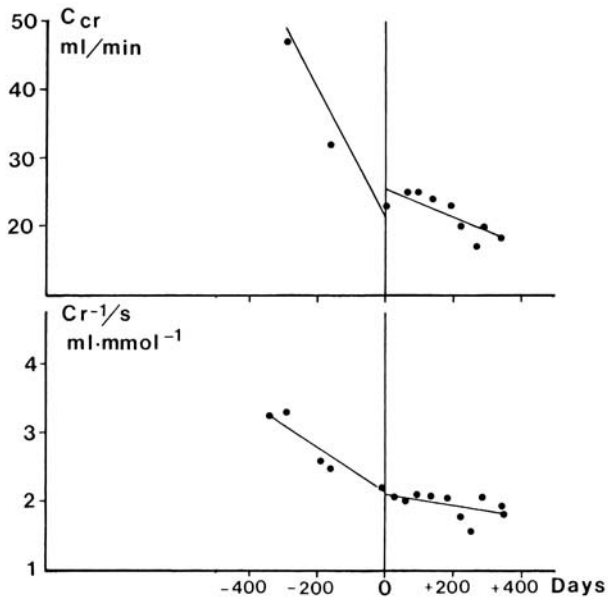


Figure 4. Progression of renal failure in a patient with chronic glomerulonephritis during the retrospective and prospective phases, respectively. During the prospective phase the blood pressure was on average lower (125/90) than during the retrospective phase (140/100)

TABLE I

	Slope versus time (days)	
	$\text{Cr}^{-1} \cdot 10^5$ (n=17)	$\text{Ccr} \cdot 10$ (n=16)
Before control phase	$b = -0.203 \pm 0.028$	$b = -0.281 \pm 0.052$
During control phase	$b = -0.102 \pm 0.034$ $p < 0.025$	$b = -0.170 \pm 0.028$ $p < 0.05$

TABLE II

n=17	Blood pressure (mmHg)	
	Systolic	Diastolic
Before control phase	$146.2 \pm 3.8$	$92.6 \pm 1.6$
During control phase	$145.6 \pm 3.9$ NS	$89.9 \pm 1.0$ $p < 0.05$

Of course our findings do not exclude that protein restriction has a beneficial effect on the progression in addition to the more unspecific effect of better patient care and blood pressure control. However, to prove or disprove that this is true, prospective randomized studies are required in which the frequency and quality of the clinical and laboratory check-ups are the same with and without protein restriction, either in the same individuals or in groups of patients that are compared.

## References

- 1 Bergström J. *Clin Nephrol* 1984; 21: 29
- 2 Mitch WE. *Ann Rev Med* 1984; 35: 249
- 3 Alvestrand A, Ahlberg M, Bergström J. *Kidney Int* 1983; 24 (suppl 16): S268