SEMICONTINUOUS SEMIAMBULATORY PERITONEAL DIALYSIS

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Introduction

The practical realisation of equilibrium dialysis [1,2] by continuous ambulatory peritoneal dialysis (CAPD) has confirmed a series of clinical and metabolic advantages inherent in this concept [2–4].

However, a remarkably high proportion of patients refuse this new dialysis schedule because of the need to make two exchanges in the middle of the day, which interferes with their social or working life. Moreover, the number of connection-disconnection acts greatly increases the risk of peritonitis. Finally, the high incidence of hypertriglyceridaemia [5,6] (up to 70%), is a negative metabolic consequence of CAPD. In order to overcome these two limiting technical aspects and possibly to limit the hypertriglyceridaemia rate, we experimented with a new peritoneal dialysis (PD) schedule, aiming to maintain, at the same time, the advantages of CAPD.

Treatment schedule and technique

Chiefly according to the patient’s preference, two different schedules were adopted.

Schedule (a) consists of a rapid exchange of 8 litres at late evening plus two long periods of equilibrium dialysis (daytime and nighttime) each with 2 litres, using two 5L bags in the evening and a 2L bag in the morning.

Schedule (b) presents little difference from schedule (a): using a 6L bag in the morning and in the evening, a rapid exchange of 4L is accomplished, followed by a long equilibrium period (11 to 12 hours during the day and during the night).

In order to reduce further the risk of peritonitis (already limited by the fewer daily exchanges) we initially recommended that the patients wear the rolled empty bags during the night, but soon afterwards we adopted a permanently inserted ‘Y’ shaped connector. The connector, more extensively described else-
where [7], is filled with a disinfectant between the exchanges and thanks to the third branch for outflow, allows sterilisation after the potential contaminating acts (connection—disconnection) and washing of the killed bacteria and the disinfectant off the catheter.

Patients

A total of 16 patients were treated for periods ranging from 1 to 9 months (total = 51 patient-months), of whom 13 patients came from a daily peritoneal dialysis (DPD) group. Ages ranged from 9 to 70 years, mean 54 years.

Results

Figure 1 shows the BUN, haematocrit, creatinine, uric acid and phosphate values (columns B) and compares them with those of a group of patients on CAPD (columns C). Columns A show the variations of the same parameters in patients

![Bar charts showing BUN, hematocrit, creatinine, uric acid, and phosphate levels for CPD, CAPD, and daily PD groups.]
switched from DPD (shaded part of columns A) to combined peritoneal dialysis (CPD) (non-shaded part of columns A). It is evident that the biochemical parameters and the haematocrit values overlap those of CAPD patients and that these are clearly better than those in DPD patients.

![Graph showing pH and bicarbonate levels over 24 hours](image)

Figure 2

Figure 2 shows the behaviour of pH and bicarbonates during the course of the day. There are small fluctuations related to the exchanges, but the values remain almost always within the normal range.

Figure 3 shows the mean values of systolic and diastolic blood pressure, and their comparison in patients switched from DPD to CPD (shaded and non-shaded parts of columns A, respectively). Columns C show the same parameters in a group of CPD patients.

Figure 4 reproduces the platelet aggregation curves in CPD patients and, for comparison, those in the normal subjects (NS) and in CAPD and DPD patients. In the last group the platelet function was checked just before and after the dialysis session (respectively DPD1 and DPD2).

With regard to the other metabolic parameters, we found the following in the 11 patients treated for at least 3 months: mean values for serum albumin and total protein 3.4 and 6.6g% respectively; hypertriglyceridaemia at a rate of 27%; potassium and calcium easily kept stable within the normal range.

With regard to other clinical features we found: MNCV improved or unchanged; easy control of body weight and no major problems with fluid
removal; no tormenting thirst; high level of well being; peritonitis incidence = 0/51 patient-months; rehabilitation degree (according to the EDTA criteria) elevated, with 30% of the patients falling in grade I, 50% in grade II and 20% in grade IV.

Discussion and conclusion

It clearly emerges from our experience that CPD gives almost overlapping metabolic and clinical results compared with those of CAPD, and these results are far better than those of any other substitutive treatment. In some respects, indeed, it seems to offer advantages in comparison with CAPD, such as a less marked hypotensive effect (lower removal of salt or of a hypertensive substance?) and, perhaps, a lower hypertriglyceridaemia rate (lower glucose absorbed or lower carnitine loss?). The study time has been too brief, however, to enable us to draw definite conclusions. The removal of less substances in the range of the middle molecules could theoretically avoid the potential risk of depletion in prolonged treatments. The reduced water removal due to the longer equilibrium periods is well counterbalanced by the good degree of dehydration achieved during the rapid exchanges, with only an occasional necessity to resort to hyperosmolar extra-exchanges. Finally, the freedom from the need to make exchanges in the middle of the day, leaving more time for social and working life, greatly contributes to the high degree of rehabilitation and relieves the patients of psychological problems connected with daytime changes.

We can thus conclude that this new PD schedule seems to be a good and sometimes advantageous alternative to CAPD.

References

4 Robson MD, Oreopoulos DG. Dial Transplant 1978; 7: 999
5 Oreopoulos DG. Dial Transplant 1979; 8: 460