New Prescription of Peritoneal Dialysis: Intermittent Ambulatory Peritoneal Dialysis

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appeared (fig. 1b). We therefore reached a diagnosis of uremic pericarditis. CAPD schedule was Dianeal PD-2 UV-flash twin-bag 1.5%, 1,500 ml (Baxter Co.) 3 exchanges/day, because his urine volume was maintained by the administration of diuretics. His renal C_{cr} was improved to 5.1 ml/min/1.73 m². Since the patient became stable 2 weeks after the introduction of CAPD, we discontinued CAPD during 72 h with the administration of diuretics, vitamin D metabolite and uric acid synthesis inhibitor (table 1). The levels of UN, Cr, UA, K and Pi

Dear Sir,

Continuous ambulatory peritoneal dialysis (CAPD) has been established as a treatment of end-stage renal failure [1]. To achieve adequacy of dialysis in CAPD, patients have usually been dialyzed every day with four 2-liter volume exchanges per day. However, there are no prospective studies of methodology for prescription of CAPD. In addition, individual variation in peritoneal dialysis prescription exists. It has been indicated that one of the tools for prescribing minimum adequacy of peritoneal dialysis is overall (peritoneal and renal) creatinine clearance (C_{cr}) of 50 l/week/1.73 m² (4.96 ml/min/1.73 m²) [2]. We therefore attempted intermittent ambulatory peritoneal dialysis (IAPD), which is modified CAPD, in a patient with renal C_{cr} near 5 ml/min/1.73 m², and the results have been reported here.

A 68-year-old male was started on hemo-dialysis (HD) because of chronic renal failure due to diabetes mellitus and tamponade due to massive pericardial effusion (fig. 1a) on May 11, 1995. His blood pressure was 120/80 mm Hg, pulse 108/min, temperature 36.0°C, height 160 cm, and body weight (BW) 53.8 kg. Examination of the blood and urine yielded the following data: hemoglobin concentration, 7.1 g/dl; hematocrit, 21.3%; serum urea nitrogen concentration (UN), 83.7 mg/dl; serum creatinine concentration (Cr), 10.9 mg/dl; serum uric acid concentration, 10.5 mg/dl; 24-hour C_{cr}, 9.2 ml/min/1.73 m²; serum total protein concentration, 6.6 g/dl; serum sodium concentration (Na), 141 mEq/l; serum potassium concentration

Fig. 1. Chest radiograph (a) at admission and (b) on CAPD.

(K), 4.4 mEq/l; serum total calcium concentration (Ca), 6.9 mg/dl; serum phosphate concentration (Pi), 7.2 mg/dl; blood glucose concentration, 194 mg/dl, and HCC_{1/8} 17.6 mmol/l. The genesis of pericardial effusion could not be clarified. Although his BW was

reduced to 48.0 kg by ultrafiltration, pericardial effusion had not disappeared. Since his C_{cr} decreased to 4.5 ml/min/ 1.73 m² because of severe hemodialysis-induced hypotension and ultrafiltration, the patient was transferred to CAPD. After transfer to CAPD, pericardial effusion dis-

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(Monday) (Tuesday) (Wednesday) (Thursday) (Friday) (Saturday) (Sunday)

Fig. 2. Weekly schedule of IAPD.

Table 1. Changes of serum urea nitrogen (UN), serum creatinine (Cr), serum uric acid (UA), serum sodium (Na), serum potassium (K), serum total calcium (Ca), serum phosphate (Pi) and bicarbonate (HCO₃) concentrations and body weight (BW) after cessation of peritoneal dialysis (PD)

with time. However, the levels of Na and BW had not changed. The results indicated that peritoneal dialysis can be discontinued for 24-48 h without problems like underdialysis, hyponatremia, hyperkalemia, hypocalcemia, hyperphosphatemia, metabolic acidosis and overhydration. We therefore performed IAPD during 3 days (Monday, Wednesday and Friday) per week with Dianeal PD-2 UV-flash twinbag 1.5%, 1,500 ml 3 exchanges/day (fig. 2). On

the morning of dialysis-free days, except for Sunday, the dialysate was drained by Y-set. The level of 24-hour C_{cr} after the introduction of IAPD was 7.0 ml/min/1.73 m², resulting in 70.6 l/week/1.73 m² and the level of peritoneal C_{cr} was 3.9 l/day/1.73 m², resulting in 11.7 l/week/1.73 m². Then, the overall C_{cr} was 82.3 l/week/1.73 m². The overall C_{cr} exceeded minimum adequacy of peritoneal dialysis (50 l/week/1.73 m²). The patient favored IAPD more than CAPD, because bag exchange times were less frequent and dialysis-free days existed. The patient

has been on IAPD for 4 months without any problems such as aggravation of clinical symptoms, underdialysis and overhydration, except for the slight increase in the level of serum β₂-microglobulin. The peritoneal equilibration test demonstrated low average. It seems likely a concept that ambulatory peritoneal dialysis should be performed every day. However, our report indicates that IAPD is useful for managing the patient with end-stage renal failure and IAPD is more acceptable than CAPD. Although the differ-

ence of prognosis between IAPD and CAPD is unclear, we thought that IAPD is better than CAPD for the following reasons. The continuous presence of dialysis fluid in the peritoneal cavity is favorable for dialysis clearance as compared to the intermittent presence. However, it has been reported that transient cessation of CAPD in patients with membrane failure led to improvement of peritoneal function, indicating that continuous contact between peritoneum and dialysis fluid should be avoided if possible [3]. Therefore, IAPD is suggested to be better than CAPD to continue peritoneal dialysis longer. After 2 years of introduction of CAPD, almost 24% of patients are transferred from CAPD because of noninfectious medical and psychosocial problems [4]. Since IAPD has dialysis-free days, similar to HD, the patient's quality of life will improve and psychosocial problems will decrease as compared to CAPD. We therefore recommend the introduction of IAPD in patients with sufficient residual renal function when the patients do not select automated peritoneal dialysis. Even if the residual renal function decreases, IAPD can be continued long term by modulating dialysis volume, dialysis osmolality, dialysis exchange times and dialysis-free days.

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