

LEADING ARTICLE

CONTINUOUS AMBULATORY PERITONEAL DIALYSIS (CAPD)

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Continuous Ambulatory Peritoneal Dialysis (CAPD), first described in 1976 by Popovich 11 years ago is now an established form of treatment for patients with end stage renal failure (ESRF) (1). Over the last 7 years, the number of patients on CAPD has increased steadily. The highest percentage of dialysis patients on CAPD is seen in Mexico (81%) and the lowest in Japan (2%). Australia has 29% and New Zealand 42% with 12% in the United States and 7% in Europe (2). CAPD was started in Singapore in 1980. Up to the end of December 1986 we had 99 patients on CAPD, constituting 36% of our dialysis population. If transplanted patients are included, CAPD accounts for 24% of the population of patients who have renal replacement therapy for end stage renal failure (ESRF).

CAPD has several advantages over hemodialysis, namely; a stable biochemical state since patients are continuously on it compared to patients on hemodialysis who are dialysed 3 to 4 hours a week with wide fluctuation of their biochemistry. Compared to patients on hemodialysis who tend to be fluid overloaded, those on CAPD have less problems with salt and water intake.

They do not require very stringent restriction of salt and water as the daily CAPD exchanges usually yield an average negative balance of 500 mls to as much as 1000 mls per day. Potassium restriction is not required in patients on CAPD as it is constantly removed in the dialysate. Hemodialysis patients in contrast, require constant restriction of potassium because of the dangers of potentially fatal hyperkalaemia. The peritoneal membrane is also better at clearing middle molecules than the average membranes used for hemodialysis. CAPD patients in addition have better control of phosphates and their haemoglobin levels are generally better than those of patients on hemodialysis.

However, one of the drawbacks with CAPD is the high incidence of peritonitis. Peritonitis remains the most frequent complication of CAPD and is the most common cause for transfer to hemodialysis. The incidence of peritonitis has in fact progressively declined over the last 7 years due to the use of in line filters, special aseptic precautions during spiking of the dialysate bags and lately, the use of the ultraviolet sterilising kits.

This issue of the journal reports the experience of... et al from Hong Kong in 63 patients with ESRF treated by CAPD. Most of the patients did the procedure by themselves. This is important because from our experience there is a higher risk of infection if the procedure is performed by a relative instead of the patient. Their incidence of peritonitis based on culture positive peritonitis was 1 episode per 15.7 patient months. Our incidence in Singapore is 1 episode of peritonitis every 13.2 patient months (3). The occurrence of tuberculous peritonitis as reported is not new in this part of the world. We too are reporting a case of tuberculous peritonitis in one of our CAPD patients (4) and doctors involved in management of patients on CAPD should be more aware of this possibility.

Most cases of peritonitis are due to organisms travelling through the catheter lumen or periluminally from the exit site infection. The predominant organisms are gram positive skin contaminants (*Staph aureus* and *epidermidis*). In the Hong Kong series, *Staph* is responsible for infection in 73% of patients. Removal of the Tenckhoff catheter is initiated early in patients with resistant infection as prolonged antibiotic therapy predisposes to fungal infection. Fungal peritonitis is a major cause of morbidity and mortality in CAPD. Once diagnosed, the catheter should be immediately removed and the patient transferred to hemodialysis for at least 2 months before reinsertion of the catheter and recommencement of CAPD.

Other complications of CAPD are hyperlipidemia and hypoproteinemia. Patients on CAPD lose about 6 to 8 grams of protein and 2 to 3 grams of amino acids in the effluent dialysate every day. This can lead to malnutrition in some patients. At the same time they absorb about 150 to 200 grams of glucose from the dialysate which causes hypertriglyceridemia and hyperinsulinemia. Some patients gain fat but do not improve their lean body mass.

CAPD has been the treatment of choice in the very young (less than 15 years), the elderly (more than 60 years) and the diabetic. Children on CAPD grow faster than those on hemodialysis. The elderly patient has better cardiovascular stability on CAPD. For the diabetic, CAPD is now the treatment of choice. Compared with hemodialysis, diabetics on CAPD have better survival, control of hypertension and hyperglycemia and less aggressive retinopathy. Diabetics account for 25% of patients with ESRF in Singapore and 15.8% in Hong Kong. In this series as in most other series, diabetic patients on CAPD did not fare worse and their peritonitis rate was no more frequent than in the non-diabetic patient.

We share the authors' view that satisfactory biochemical and nutritional state can be maintained with 3 two-litre exchanges per day. It causes less disruption of the patient's work routine and reduces expenditure by 25%. Only the occasional patient who tends to be overloaded need be on 4 exchanges per day. CAPD has certainly come a long way as an alternative to hemodialysis. It has proven successful in patients with ESRF and has kept them alive for a lengthy period with a reasonable quality of life.

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