

Experience Managing Adult Patients on Continuous Ambulatory Peritoneal Dialysis in Bangladesh

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Continuous ambulatory peritoneal dialysis (CAPD) is becoming increasingly known to the patients of Bangladesh, and patient numbers are increasing. Here, we report our experience and clinical outcomes in this field.

Our analysis included all CAPD patients managed in a tertiary care hospital in Bangladesh between 2003 and 2015. All patients received a Tenckhoff double-cuff catheter by mini-laparotomy, and twin bags were used in most patients. In acute cases, regular exchanges were started manually with small-volume dwells the same or the next day.

During the study period, 500 patients (mean age: 62 ± 18 years; 62% men; 86% percent with diabetes) were managed. Selection of CAPD was made by choice (47%) or for hemodynamic instability (32%), remote residence (17%), or poor vascular access (4%). Total duration of follow-up was 9364 patient-months (range: 1 – 78 months). The peritonitis rate was 1 episode in 30 patient-months. Fewer than 5% of patients required catheter removal. Similarly, the percentages of catheter tip migration and fluid leak were at the lower end. Patient survival was 68%, 48%, 38%, 22%, and 8% at 1, 2, 3, 5, and 7 years. Deaths were mostly attributable to vascular events.

In a population with predominantly diabetic patients, CAPD was shown to be a viable mode of renal replacement therapy. The rates of peritonitis and catheter-related complications were low. Survival in the initial years can be considered acceptable.

Key words

CAPD, survival, peritonitis, diabetes, infections

Introduction

The scenario for peritoneal dialysis (PD) in Asia, as reported in the mid-1990s (1), showed, in most countries, low utilization compared with hemodialysis (HD). Multiple circumstances influenced PD uptake, including modality cost, complications such as peritonitis, and more importantly, the economic stress prevailing in the many countries with a low GDP. Even in countries in which dialysis services were reimbursed, PD use tended to be low. In addition, physician attitude, either through an absence of incentives or a lack of appropriate knowledge, was an important hindrance to PD spread at the time. Some recent reports show that the situation has changed in many parts of Asia, as evidenced by higher PD uptake in Hong Kong, Thailand, Malaysia, and India. Key to that success has been the reimbursement policy for the implementation of PD as a first-choice therapy (2).

In Bangladesh, as in many developing countries, most patients have to procure dialysis services for themselves. Compared with the cost of HD, the cost of PD is an issue, because PD costs relatively more, partly because of imported supplies and low uptake (3). In addition, infectious complications are a strong negative issue, affecting PD selection by patients, their caregivers, and their physicians alike.

Here, we report our experience and the clinical outcomes of patients who were managed on PD at the same institute for a long period.

Methods

Our retrospective study included all patients managed using continuous ambulatory PD (CAPD) at BIRDEM Hospital, Bangladesh, a tertiary care hospital that cares predominantly for patients with

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diabetes, between 2003 and 2015. Medical records were evaluated for the last clinical and laboratory data and for patient outcomes.

The study subjects were adults, and the overall population was predominantly diabetic. All patients received a Tenckhoff double-cuff catheter by mini-laparotomy. The connection systems initially used were Y-connection (spike) systems; subsequently, twin bags with flush-before-fill were used for exchanges. All patients received intraperitoneal prophylactic antibiotics during PD catheter insertion. In symptomatic patients or those having an acute need for dialysis, short dwell times and small-volume exchanges were started manually the same or the next day (0.5 L – 1 L per session, subsequently increasing to 2 L).

Peritonitis was considered in the presence of cloudy dialysate, and empiric treatment was started immediately. The early choice of antibiotics was a combination of vancomycin and gentamycin; subsequently, ceftazidime was substituted for the gentamycin. Microscopic examination of PD effluent showing a white cell count exceeding $100/\text{mm}^3$ (>50% neutrophils), with or without accompanying constitutional symptoms, was taken as peritonitis. Culture of the PD effluent was undertaken in patients presenting early and in those with an absence of improvement after empiric therapy. The catheter was removed after 1 – 2 weeks if no improvement was observed in the PD effluent cell count, or if fungal peritonitis was suspected.

Results

During the study period, 500 patients were managed on CAPD. Mean age in this group was 62 ± 18 years, and 62% of the patients were men. A comparison of the men and women showed that the groups were of a similar age (62 ± 11 years vs. 63 ± 10 years, $p = \text{non-significant}$). Selection of CAPD was made by choice (47%) or for hemodynamic instability (32%), remote residence (17%), or poor vascular access (4%). Most of the patients had diabetes (86%). The total duration of follow-up was 9364 patient-months (mean: 15 ± 13 months; range: 1 – 78 months). The average number of 2 L daily exchanges was 3.

The peritonitis rate was 1 episode in 30 patient-months. Exit-site infection developed in very few patients (<1%). Fewer than 5% of the patients required catheter removal. Technique failure because of omental wrap, tip migration, fluid leak, and so on was reported in about 1% of patients.

At the time of last follow-up, mean hemoglobin was 10.2 ± 2.1 g/dL, and serum creatinine was 6.2 ± 2.5 mg/dL, with urea 94 ± 25 mg/dL, potassium 3.1 ± 1.3 mmol/L, and albumin 28 ± 2.4 g/L.

Patient survival was 68%, 48%, 38%, 22%, and 8% at 1, 2, 3, 5, and 7 years. Deaths were predominantly attributable to cardiac and cerebrovascular events (31% and 19% respectively), inadequate dialysis and cachexia (16%), and peritonitis (8%).

The average duration of PD in the patients overall was 12 ± 13 months, without any age difference between the men and the women (62 ± 11 years vs. 63 ± 10 years, $p = \text{non-significant}$). When age groups (<40 years, 2%; 41 – 60 years, 41%; 61 – 75 years, 42%; >75 years, 15%) were considered, the average PD duration was 38, 19, 19, and 14 months, indicating that survival was poorer with increasing age, but similar in patients 45 – 75 years of age. A correlation analysis showed a negative association of PD duration with higher age, with clustering in the middle ($r = -0.10$, $p < 0.05$, Figure 1).

Discussion

Quality of life and survival on PD have improved substantially and are similar in many instances to survival on HD, especially during the initial years. A number of published observations in larger patient populations at various time periods support that claim (4,5). In many Asian countries, increasing treatment reimbursement policies, accompanied by improvements in PD technique and the availability of supplies, have led to CAPD becoming more acceptable

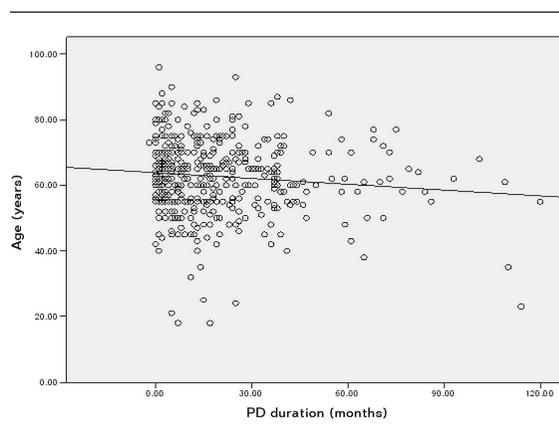


FIGURE 1 Association of continuous ambulatory peritoneal dialysis duration with age.

as an option of renal replacement therapy (RRT), with patient numbers increasing (2). One report covering a 12-year period showed PD continuing to grow in developing countries while declines were observed in developed countries (6).

In Bangladesh, the number of patients being treated with the PD modality is also increasing (3). Given the country's growth in population, the number of incident end-stage renal disease patients requiring RRT is also increasing. A combination of improved economic strata, improved PD outcomes, and growing awareness among patients and physicians has contributed to the increase. Nevertheless, growth and penetration of PD remain disproportionately low. Approximately 2%–3% of patients receiving RRT are receiving PD—a proportion similar to the proportions seen in many developed countries. The U.S. Renal Data System reports that only 9% of incident end-stage renal disease patients in the United States start with PD (7). Lack of awareness and of timely provision of information to patients remain important obstacles to the spread of PD. The view is that the current distribution of dialysis modalities in the United States does not reflect patient choice. Some 20%–40% of patients can be treated with PD, a level that could be achieved with more training for health care providers (8).

Among laboratory parameters, serum potassium and albumin are two important variables in PD. Potassium metabolism in PD has to be carefully evaluated because removal of potassium is increased in the presence of significant residual renal function, use of diuretics, and a higher number of PD exchanges. Deficiency in dietary intake can further complicate the situation (9). In our patient group, serum potassium was low. Most of our patients were using 3 exchanges daily, and their low serum potassium could be a result of dietary deficiency. In addition, serum albumin was also lower than the recommended target in our patient group. Individuals of Asian ethnicity tend to maintain lower levels of serum albumin, and so the levels seen in our patients might not be an indicator of inadequate dialysis. As a Chinese study showed (10), even when analyzed by Kt/V (low to high), serum albumin did not vary much and remained low. The reasons for these low levels require further exploration with peritoneal membrane function tests and precise measurement of albumin.

Systematic data collection in registries is absent in most Asian countries. Hence, PD infection rates,

survival, and causes of death are not readily available. The International Society for Peritoneal Dialysis advocates for a peritonitis rate lower than 1 episode in 18 patient-months (11). In South Asian countries, reports from earlier years showed that, in the various countries of the region, the peritonitis rate fell into the range of 1 episode in 19–22 patient-months (12). Our patients experienced 1 episode in 30 patient-months, which reflects the better management in the current era and is similar to rates seen in the economically advanced countries of the region (2,13).

Some reports show that, for PD patients, survival varies from 79% to 94% in the 1st year and from 57% to 77% in the 3rd year (2). Higher survival rates are more prevalent in developed countries such as Australia, New Zealand, and Taiwan. The main causes of mortality—cardiovascular events and infection—are similar in all geographic areas. That situation was also true for our patients, in whom the leading cause of death was vascular catastrophe. Our patient survival was relatively low during years 1–3, which might be attributable to the predominantly diabetic population and the presence of more cardiovascular comorbidities at dialysis start. A similar pattern of outcomes was also reported from India (14). A meta-analysis found decreased survival in elderly diabetic patients after 2–3 years of PD (15). Patients with end-stage renal disease who are more elderly and in poor health can experience increased mortality (16).

Conclusions

The CAPD modality can be a viable mode of RRT in a population of predominantly diabetic patients. In our population, rates of peritonitis and catheter-related complications are low. The presence of more comorbidities at dialysis initiation, possibly with subsequent poorer nutrition status, might have resulted in relatively lower survival.

Disclosures

We understand that *Advances in Peritoneal Dialysis* requires disclosure of any conflicts of interest, and we declare we have no conflicts to disclose.

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