Original Article

Continuous Ambulatory Peritoneal Dialysis (CAPD) is a Suitable Alternative of Renal Replacement Therapy for End Stage Renal Disease.

Acharya A[1], Naik Haladhara[2], Mohanty D P[3], Mishra D N*[4]

1. Associate Professor, Department of Nephrology S. C. B. Medical College & Hospital Cuttack753007, Odisha, India.
2. Associate Professor Department of Surgery S. C. B. Medical College & Hospital Cuttack753007, Odisha, India.
3. Associate Professor, Department of Microbiology, SCB Medical College, Cuttack, Odisha, India.
4. Associate Professor, Department of Anatomy S. C. B. Medical College Cuttack753007, Odisha, India.

***Corresponding author's E-mail:** dharmaniranjan.mishra08@gmail.com

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ABSTRACT

Introduction: Continuous ambulatory peritoneal dialysis (CAPD) is an alternate mode of treatment for patients suffering from end stage renal failure in the state of odisha since decades. It is an accepted form of renal replacement therapy in our institution.

Aim: To evaluate the CKD patients on CAPD as a modality of renal replacement therapy.

Materials and Methods: The present retrospective cross-sectional study was done on patients undergoing CAPD treatment and their follow up between the years 2013-2020 in a tertiary care hospital of Odisha.

Observation: We studied a total of 31 cases for evaluation. The mean age was 39.51 years ± 18.09 ranges 4 to 67 years. There were 24 male constituting 77.42% and 7 females being 22.58%. There were 68 episodes of peritonitis. The rate of peritonitis was 2.19 per patient in follow-up of 31 patients. The duration of peritoneal dialysis was 6-12 months in three cases, 12-24 months in eleven cases and >24 months in seventeen cases respectively. Six patients developed exit site infection and were treated with oral antibiotics and local dressing. Two patients underwent catheter removal due to recurrent peritonitis. Tunnel infection was seen in none of them.

Conclusion: For end stage renal disease (ESRD), the safe and suitable modality for renal replacement therapy was chronic ambulatory peritoneal dialysis (CAPD) in remote and geographically outreached areas of odisha.

Keywords: Chronic ambulatory peritoneal dialysis, renal replacement therapy, CKD, ESRD.

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INTRODUCTION

The number of patients with chronic kidney disease (CKD) is increasing in leaps and bounds.[1] Management of these cases is a herculean task. Effective conservative management in initial stages prolongs the time of onset of End Stage Renal Disease (ESRD) and so delays the need for Renal Replacement Therapy (RRT). [2]

CAPD (Continuous Ambulatory Peritoneal Dialysis) is a proven and effective mode of RRT, with many clinical and non-clinical advantages. [3] The patients can do it at their residence and at their own convenience without being subjected to the discomfort associated with an in-center dialysis. Many patients of ESRD have also co morbid conditions like dilated cardiomyopathy, coronary artery disease, retinopathy, bad peripheral veins which make it difficult to obtain vascular access, also inherent cardiovascular instability.[4] Hemodialysis in this group of patients is at times risky and even fatal. It has been proven beyond doubt that CAPD, in comparison to HD (Hemodialysis) preserves the residual renal function (RRF) better.[5] This preservation of RRF has many inherent advantages.

It is imperative and in-line with professional ethics, that any chronic diseased patient be aware of all modes of therapy available to him/her. SCB Medical College & Hospital being a hospital which carries a tradition of putting the patient first is proud to announce the induction of "Peritoneal Dialysis Program" in it. With this we become a more comprehensive center and add to the value we bring to patients.

SUBJECTS AND METHODS

This cross-sectional study was initiated and carried out on CAPD patients at the department of Nephrology SCB Medical College, Cuttack from 2013 to 2020. All the patients were subjected to detailed clinical, biochemical and echo-cardiography to assess the degree of renal failure and fitness of the patient to withstand CAPD treatment. We designed a proforma to collect variables like age, sex, marital status, education, socio-economic and demographic profile of the study group. Peritoneal dialysis catheter was given by surgical procedure under local

anesthesia. After breaking they were maintained with a twin bag system.

The following guidelines have been designed to enable our study to deliver high class PD standards of care. The main areas of focus are:

1. Pre-Dialysis Education
2. Pre-Operative Protocols & PD Access
3. PD therapy training
4. Adequacy of Peritoneal Dialysis and Fluid Management
5. Management of Infectious Complications of PD
6. Track peritonitis rate annually.
7. Chart trends of causative organism by month or by quarter.
8. Monthly meetings to explore root causes of each infection and plan for intervention to prevent recurrence.
9. Re-evaluate the peritonitis treatment protocol of the PD programme.

Data Analysis

All collected data is analyzed on a regular basis, i.e. every 6 months if any change in protocols are initiated else once in every 12 months to check for areas of improvement. We used Graph pad Software for statistical analysis. The p value <0.05 is considered significant.

Ethical clearance:

Ethical clearance of the present study was obtained by Institutional Ethics Committee (IEC) S.C.B Medical College Cuttack, 753007, Orissa as per world Medical Association Declaration of Helsinki.

Table 1: Age and Sex distributions of study group.

Age in years	No of patients	Male	Female
1-15	5	3	2
16-30	5	3	2
31-45	7	6	1
46-60	10	9	1
≥61	4	3	1
Total	31	24(77.42%)	7(22.58%)

In the present study 31 cases were analyzed for end stage renal failure. The mean age was 39.51 years ± 18.09 ranges 4 to 67 years. There were 24(77.42%) male and 7 (22.58%) female patients respectively. The M: F ratio was 3.4:1. There were 5 cases each In the age group of 1-15 and 16-30 years respectively. From 31 to 45 years 7 cases, 46 to 60 years maximum 10 cases and ≥61 years 4 cases seen.

Table 2: Geographical distribution region wise

Districts of Odisha	No of cases	Male	Female
Central Odisha	11(35.5%)	9	2
Southern Odisha	4(12.9%)	2	2
Northern Odisha	3(9.6%)	2	1
Western Odisha	07(22.6%)	6	1
Coastal Odisha	06(19.4%)	5	1
Total	31(100%)	24(77.41%)	7(22.6%)

Out of 31 cases 11(35.5%) cases were within 50 kms from the Central Odisha. But majority of 20(64.5%) cases were from southern, northern, western and coastal districts of Odisha. They belonged to rural and tribal areas more than 150 kms radius from the study location.

OBSERVATION

Table 3: Total patients observed in the study group (yearly cumulative basis)

Chronological Year	2013	2014	2015	2016	2017	2018	2019	2020	Total
Patients observed	4	3	15	16	-5	-1	9	-10	31
Patients base	4	7	22	38	33	32	41	31	31
Peritonitis episodes	1	1	3	7	16	9	18	13	68
Patients months	34	61	56	46	22	14	44	44,03	321.03
Exit site infection			1	2	1	1	1		6(19.35%)

There were 4 patients receiving peritoneal dialysis in 2013 and in 2014 3 new cases added making the patient base observed become 7 later on in subsequent years up to 2020 the cumulative patients increased up to 31 cases. The total follow-up was 31 patients amounting 321.03 patient months. The duration of peritoneal dialysis was 6-12 months in three cases, 12-24 months in eleven cases and >24 months in seventeen cases respectively. There were 68

episodes of peritonitis. The rate of peritonitis was 2.19% per patient and 1 in 4.72 (321.03/68) patient months. Six patients 6(19.35%) developed exit site infection 2 patients in 2016 followed by one patient in the year 2015, 2017, 2018 and 2019 in the present study.

Figure 1: Peritoneal Dialysis at residence of the patient.

DISCUSSION

CAPD is relatively easy, affordable and most suitable mode of renal replacement for ESRD in backward and rural districts of Odisha. In the present study of 31 cases with male predominance of 24(77.42%) with M: F ratio was being 3.4:1 majority of cases were from 20 (64.5%) from distant rural and tribal areas more than 150 kms. [6]

Maximum patients 17 (54.83%) were belonging to the age 31-60 years [7] as studied by Mehrotra R et al 43% , which was the most productive period of human life cycle with male predominance [10] (Table 1). CAPD was having advantage over hemodialysis in rural and remote areas as it can be done at their residence by learning initial simple techniques by nephrologists[8,11] (Table 2 & Fig 1). 68 episodes of peritonitis were observed, which was on an average 2.19 per patient and occurring one in 321.03 patient months. Catheter exit site infections and recurrent peritonitis are common morbidity[9] (Table 3). The infected sites were treated with oral antibiotics followed by reinsertion of catheter. In the present study the exit site infection was managed with daily betadine dressing followed by intraperitoneal ceftazidime, intra peritoneal Amikacin and oral Ciprofloxacin on the other hand peritonitis was treated with intraperitoneal ceftazidime, vancomycin, intravenous piperacillin tazobactam (2.25) and intravenous vancomycin was considered if staphylococcal peritonitis was suspected. [12]

The standard prescriptions for all patients were three daily exchanges with Dianeal PD 1bags of 1.5% glucose in the first bag followed by 2.5% in Dianeal PD 2 and 3 bags. Three patients required Extraneal 7.5% in PD 3. Six patients developed exit site infection and were treated with oral antibiotics and local dressing. Two patients underwent catheter removal due to recurrent peritonitis. Tunnel infection was seen in none of them. [13] The empirical protocol followed for exit wound infection was daily dressing of exit site and intraperitoneal ceftazidime 1 gm in single exchange with a longer dwell time of more than 6 hours or intraperitoneal ceftazidime 125mg in each exchange, Ciprofloxacin 500 OD orally and injection Amikacin(2mg/kg) IM in one exchange. The treatment protocol for peritonitis was intraperitoneal ceftazidime 1 gm in the night exchange, vancomycin 1 gm once daily intra peritoneal and intravenous (IV) piperacillin tazobactam (2.25) 8 hourly. Staphylococcal peritonitis was treated with vancomycin 15 mg/kg IV infusion. Total duration of treatment is 2 weeks. Every 5th day the specific treatment was given in all cases of peritonitis according to the PD fluid culture and sensitivity report. [14]

CONCLUSION

This study was carried out for the first time in odisha in a referral medical college considering the chronic kidney disease patients from distant parts of the state. Most of them were male in their productive age group. Hence Continuous ambulatory peritoneal dialysis (CAPD) was proved as an effective, essential and suitable alternative to the renal replacement therapy among poor patients. So poverty, low socioeconomic status and education should not be considered a hindrance to successful peritoneal dialysis (PD). Careful and meticulous patient selection, training, regular home visits and follow up proper protocol can ensure a successful performance of CAPD.

Limitations: Small study group, ignorance and fear about peritoneal dialysis with adverse geographical locations are major limitations to the study.

REFERENCES

1. Sanyaolu A, Okorie C, Annan R, et al. Epidemiology and management of chronic renal failure: a global public health problem. Biostatistics Epidemiol Int J. 2018;1(1): 11-16.
2. Nina R, O' Connor and Pallavi K. Conservative Management of End Stage Renal Disease Without Dialysis: A Systematic Review. J Palliat Med. 2012; 15(2):228-225.
3. Wearne N, Kilonzo K, et al. Continuous ambulatory peritoneal dialysis: perspectives on patients selection in low low-to-middle-income countries. Int J Nephrol Renovasc Dis.2017;10: 1-9.
4. Subbiah A K, Chhabra Y K, Mahajan S. Cardiovascular disease in patients with chronic kidney disease: a neglected subgroup. Heart Asia.2016;8(2): 56-61.
5. Lang S M, Bergner A, Topfer M, Schiffl H. Preservation of residual renal function in dialysis patients: effects of dialysis-technique-related factors. Perit Dial Int. 2001; 21(1): 52-57.

6. Vanholder R, Lameire N, Annemans L, et al. Cost of renal replacement: how to help as many as possible while keeping expenses reasonable?. Nephrology Dialysis Transplantation. 2015; 31(8): 1251-1261.

7. Mehrotra R, Chiu Y W, Zadeh K K, et al. Similar Outcomes with Hemodialysis and Peritoneal Dialysis in Patients with End-Stage Renal Disease. ARCH INTERN MED. 2011; 171 (2): 110-118.

8. Akash Nayak Karopadi et al. Remote monitoring of peritoneal dialysis: Why? Where? How?. Hong Kong Journal of Nephrology. 2013; 15(1): 6-13.

9. Jacob A Akoh. Peritoneal dialysis associated infections: An update on diagnosis and management. World J Nephrol. 2012; 1(4): 106-122.

10. Usha Bapat, Shobhana G. Nayak, Prashanth G. Kedleya, Gokulnath. Demographics and Social Factors Associated with Acceptance of Treatment in Patients with Chronic Kidney Disease. Saudi J Kidney Dis Transpl 2008; 19(1):132-136.

11. Kavanagh D, Prescott G J. peritoneal dialysis-associated peritonitis in Scotland. Nephrol Dial Transplant. 2004; 19(10): 2584-91.

12. William L Salzer. Peritoneal dialysis-related peritonitis: challenges and solutions. Int J Nephrol Renovasc Dis.2018; 11: 173-186.

13. Atul Kumar Srivastava, Indranil Ghosh, Shrikant Sonawane. Clinical profile and microbiological spectrum of patients with continuous ambulatory peritoneal dialysis-associated peritonitis at a tertiary care center. Medical Journal Armed Forces India. 2022; (in press) doi.org/10.1016/j.mjafi.2022.05.001

14. Alqaedi A, Parameswar P J, Alnasser B, Mubaraki AA, Bafaqeeh MAlshathri A et al. the prevalence of peritonitis among Paediatric Peritoneal Dialysis Patients at large Saudi Center. Saudi J Kidney Dis Transpl. 2022; 32: 973-8

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