LUPINE PUBLISHERS

Journal of Urology & Nephrology Studies

DOI: 10.32474/JUNS.2021.03.000161

ISSN: 2641-1687

Research Article

Reasons and Outcome of Patients after Permanent Transfer from Peritoneal Dialysis to Hemodialysis: A Review of 16 years of Experience in Senegal

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Received: November 16, 2021 **Published:** November 24, 2021

Abstract

Introduction: Peritoneal dialysis (PD) and haemodialysis (HD) are two complementary and non-competitive renal replacement therapy (RRT). A patient can be transferred from one technique to the other. The objective of this study was to assess the reasons for transferring patients from PD to HD and to follow their outcome.

Patients and Methods: This is a 16-year descriptive and analytical retrospective study (March 1, 2004 - August 31, 2020) conducted at the PD unit of the Aristide Le Dantec University Hospital in Dakar. Were included, patients on PD for at least 30 days, over 18 years of age and permanently transferred to HD. The probability of survival for any duration of post-transfer follow-up was estimated by the Kaplan-Meier method.

Results: The analysis covered 98 out of 113 cases. The mean age of the patients was 45.2 ± 14.09 years at the initiation of PD and 47 ± 13.91 years at the time of transfer, with a sex ratio of 0.66. The mean duration in PD was 19.9 ± 17.25 months [range, 1.0-90.0 months]. The transfer to HD concerned 73.5% of patients in the first two years. The reasons for transfer were mainly associated with infection (82.7%), mechanical complications (23.5%), social reasons (12.2%) and inadequate dialysis (6.1%). It was programmed in 11.4% of cases and 6% of patients had a permanent approach. At the endpoint date, the mean duration in hemodialysis was 43.3 months with 42.8% of patients still in HD. There was a kidney transplant patient; a return to PD. Mortality was 34.6%. The mean HD survival was 126 months. There was a statistically significant relationship between infection as a reason for transfer and mortality (p = 0.047).

Conclusion: The main reasons for transferring PD to hemodialysis identified in the literature are found in our context. This transfer must be anticipated to reduce morbidity and mortality.

Keywords: Peritoneal dialysis; Transfer of Patients; Peritonitis

Introduction

Peritoneal dialysis (PD) and haemodialysis (HD) are two complementary modalities of renal replacement therapy. There is an increasing use of PD in the world, with a prevalence multiplied by 2.5 between 1997 and 2008 [1]. Indeed, this technique has shown survival rates similar to HD [2] or even better [3]. The main limitations of PD are related to the failure of the technique, forcing patients to switch to HD [4]. In the 2010 ANZDATA (Australia and New Zealand Dialysis and Transplant) report, 20% of PD patients were definitively transferred to HD [5]. Similar rates have been reported in other countries [6]. According to the REIN registry, each year 10% of patients in PD are transferred to HD, mainly during the first two years of treatment [7]. The most common causes of

technique failure are peritoneal infection, inadequate dialysis, catheter dysfunction or patient choice [8-10]. In addition, the risk of transfer to HD is relatively high during the first 6 months of the onset of PD [8,9]. Several risk factors for PD technique failure have been identified. They include advanced age, high permeability of the peritoneal membrane, reduced peritoneal ultrafiltration, malnutrition, diabetes, and increased body mass index [8-11]. In Senegal, there is little or no data available that has examined the reasons for transfer and the outcome of patients transferred from PD to HD. This is why we conducted this work in order to assess the reasons for transferring patients from PD to haemodialysis and to monitor their future on haemodialysis.

Patients and Methods

This was a descriptive, analytical and multicenter retrospective study over a period from March 01, 2004, to August 31, 2020. Were included, all patient in PD for at least 30 days, over 18 years of age and permanently transferred to HD. The data were collected on an operating sheet, from the medical files.

Epidemiological data: existence of comorbidities at the start of PD and at the time of transfer to HD (the Charlson comorbidity score [12] was calculated retrospectively at the initiation of PD and at the start of treatment with HD); the stay in PD and entry into HD were analyzed. As of the August 31, 2020, point date, we have also collected the following parameters:

a) Haemodialysis parameters: weekly number and duration of HD sessions, mean inter-dialytic weight gain over one-week, average dialysis dose over one week, type of vascular access:

b) For the outcome of the patients:

a. Duration in HD.

b. Status: deceased, kidney transplant returned to PD, still in HD or lost to follow-up.

c. If death: date / year, cause.

d. If returned in DP: reasons.

Results

Ninety-eight (98) were included in the study. The mean age at initiation of PD was 45.17 ± 14.09 years. At the time of transfer the mean age was 47.00 ± 13.91 years. There was a female predominance with a sex ratio of 0.66. The initial nephropathy was undetermined in 29.6% of cases. Nephroangiosclerosis and chronic glomerulonephritis of undetermined origin accounted for 28.6% and 15.3% respectively (Table 1). Forty-nine (49) patients received hemodialysis before access to PD. At the initiation of PD, high blood pressure was the most common medical history (94.90%), followed by diabetes and a history of cardiovascular disease (8.16%). The mean Charlson's index was 2.88 ± 1.31. The mean distance traveled to reach the PD unit was 68.62 ± 104.61 km. The mean length of stay in PD was 19.94 ± 17.25 months. Seventy-two (72) patients were transferred during the first two years of PD. The majority of patients had infectious complications (92.85%) (Table 2) and 59.18% of cases had mechanical complications (Table 3). The main reason for transfer was infection (82.7%), followed by mechanical causes (23.5%) and social reasons (12.2%) (Table 4). There was a statistically significant relationship between infection as a reason for transfer and mortality (p = 0.047). Transfer was program in 9 patients (11.4%). The vascular access at the first haemodialysis session was permanent in 6 patients. Twenty-seven (27) patients had a permanent vascular access after transfer. The mean time to have arterio-venous fistula was 6.46 ± 4.60 months. The mean duration on Haemodialysis was 43.29 ± 44.82 months.

Table 1: Epidemiological baseline.

Parameters	Results
Mean age at PD initiation	45.17±14.09 years
Mean age at transfer to HD	47.00±13.91 years
Gender	
Female	n= 59(60.2%)
Male	n= 39 (39.8%)
Nephropathy	
Hypertensive nephropathy	n= 28(28,6%)
Polycystic kidney disease	n= 09(09,2%)
Chronic glomerulopathy	n= 15(15,3%)
Diabetic nephropathy	n= 08(08,2%)
Indeterminate	n= 29(29,6%)

Table 2: Type of infection.

Type of Infection	Number	Percentage
Exit-site infection	46	50.55
Peritonitis	89	97.8
Catheter tunnel infection	8	8.79

Catheter infection	5	5.49
Others	12	13.19

Table 3: Mechanical complications.

Type of Mechanical Complications	Number	Percentage
Catheter dysfunction	51	87,93
Cracking or perforation	4	6,89
Postoperative hematoma	8	13,79
Hemoperitoneum	4	6,89
Obstruction	3	5,16
Total	58	100,0

Table 4: Reason of transfer.

Reason of Transfer	Number	Percentage
Peritonitis	76	77.6
Catheter infection	5	5.1
Catheter migration	14	14,3
Bend in the catheter	8	7,84
Cracking	1	1
UF Lost	5	5,1
Insufficient dialysis dose	1	1,0
Social reason	12	12,2
Cognitive dysfonction	1	1
Undernutrition	1	1
Sclerosis peritonitis	1	1
Obstruction	1	1
Cyst rupture	1	1

Regarding the outcome, the majority of patients (42.8%) were still in HD, and 34.6% of cases had died. The mean survival according to the Kaplan Meier method was 126.51 ± 11.66 months.

Discussion

At the time of HD transfer, the mean age of transferred patients was 47.00 ± 13.91 years in our series, while it was 60.0 ± 14.2 years according to Chen et al. [13], and 68.6 ± 16.8 years according to Habib et al. [14]. Contrary to what is conventionally described in the literature, our transferred patients were younger. This can be explained by the reluctance of elderly patients to change modality, preferring to stay on PD rather than doing multi-weekly HD sessions. We can also assume that these older patients are transferred less frequently, as they die before an HD transfer is necessary. The mean PD duration was 19.94 ± 17.25 months, and the median was 15.50 months [1.0-90.0]. Habib et al. reported a mean duration of 25.9 ± 23.44 months, [14] and Panagoutsos et al. found a mean of 36 ± 16 months [15]. Ferreira et al. and Szeto et al. found a mean PD duration of 40.9 ± 26.3 months and 50.9 ± 41.5 months [16,17] respectively. This disparity between studies is related to the definition of PD technique failure adopted by each team. In some studies, technique failure was defined as a 30-day transfer to HD and others defined it as a transfer of 60 days or more. In the literature, the timing of transfer from PD to HD depends on the centers and definitions of the variables. The transfer at 6 months varied between 7% and 25%, while at 1 year it was between 21 and 44%. Eighty-eleven (91) patients developed infectious complications during their PD stay. The mean of infectious episodes was 3.36 episodes [1]. Eighty-nine (89) patients had peritoneal infections (97.80%). The mean time to onset of the first episode of peritoneal infection was 9.73 +/- 11.51 months [1]. In France in Le Maner's series, 53.62% of patients transferred after 6 months of PD had presented one or more episodes of peritonitis [18]. While in the Béchade series, 2.60% of patients transferred early (during the first 6 months) had peritoneal infections [19]. In Australia, Lan et al. found that 50% of cases had peritoneal infections [4]. The occurrence of peritoneal infection within the first 6 months is considered a risk factor for transfer from PD to HD. This is explained by the structural modifications of the peritoneal membrane, which will result in the failure of the technique.

The high rate of peritoneal infections in our study may be related to the tropical climate. The heat and humidity promote the loosening of the dressings and the proliferation of germs. Several teams, in Australia and Hong Kong, have shown that the rates of

peritoneal infections vary with the seasons, and increase with temperature and humidity [20]. The main reason for transfer was infection, 76 (77.6%) patients were transferred due to peritoneal infection. In second place come the mechanical causes in 23.5% of the patients, and the social reasons come in third place in 12.2% of the cases then the inadequate dialysis in 6.1% of the cases. Severe undernutrition and sclerosis peritonitis accounted for only 1% each. Szeto et al. found that 71.1% of patients were transferred following peritoneal infection and catheter ablation while 28.9% of transfers were due to loss of UF and other medical causes [17]. In Panagoutsos's serie , the causes of transfer were peritoneal infections (61%), loss of UF (27%), sclerosis peritonitis (9%) and social reasons (3%) [21]. The mean duration on haemodialysis in 53 patients was 43.29 ± 44.82 months. The majority of patients (42.8%) were still in HD, 34.6% of cases had died and one patient was transplanted (1%). According to Le Maner, 73 patients (62.4%) had died, 22 patients (18.8%) were transplanted, and 22 patients (18.8%) were still on hemodialysis [18]. In Szeto's serie, 61.4% of patients had died, 18.3% were transplanted, 4.6% were transferred to another center and 15.7% were still in HD [17]. Thirty-four (34.6%) patients had died. Eight (61.5%) patients had died during the first 12 months of the transfer. Patient survival according to the Kaplan Meier method was on average 126.51 ± 11.66 months, and the median was 152 months. The 5-year survival was 77%. Szeto et al. found a 5-year survival of 39.9%. They also noted that mortality was high during the first 12 months. Analysis of survival in patients who remained alive after 12 first months showed a rate of 65.2% [17]. According to Habib et al. the mean survival was 79.2 months, and the median was 90 months [14]. While in Van Biesen's serie, the median survival was 95.7 months [22].

Conclusion

The main reasons for transferring PD to haemodialysis identified in the literature are found in our context. This transfer must be anticipated to reduce morbidity and mortality.

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DOI: 10.32474/JUNS.2021.03.000161