

CASE REPORT

Peritoneal Dialysis Following the Loss of Vascular Access: only Therapeutic Option, how to Improve the Results!

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Abstract

Transfer from hemodialysis to peritoneal dialysis is necessary in the event of loss of vascular access. We report the results of a retrospective study, aiming to analyze the clinical characteristics, and the factors influencing the survival of patients transferred from hemodialysis to peritoneal dialysis following the loss of vascular access.

Results: The sample made up of 24 patients, sex ratio M/F: 7/17, average age of 62.7 ± 16.8 years, transferred in PD after an average period of 55.40 ± 57.54 months of hemodialysis, and only 30 months in diabetics. The use of PD was temporary in 3 cases and permanent in 21 patients. Ten patients were dependent on a third person, more than 50% of patients were anuric (13/24). Ten patients required an early start of exchanges and one patient benefited from placement of a buried catheter. Fifteen episodes of peritonitis in 8 patients, including 02 mycotics were identified and the rate of peritonitis estimated at 1 episode / 20 months / patient. The mechanical complications are represented by 01 cases of obstruction and 02 cases of migration requiring repositioning under laparoscopy. Actuarial survival was 63% at one year, 44% at two years and 25% at five years. Survival was clearly related to diuresis ($p=0.033$).

Conclusion: Peritoneal dialysis is an effective alternative to hemodialysis, in case of loss of vascular access, the results are better when the transfer is programmed by an experienced team

Keywords: Vascular approaches; Peritoneal dialysis; Hemodialysis; Transfer

Abbreviations: Peritoneal Dialysis (PD); Hemodialysis (HD)

Case Report

Peritoneal dialysis is the oldest method of renal replacement therapy, introduced to the world in the late 1970s by Robert Popovich and Jack Moncrief [1], since then it has become a therapeutic modality offered in the management of end-stage chronic renal failure [2]. The evolution of the equipment made available (catheter, bags, cyclor) has improved the therapeutic results [3]. It offers the advantage of preserving the patient's autonomy, saving vascular capital and, being a less aggressive technique, it allows better hemodynamic tolerance [4, 5]; but despite all these advantages, the number of patients treated with PD remains very low, its worldwide prevalence is around 11% [6]. The choice of PD most often comes as a second intention in the event of hemodynamic intolerance of hemodialysis or vascular access problems, the use of PD in this case may be temporary while waiting for the making of a vascular access. or permanently.

The medical problems then posed are anuria (after a long period of hemodialysis) [7, 8] requiring exchanges to be started quickly, without waiting for healing and the difficulty of managing dry weight, as well as the numerous co-morbidities acquired during the hemodialysis period, in particular cardiovascular, osteo-articular (fractures and others, which may invalidate the patient).

The transfer from chronic hemodialysis to peritoneal dialysis is infrequent, few studies have focused on this aspect. We therefore conducted a retrospective study over a period of nine years, with the aim of specifying the clinical characteristics and factors influencing the survival of patients transferred from chronic hemodialysis to peritoneal dialysis, following a loss of vascular access.

Patients and Methods

This is a descriptive, retrospective study, during the period from January 2012 to December 2020, at the level of the University Hospital Center of Tlemcen, with the aim of analyzing the characteristics, the future of patients, and the factors influencing the survival of patients transferred from chronic hemodialysis (duration greater than 03 months) to peritoneal dialysis following a loss of vascular access.

The main demographic characteristics (age, sex, nephropathy, diuresis, Charlson comorbidity score, autonomy) were studied. The circumstances of initiation of the PD (emergency: defined by early start of the exchanges of less than 48 hours or scheduled, allowing healing within a period of at least one week) were specified. Specific complications of PD (infectious and mechanical) were analyzed. Data were extracted from medical records and interpretation of results was done on SPSS 21. Survival was analyzed by the survival method of Kaplan-Meier, and compared to a second group of patients managed in PD in first intention. P values less than 0.05 were considered statistically significant.

Results

The sample studied consisted of 24 patients transferred to peritoneal dialysis for loss of vascular access, this passage to PD occurred after an average period of 55.40 ± 57.54 months of hemodialysis (see Table1), while average in hemodialysis was only 30 months in diabetic hemodialysis patients.

Variables	Patients (24)
Age (years)	62.7±16.8 (20-91)
Sex M/F	7/17
charlson's index	5.04 ± 1.51
Initial nephropathy	
• Diabetic nephropathy	12/24
• Nephroangiosclerosis	4/24
• Polycystic kidney disease	2/24
• Indeterminate nephropathy	6/24
Number of arteriovenous fistulas	5 (3-10)
Diuresis (ml)	360 (0-1500)
Anuria	13/24
Duration in HD (months)	55.4±57.5 (3-204)
Duration in DP (months)	23.9 ± 22.2 (3-67)

Table 1: Demographic characteristics

The use of PD was temporary for a period of less than 03 months in 3/24 cases, pending the making of a permanent vascular access, it was definitive in 21 patients.

The PD catheter was implanted surgically, paramedian, subumbilical under general anesthesia.

At the initiation of peritoneal dialysis the mean age was 62.7 ± 16.8 years, and 15/24 patients were over 60 years old. Ten patients were dependent on a third person (family member). Among the patients studied, 22 patients were treated by continuous ambulatory peritoneal dialysis (CAPD), and 02 patients by automated peritoneal dialysis (APD).

More than 50% of patients were anuric (13/24), anuria is an indication for early start of PD, within less than 48 hours, 10 patients required early start of exchanges, but successful only in Only 5 cases, on the other hand 14 patients benefited from a programmed transfer in PD and one patient benefited from the placement of a buried catheter.

Regarding the specific complications of PD, we note the occurrence of 15 episodes of peritonitis in 8 patients, including 02 of fungal origin and the rate of peritonitis estimated at 1 episode / 20 months / patient Mechanical complications are represented by obstruction of the catheter (01 cases) and migration requiring repositioning under laparoscopy (02 cases).

The actuarial survival of patients after initiation of peritoneal dialysis was 63% at one year, 44% at two years and 25% at five years (Figure 1), compared to the survival of a second group of patients treated in first-line PD (85% at one year and 73% at two years), it is significantly lower (p=0.035) (Figure 2).

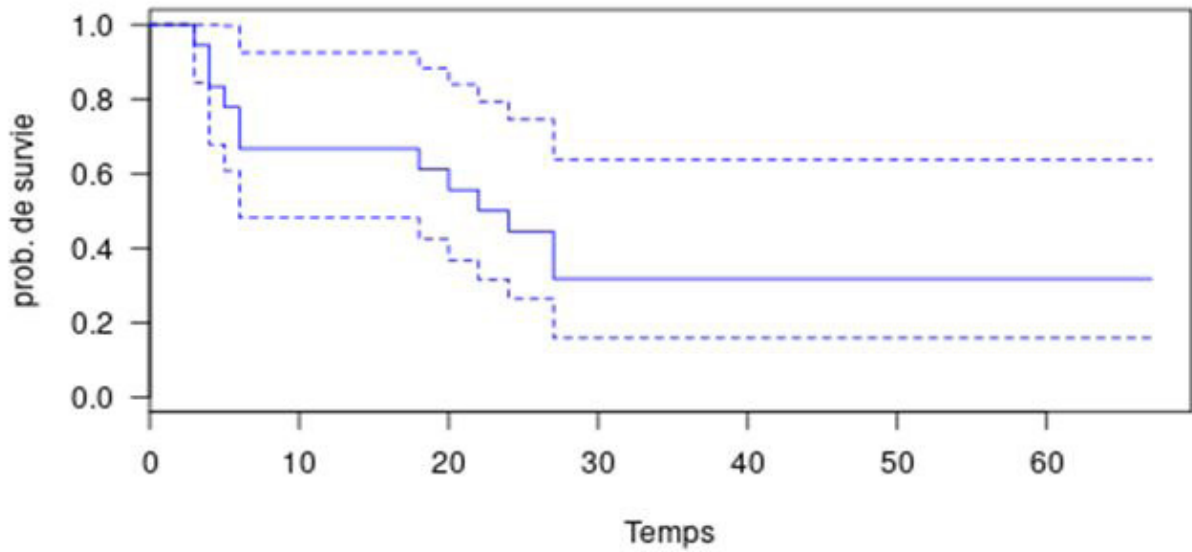


Figure 1: Survival curve of patients on peritoneal dialysis according to the Kaplan Meier method

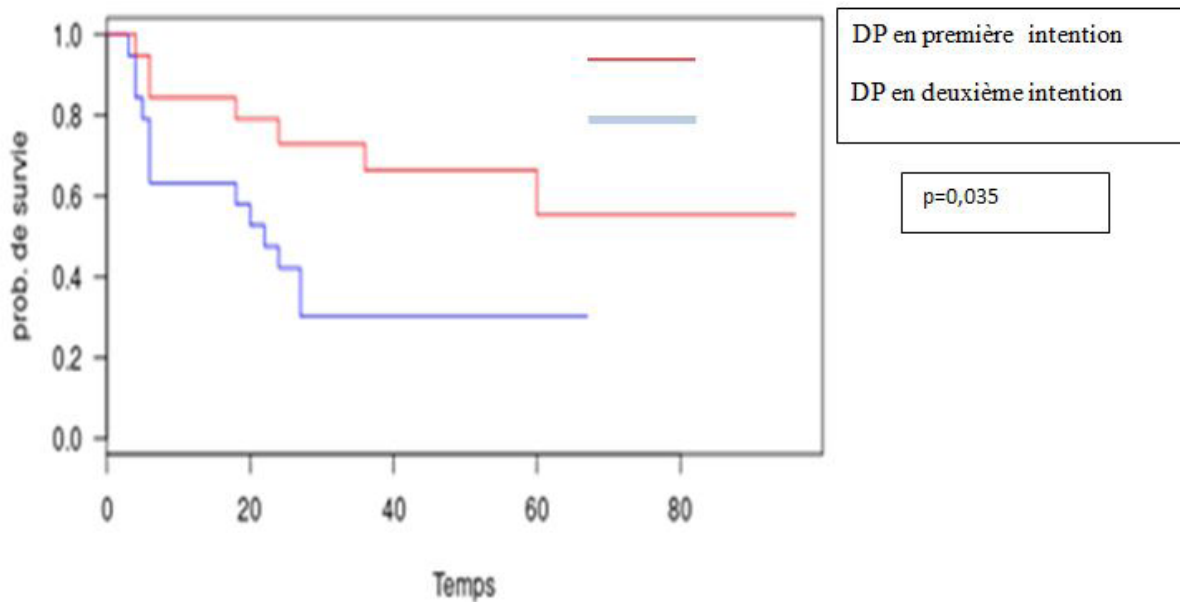


Figure 2: Survival curve of patients according to the Kaplan Meier method according to first-line or second-line peritoneal dialysis treatment

Even if age, Charlson's index and autonomy seem to have an influence on the care of patients in PD, no significant correlation was found between these factors and survival, on the other hand it was clearly demonstrated that survival was clearly linked to diuresis ($p=0.033$).

Discussion

Transfer from hemodialysis to peritoneal dialysis is infrequent; it is necessary in the event of loss of vascular access [9] and more particularly in the absence of a transplant prospect, as is the case in our series where the average age is 62 years old. In addition to age, PD is provided in a population weakened by numerous co-morbidities with an average charlson index of 5 and dependent on a third party (10/24)

All our patients benefited from a surgical implantation of the peritoneal catheter by paramedian, subumbilical approach, through the rectus abdominis muscles (transrectal), this is the technique of choice, in order to avoid eventrations and fluid leaks [10].

The recommendations of (International Society for Peritoneal Dialysis) suggest that the insertion of the catheter should be performed at least 02 weeks before the start of PD level (B2). [11] Due to anuria, an early start of the exchanges was imposed in 10 patients, but successful in 05 cases, the failures, which occurred in 05 elderly patients, were related to a difficulty of insertion of the sleeve on the weakened posterior aponeurosis, causing leaks during exchanges. This appearance can be improved by programmed placement of a buried PD catheter using the Moncrieff, Popovich technique [12].

Diabetes is found in more than 50% of patients, probably implicated in the early loss of vascular access (after an average duration of 30 months on hemodialysis). It has been well demonstrated that diabetes appears as a factor altering the survival of AVFs. Medial calcosis, endothelial dysfunction, as well as the increase in oxidative stress responsible for an increase in thrombotic events, contribute to a reduction in the half-life of vascular access in diabetics [13, 14]. These findings suggest that peritoneal dialysis should be a first-line indication in diabetics (preservation of vascular access and residual renal function)

At the time of transfer, more than 50% of patients were anuric (poor prognostic factors in PD), and it has been clearly demonstrated that survival was clearly linked to diuresis ($p = 0.033$).

Several studies comparing HD and DP support a more rapid decline in residual renal function in HD [7]. For Jansen et al., during the first year of dialysis, the drop in FRR is between 0.18 and 0.33 ml/min/month in HD whereas it is between 0.05 and 0.30 mL/min/month in DP [15]. By comparing two groups of patients, the first group made up of patients treated with PD as first intention, the second group comprised of patients transferred from hemodialysis to peritoneal dialysis, Zhang et al, found that residual diuresis was significantly higher 850 ml (range: 600 - 1250 ml) in the first group vs 0 ml (range: 0 - 775 ml / d), for the second $p = 0.000$ [16].

Admittedly, anuria constitutes a factor of poor prognosis influencing survival with difficulty in managing dry weight, however the management of patients can be improved by the use of DPA (reducing the risk of infection and the increase in peritoneal ultrafiltration), as well as by the use of glucose polymers [17].

Infectious complications are formidable, in particular mycotic peritonitis, they are linked to a high rate of hospitalization, removal of the PD catheter, transfer to HD, and even death [18]. In our series, mycotic peritonitis had a fatal outcome due to the impossibility of transfer to HD, in the two cases identified.

Catheter migrations, which occurred in 02 patients, were repaired by repositioning under laparoscopy, which allowed an immediate resumption of exchanges and avoiding the use of hemodialysis [19].

Survival of patients treated with first-line PD was significantly higher than that of patients transferred to PD. 85% at one year and 73% at two years in the first group VS 63% at one year, 44% at two years in the transferred group ($p = 0.035$), similarly Nessim SJ et al. report that patient and technique (PD) survival are better in patients initiating extrarenal replacement therapy with PD [20].

Conclusion

Peritoneal dialysis can become, in the event of loss of vascular access, the only therapeutic option, even if it is proposed for a population weakened by the numerous co-morbidities acquired during hemodialysis, management by a trained team as well as programmed transfer make it an effective therapeutic alternative.

Declaration of interests

The authors declare that they have no conflict of interest

References

1. Popovich RP, Moncrief JW, Nolph KD, Ghods AJ, Twardowski ZJ, et al. (1978) Continuous ambulatory peritoneal dialysis. *Ann Intern Med* 88:449–58
2. Canaud B, Daubin D, Chenine L, Morena M, Leray-Moragues H, et al. (2013) Place and use of peritoneal dialysis in the treatment of end-stage chronic renal failure. *EMC–Nephrology* 1-9.
3. Ryckelynck JP, Lobbedez T, de Ligny BH (2005) Dialyse péritonéale *Nephrologie and thérapeutique* 1:252-63.
4. Sitjar Suner M, Suner Soler R, Masia Plana A, Chirveches Perez E, Bertran Noguer C, Fuentes Pumarola C et al. (2020) Quality of Life and Social Support of People on Peritoneal Dialysis: Mixed Methods Research. *International journal of environmental research and public health* 14:7
5. Habib A, Durand AC, Brunet P, Duval Sabatier A, Moranne O, Bataille S, et al. (2017) [Factors affecting the choice of peritoneal dialysis Perspective of patients and nephrologists] *Nephrologie & thérapeutique* 13:9
6. Jain AK, Blake P, Cordy P, Garg AX (2012) Global trends in rates of peritoneal dialysis. *Journal of the American Society of Nephrology JASN* 23:533.
7. Kjaergaard KD, Jensen JD, Peters CD, Jespersen B (2011) Preserving residual renal function in dialysis patients: an update on evidence to assist clinical decision making. *NDT plus* 4:225.
8. Ryckelynck JP, Goffin É, Verger C (2013) Préservation de la fonction rénale résiduelle en dialyse *Nephrologie & thérapeutique* 9:403.
9. Jin H, Fang W, Zhu M, Yu Z, Fang Y, Yan H, et al. (2016) Urgent Start Peritoneal Dialysis and Hemodialysis in ESRD Patients Complications and Outcomes *PloS one* 11:0166181.
10. BHE klund Surgical (1995) implantation of CAPD catheters presentation of midline incision lateral placement method and a review of 110 procedures *NDT* 3:386-90
11. Crabtree JH, Shrestha BM, Chow KM, Figueiredo AE, Povlsen JV, Wilkie M, et al. (2019) Creating and Maintaining Optimal Peritoneal Dialysis Access in the Adult Patient Update *Peritoneal dialysis international journal of the International Society for Peritoneal Dialysis* 39:414.
12. Ryckelynck JP, Abbadie O, Castrale C, Lavainne F, Fakhouri F, Lobbedez T (2011) [Why and how to promote peritoneal dialysis?]. *Presse medicale* 40:1053.
13. Huijbregts HJ, Blankestijn P (2006) Dialysis access guidelines for current practice. *European journal of vascular and endovascular surgery : the official journal of the European Society for Vascular Surgery* 31:284.
14. Kabbali N, Mikou S, El Pardiya NT, El Bardai G, Arrayhani M, et al. (2014) [Profile of diabetic in chronic hemodialysis: a multicenter study in Morocco] *The Pan African medical journal* 17:125
15. Maarten AM Jansen, Augustinus AM Hart, Johanna C Korevaar, Friedo W Dekker, Elisabeth W Boeschoten, Raymond T Krediet (2002) Predictors of the rate of decline of residual renal function in incident dialysis patients *Kidney International* 3:1046-53

16. Zhang L, Cao T, Li Z, Wen Q, Lin J, Zhang X, et al. (2017) Clinical outcomes of peritoneal dialysis patients transferred from hemodialysis: a matched case control study. *Peritoneal dialysis international journal of the International Society for Peritoneal Dialysis* 33:259.
17. Davies SJ, Woodrow G, Donovan K, Plum J, Williams P, Johansson AC, et al. (2003) Icodextrin improves the fluid status of peritoneal dialysis patients results of a double blind randomized controlled trial. *Journal of the American Society of Nephrology JASN* 14:2338
18. Li PK, Szeto CC, Piraino B, de Arteaga J, Fan S, Figueiredo AE, et al. (2016) ISPD Peritonitis Recommendations: 2016 Update on Prevention and Treatment. *Peritoneal dialysis international : journal of the International Society for Peritoneal Dialysis* 36:481.
19. Alabi A, Dholakia S, Ablorsu E (2014) The role of laparoscopic surgery in the management of a malfunctioning peritoneal catheter. *Annals of the Royal College of Surgeons of England* 96:593.
20. Nessim SJ, Bargman JM, Jassal SV, Oliver MJ, Na Y, Perl J, (2015) The impact of transfer from hemodialysis on peritoneal dialysis technique survival. *Peritoneal dialysis international journal of the International Society for Peritoneal Dialysis* 35:297.