

# Bulletin de la Dialyse à Domicile

## Peritoneal dialysis in a Moroccan center: Prevalence and complications

(La Dialyse Péritonéale dans un centre Marocain : prévalence et complications)

Bahadi A<sup>1,2</sup> ; Benbria S<sup>1</sup>; Rafik. H<sup>1</sup>; D. El Kabbaj<sup>1,2</sup>

<sup>1</sup>Department of nephrology, military teaching hospital mohammed the Vth., Rabat, Morocco

<sup>2</sup>Pedagogy and formation unit of nephrology, university Mohammed the Vth, Rabat, Morocco

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### Résumé

**Introduction :** La Dialyse Péritonéale (DP) est une méthode de suppléance aussi efficace que l'hémodialyse et offre souvent une meilleure qualité de vie aux patients. Malgré cela, la technique reste peu implantée au Maroc avec une prévalence de moins de 1% des patients en insuffisance rénale terminale. L'objectif de ce travail est de rapporter l'évolution et les complications de la DP dans notre centre.

**Patients et méthodes :** Il s'agit d'une étude rétrospective incluant tous les patients pris en charge en DP entre octobre 2008 et mars 2019. Nous avons relevé leurs données démographiques, cliniques et biologiques à la date de leur mise en Dialyse Péritonéale. Nous avons suivi leurs évolutions pour en discuter les complications infectieuses et mécaniques ainsi que les causes de transfert en hémodialyse.

**Résultats :** Durant la période de l'étude, 456 patients ont été pris en charge pour insuffisance rénale terminale, dont 28 mis en DP, soit une prévalence de 6,1%. Parmi ces patients 8 étaient en hémodialyse. L'âge moyen était de 37,7 ans et la surface corporelle moyenne était de 1,59 m<sup>2</sup> avec une fonction rénale résiduelle moyenne de 6,05 ml/min. Sur le plan infectieux, nous avons répertorié 8 épisodes de péritonites chez 4 patients correspondant à un taux de 1 épisode sur 56 mois. Concernant les complications mécaniques, nous avons relevé une aspiration épiploïque dans 9 cas, une fuite dans 1 cas et une hernie ombilicale nécessitant une reprise chirurgicale chez une patiente. Sur ces 28 patients, 17 sorties ont été recensées ; 10 patients (67%) ont été transférés en hémodialyse, 4 sont décédés et seulement 3 patients (18%) ont été transplantés. Les causes de transfert définitif en hémodialyse étaient dues à des complications mécaniques dans 5 cas, à une perte d'ultrafiltration dans 1 cas, à une surcharge hydro-sodée à répétition dans 1 cas, à une péritonite dans 1 cas et à des raisons sociales dans 2 cas. La survie médiane dans la technique était de 18,5 mois.

**Conclusion :** La DP est une technique efficace, qui préserve la fonction rénale résiduelle et la qualité de vie, mais sa prévalence reste faible, de l'ordre de 6% des patients pris en charge pour insuffisance rénale terminale. Pour notre unité, les complications mécaniques représentent la cause principale de transfert définitif en hémodialyse.

Mots clés : dialyse péritonéale, Maroc, complications, prévalence, évolution

### Summary

**Introduction :** Peritoneal dialysis (PD) is as effective as hemodialysis and often provides a better quality of life for patients. Despite this, the replacement therapy remains little established in our country, with a prevalence of less than 1% of patients with end-stage renal disease (ESRD). The objective of this work is to report the development and complications of PD in our center.

**Patients and methods :** This is a retrospective study including all patients on PD between October 2008 and March 2019. We noted their demographic and clinical data at their initiation in PD, and we followed their evolution to discuss infectious and mechanical complications as well as the causes of PD exit.

**Results :** During the study period, 456 patients were admitted for ESRD. Among these patients, only 28 (6.1%) were put on PD, including two diabetics. Their average age was 37.7 years, with a sex ratio of 0.8. The average body surface area was 1.59 m<sup>2</sup>, with an average residual renal function of 6.05 ml/min. PD was chosen as the first intention in 20 patients, while 8 patients were on hemodialysis. The evolution was marked by a median survival of the technique of 18.5 months, characterized by 8 episodes of peritonitis in 4 patients, corresponding to a rate of 1 episode over 56 months. Regarding mechanical complications, we noted 9 omentum aspirations, 1 leak in one case, and 1 umbilical hernia requiring surgical recovery in a patient. Out of 28 patients, 17 discharges were identified; 10 patients (67%) were transferred to hemodialysis, 4 died, and only 3 patients (18%) were transplanted. The final transfer to hemodialysis was related to mechanical complications in 5 cases, the loss of ultrafiltration in 1 case, repeated hydro-sodium overload in 1 case, peritonitis in 1 case, and social reasons in 2 cases.

**Conclusion :** PD is an effective technique that preserves residual renal function and quality of life, but its prevalence remains low in the order of 6% of patients treated for ESRD. The complications are dominated in our context by mechanical complications, the main cause of final transfer in hemodialysis.

Key words : peritoneal dialysis, Morocco, prevalence, outcome, complications

## INTRODUCTION

The prevalence of end-stage renal disease (ESRD) is continuously increasing because of the aging population and the increase of vascular and metabolic pathologies. At this stage, dialysis can replace the vital functions that the kidneys no longer provide and therefore allows survival while awaiting a possible transplant. Peritoneal dialysis (PD) is an extra-renal purification technique based on the principle of exchange between the blood and a fluid (dialysate) infused into the peritoneal cavity using a catheter so that the peritoneum behaves like a physiological semipermeable membrane. Dialysis bag exchanges can be done manually, which is referred to as continuous ambulatory peritoneal dialysis (CAPD), or using a cyclor, which is called automated peritoneal dialysis (APD).

Various studies have emphasized the advantages of PD, particularly in terms of quality of life, the prolonged preservation of residual renal function, patient autonomy, relative simplicity, and lower cost. On the other hand, despite these advantages, PD constitutes the method of treatment in only 10% of patients with ESRD in most countries and less than 1% in Morocco. The reasons for this are numerous and can be related to the technique and its complications but especially to its insufficient knowledge.

The objective of our work, carried out in the nephrology department of the military training hospital Mohammed V, is to report through a retrospective study the experience of our PD unit and especially the short- and long-term results.

## MATERIALS AND METHODS

This is a retrospective study carried out in the nephrology department of the Mohammed V military instruction hospital, including all patients on PD since the start of activity in October 2008 to March 2019.

### 1. Recruitment and management :

- Recruitment : Our training mainly takes care of not only military patients and their families (spouses and children) but also sometimes members of other social security systems. Patient recruitment begins with clear and complete information on the three replacement methods by the department's nephrologists with audiovisual support. The selection of candidates is not limited by socioeconomic conditions or the patient profile unless absolute contraindications, in particular heavy abdominal surgery and unsanitary housing, are found.

- Peritoneal access : The catheters were placed by mini-laparotomy (2008–2010) or by laparoscopy by a urological surgeon (2010–2018) or percutaneously by a nephrologist from 2018. The catheter used is of the Tenckhoff swan neck type with two cuffs. The length is variable depending on the size, and it varies between 39 cm and 62 cm. The first dressing of the catheter was redone on the 7th day. Then once the PD was started, the dressing was changed three times a week.

- Evaluation of the peritoneum : The peritoneal equilibration test (PET) was systematically carried out after at least 2 months of the start of exchanges between 2008 and 2015, but this test

was only carried out in the event of the loss of ultrafiltration.

- Definitions : The diagnosis of peritonitis was retained according to the recommendations of the International Society of Peritoneal Dialysis (ISPD) [1] if at least 2 of the following 3 criteria were met: (1) abdominal pain or cloudy peritoneal fluid; (2) number of leukocytes greater than 100 per mm<sup>3</sup> in the drainage fluid, with a level of neutrophils greater than 50% over an exchange of more than 2 hours; and (3) bacteriological culture and/or positive microscopic examination. The bacteriological samples of the dialysate were taken after the appearance of clinical signs, such as the turbidity of the drained dialysate, associated or not with fever or abdominal pain. Infections related to catheters (e.g., infection of the site of the emergence of the catheter, fleshy bud, tunnelitis) have been recognized based on the relative recommendations of the ISPD [2].

- Treatment of infectious complications : Peritonitis was treated according to the recommendations of the ISPD by empirical antibiotic therapy targeting both Gram-positive and Gram-negative germs [1]. We thus administered a third-generation cephalosporin associated with a dose of vancomycin initially and then adapted to the antibiogram.

## **2. Data collection :**

- Clinical and demographic data: This includes the patient's age, sex, professional activity, and the existence (or not) of medical cover as well as their clinical data: anthropometric parameters (e.g., weight, BMI), medical history and comorbidities, history of hemodialysis, initial nephropathy, surgical history, indications of PD (in an urgent context, difficulty or failure to create vascular initially, social or desire for home dialysis in search of autonomy and independence), and residual diuresis.

- Biological data: This includes hemoglobin, ferritin, parathormone, lipid balance, albumin, and CRP as well as phosphocalcic balance and residual renal function. Note that the different biological parameters were evaluated before the start of the PD technique and 3 months, 6 months, and 12 months after the start of PD.

- Complications: We noted immediate per operative complications (e.g., digestive wound, bladder wound, vascular wound), mechanical complications linked to the dysfunction of the peritoneal catheter (e.g., migration, aspiration of the omentum or obstruction of the catheter by the fibrin or by a blood clot) and linked to the increase in intraperitoneal pressure (e.g., dialysate leakage at the emergence of the catheter, pleuro-peritoneal communication, genital leakage or inguinal and umbilical hernia). Infectious complications included those linked to the catheter (e.g., infection of the site of the emergence of the catheter, fleshy bud, tunnelitis) and peritonitis. We analysed the long-term outcome of patients according to the need for a transfer to hemodialysis or kidney transplant or death.

## **RESULTS**

### **1. Clinical and demographic data :**

Twenty-eight patients were enrolled in the study, 8 of whom were initially on hemodialysis: 4 cases for vascular failure, 2 cases for transfer from the hemodialysis center, and 2 cases for

hemodialysis initially in an urgent context. The average age of the patients was 37.7 years, with extremes ranging from 8 to 69 years and with a male/female sex ratio of 0.8. Eight patients (28.5%) were professionally inactive (retired or housewife), and 8 were students. Tubular interstitial nephropathy was the cause of ESRD in 8 cases, vascular disease in 4 cases, and unknown diseases in 6 patients. Residual renal function at the start of the PD averaged 6.05 ml/min/1.73 m<sup>2</sup> (Table 1). Hemodynamically, 2 patients remained hypertensive without signs of volume overload. The average blood pressure of all our patients at the end of the follow-up was 130.07 mmHg of systolic and 80.15 mmHg of diastolic. At the end of the study, all patients had an ultrafiltration rate associated with residual diuresis greater than 700 ml.

Table 1: demographic characteristics of the patients

PARAMETERS	
Number of patients	28 ( APD : n= 3, CAPD: n= 25)
Average age (years)[min, max]	37.72 [8, 69]
Sex ratio H/F	0.80
Weight (Kg) (moyenne ± SD)	58,2 ± 16,04
Body surface area (m <sup>2</sup> ) (mean ± SD)	1.59 (± 0.28)
BMI (Kg /m <sup>2</sup> ) (mean +/- SD)	21,3 ± 4,3
RRF (ml/min) (mean +/-SD)	6.05 (± 3.64)
	> 5 ( 60%) 5-2 (36%) < 2 ( 4%)
Diabetes : n (%)	4 (14.2)
Nephropathy: n (%)	
▪ Tubulo-interstitial	8 (28,5)
▪ Diabetes	4 (14,2)
▪ Vascular	4 (14,2)
▪ Glomerular	5 (17,8)
▪ Hereditary (ADPKD)	1 (4,1)
▪ Unknown	6 (21,4)

APD : automated peritoneal dialysis; CAPD : Continuous Ambulatory Peritoneal Dialysis; SD Standard deviation.  
 BMI : body mass index. RRF : residual renal function. ADPKD Autosomal dominant polycystic kidney disease

## 2. Biological data :

During our study period, we followed the different biological parameters of our patients (Table 2). In terms of hematology, we found an improvement in anemia, especially with the introduction of iron and erythropoietin when necessary except for 1 patient followed for sickle cell anemia and having had iterative transfusions. In contrast, the worsening of secondary hyperparathyroidism was noted in most of our patients with PTH, which increased on average from 366 pg/ml to 693 pg/ml. From the nutritional point of view, no patient presented severe malnutrition secondary to the protein loss caused by the PD technique, but the biological parameters were below the targets, with an average albumin level at 32.1 g/l, and the average BMI was 20.6.

Concerning the residual function, its value before the PD was 6.29ml/min. It decreased at the end of the study to 4.12 ml/min. For the dialysis dose, the average urea KT/V was 1.73, and the weekly creatinine clearance was 77.04 L/wk/1.77 m<sup>2</sup>. In addition, only 2 patients benefited from the measurement of the normalized protein catabolic rate (nPCR), which was 0.97 g/kg/day and 0.77 g/kg/day.

To assess the function of the peritoneum, we performed the PET in all patients. Thus, 3 patients had frank peritoneal hypopermeability, 5 patients had moderate peritoneal hypopermeability, and the rest had moderate peritoneal hyperpermeability.

Table 2: Evolution of biological parameters during follow up

Parameters	M0 n=28	M3 n=25	M6 n=20	M12 n=13
Hemoglobin (mg/dl)	8,42	10,8	9,86	11,62
Ferritin ( mg/l)	432,22	_	263	139
PTH ( pg/l)	366,66	456	708,25	693.75
Albumin (g/l)	34,25	32,1	30,25	32
TC (total chol?) (g/l)	1,31	1,66	1,47	1,83
TG (Triglycerides)(g/l)	1	1,51	0,58	1,36
Fasting Glycemia (g/l)	1,24	0,79	0,83	0,89
CRP (mg/l)	4,44	2,88	4,02	8,3

### 3. Complications :

We did not find any immediate intraoperative complications. On the other hand, for complications related to PD, we found the following complications :

#### • Mechanical complications :

We noted a migration of the PD catheter in 9 patients who required surgical repositioning. In addition, a case of leakage of the dialysate was objectified in a patient whose catheter was placed percutaneously. Six cases of PD catheter obstruction were found, only 1 of which responded to drug clearing using heparin sodium, and the others required revision surgery with a diagnosis of omentum aspiration. A recurrent umbilical hernia (2 times) was found in 1 patient who required a transient cessation of PD and its resumption after the hernia repair. The implantation of the PD catheter was surgical in 11 patients, by laparoscopy in 14 patients, and percutaneously in 3 patients, and surgical laparotomy implantation was found to provide more mechanical complications (Figure 1).

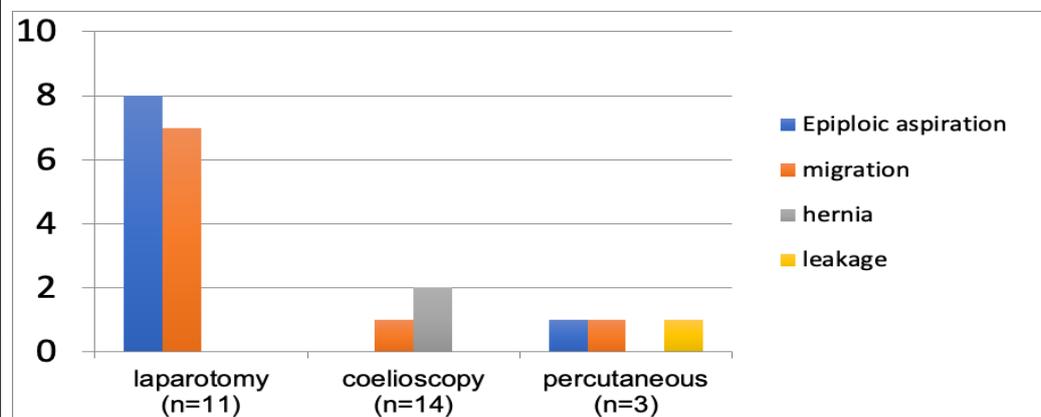


Figure 1: mechanical complications in relation with the implantation technique

**• Infectious complications :**

During the study, 8 episodes of infectious peritonitis occurred in 4 patients. Bacteriologically, the patients had an effluent leukocyte count greater than 100/mm<sup>3</sup>, with a predominance of neutrophils. The culture of the peritoneal fluid was positive in 6 cases, including 5 with Gram-positive cocci and 1 Gram-positive bacillus. The culture was sterile in 2 cases of peritonitis (25%). Infectious complications often require medical attention, but catheter withdrawal was inevitable in 2 cases—in front of repeated episodes of peritonitis in 1 case and before catheter-related peritonitis in the other case.

**• Survival of patients and technique :**

During follow-up, we noted 17 cases of exit from PD (Figure 2), including 4 deaths: 1 following meningoencephalitis, 1 following the neo-cervix, and 2 following sudden death (1 patient followed for ischemic tri-truncular cardiopathy, and the other patient followed for vasculitis with ANCA). Ten patients were transferred to chronic hemodialysis (Figure 3), most of them following a mechanical complication, in particular epiploic aspiration. During the entire study (more than 10 years), only 3 patients were transplanted from living relatives. At the end of the study, 9 patients were still on PD, with a median survival of 18.5 months.

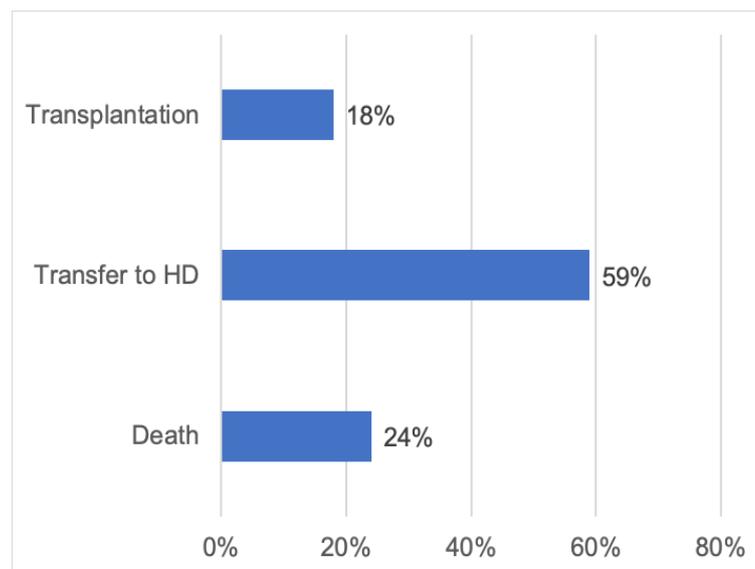


Figure 2 : modality of drop out (percentage of all causes of dropout)

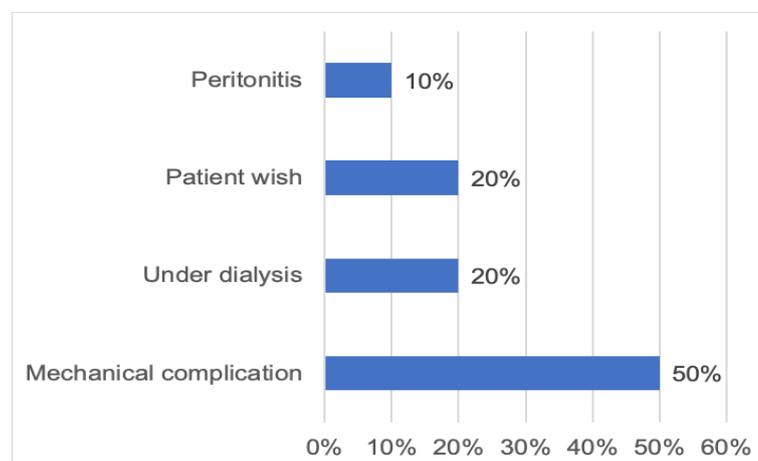


Figure 3: Causes of transfer to HD

## DISCUSSION

PD is a treatment for end-stage chronic renal failure, the results of this technique equivalent to those of hemodialysis in terms of mortality and quality of life. Therefore, it should be offered as first-line treatment for ESRD [3]. It was first used in Morocco during the 1980s and then quickly abandoned. PD has improved in recent years, which has helped reduce complications on the one hand and optimize its effectiveness on the other. However, many obstacles, especially extra-medical ones, to the development of PD still exist, including ignorance of the technique and emergency care in patients who have not received the necessary information beforehand [3, 4].

The age of incidence among patients on PD varies from 18 to 72 years, with an average age of 56 years and a sex ratio (M/F) of 2.24 [5]. In our study, the average age is younger (37 years), with a sex ratio (M/F) of 0.8. This could be explained by the easier adoption of PD not only by families of fasting patients to ensure their education but also by our duty to optimize their life expectancy and autonomy with 2 main strategic directions: transplants for young adults and treatment methods for the elderly who are not very autonomous by offering treatment opportunities while maintaining them in their environment and avoiding their transport and long journeys, as is the case in 2 of our patients.

In our study, more than half of our patients were active at the start of PD (12 professionally active and 8 students) and even throughout the follow-up on PD. This strategy has been supported by several studies, which have shown that the quality of life indices and the employment rate are higher in patients on PD than in those on hemodialysis [6]. In a study including 4 French establishments in the Provence-Alpes-Côte d'Azur region, 47.6% of the patients preferred hemodialysis, and 52.4% preferred PD [7]. The 2 main reasons for such a preference for PD were the absence of the need to go to the hospital (treatment at home) and autonomy (flexibility of schedules in particular); these reasons were also adopted by the patients in our study

The advantages of PD compared to other extra-renal purification techniques are the absence of extracorporeal circulation with its inherent risks, the protection of venous access, and good hemodynamic tolerance [8]. PD is used as a lifesaving method and remains effective in patients who present with the absence of any possible vascular access [9]. In our study, 4 patients were transferred to PD because of vascular difficulties.

Diabetic nephropathy is the first reported cause of ESRD, followed by vascular nephropathy and then chronic glomerulonephritis [10]. In addition, in diabetics, a preference for PD could be considered given the hemodynamic instability observed in certain diabetics during hemodialysis sessions [12]. However, in our study, diabetic nephropathy represents only 14.2% of the causes of ESRD, with a predominance of chronic tubulointestinal nephropathy, which was most often retained on the clinical presentation or from the information of long follow-up by the nephrologist prior to PD.

On PD, patients have less anemia compared to hemodialysis patients. In a retrospective study of 121,970 patients on hemodialysis and 7,129 on PD, the authors showed that the requirements for erythropoietin are lower in PD than in hemodialysis [13]. In our study, we noted an evolution toward the improvement of hemoglobin levels after the setting on PD with the stimulating agents of erythropoietin and the recourse to the transfusion of red cells in 1 patient followed for sickle

cell anemia. Undernutrition is a common complication in PD [3], and this emerged from our study, with albuminemia often below target.

The catheter implantation technique has a significant impact on the survival of PD and must be performed by a trained team to obtain good long-term results according to a specific protocol [14]. The catheter can be placed by laparotomy, laparoscopy, or percutaneously. In our study, 14 (50%) of our patients had benefited from catheter insertion by laparoscopy under general anesthesia, and this was done by 2 trocars in all these patients except in the last 2, where the insertion was carried out using 3 trocars. All these catheters remained functional throughout the study period, with a single case of migration and 2 hernias at the trocar site in the same patient.

The strength of this procedure is that one can visualize the anomalies that often affect catheters, in particular migration, omental insertion, and peritoneal adhesions. Identifying and correcting these anomalies at the time of implantation are potential benefits. This technique remains secure since it allows the precise placement of the PD catheter compared to other implantation techniques [15]. The laparoscopic insertion of the catheter can be done by one or more trocars. During a retrospective study—including 263 patients on PD followed for a period of 6 years, between December 2009 and June 2015, and who benefited from laparoscopic catheter insertion via a single trocar using a rigid guide technique—Alan Pan showed that this method can lead to a low rate of complications and a high rate of catheter survival rate [5]. Catheter occlusion was the most common early complication in 4 patients. Complications—including catheter occlusion, catheter leakage, catheter migration, infection, and hernia—occurred in 5, 3, 3, 6, and 4 patients, respectively. The survival rates for catheters at 1, 2, 3, 4, and 5 years were 96%, 94%, 90%, 85%, and 82%, respectively.

Garcia-Cruz demonstrated the efficacy and safety of laparoscopic 2-trocar insertion in a retrospective study conducted between 2006 and 2009 on 51 patients who underwent dialysis catheter insertion using this technique. As a result, 1 patient presented with immediate postoperative obstruction requiring surgical repositioning, and the 6-month, 1-year, and 2-year survival rates of the catheter were 94%, 87%, and 72%, respectively [16].

Catheter placement was performed in our study by laparotomy in 11 patients (39%) with a higher frequency of mechanical complications, with 8 cases of omentum aspiration, most often preceded by migration. The small number of patients does not allow a reliable statistical analysis to support this finding in our study. A retrospective study was carried out at Texas Children's Hospital between February 1, 2002, and July 1, 2014, on 173 patients, including 122 patients undergoing catheter insertion by open surgery and 51 by laparoscopy. The rates of early complication were similar in laparoscopic and open procedures (17% versus 13%). However, the late complication rate was higher among those who had had surgical insertions (57% versus 37%). The results showed that laparoscopic insertion appears to have an advantage in reducing the rates of late complications and recovery. Also, laparoscopically placed catheters experienced an improved survival rate during the first 1,000 days compared to catheters placed by open surgery [17]. The occurrence of catheter-related complications is a frequent cause of hemodialysis transfer (8% to 20% of patients treated on PD) [18]. In our study, 4 patients were transferred to hemodialysis for mechanical complications after aspiration.

In our study, 3 patients were put on PD by catheter placement percutaneously, this technique was

recently initiated in our unit in the face of the impossibility of anesthesia in 2 patients in view of their comorbidities and once in front of the emergency of initiating renal replacement therapy. This technique has the advantage of autonomy for the nephrology team and avoids the delay linked to the logistics of the operating room. With this technique, the evolution was marked by a case of flight and a case of migration secondary to epiploic aspiration.

Peritonitis remains a major complication in PD, and the use of the catheter promotes the formation of biofilm, a major factor predisposing to infections. The bacteria are found in a favorable environment, rich in nutrients (dialysate solution rich in glucose for PD), and are often secondary to manual contamination carried during the handling of the catheter [19], hence the interest of strict education of hygiene rules to patients.

In our study, 8 episodes of infectious peritonitis occurred in 4 patients, corresponding to a peritonitis rate of 1 peritonitis per patient every 56 months. The bacteriological study found Gram-positive cocci in 62.5% of the cases where the Staph aureus was methi-S and the culture was sterile in 25% of the cases. The therapeutic management of IP was based on the recommendations of the international DP company. In the literature [20], the germs most often encountered are staphylococci in 45% to 60% of cases and Gram-negative bacilli in 25% to 30% of cases. Infections with Gram-positive bacilli (corynebacteria), Gram-negative cocci, and yeasts (predominantly Candida) are more rare (less than 2%) [21]. A retrospective study was carried out over a period of 2 years—from January 1, 2011, to December 31, 2013—in a PD unit in sub-Saharan Africa [22] where all patients treated with PD who presented with peritonitis were included. They noted that the most frequently isolated germs were Gram-positive cocci (60.78%) and Gram-negative bacteria (39.22%). Staphylococcus aureus was identified in 45.12% of patients and Pseudomonas aeruginosa in 17.64% of patients. Among S. aureus, only 1 strain was resistance to ceftazidime, 2 strains were methi-R, and no resistance to vancomycin was found. According to the ISPD [1], antibiotic therapy should cover both Gram-positive and Gram-negative bacteria. Two types of protocol are currently recommended [20]. The first comprises a 1st- or 2nd-generation cephalosporin (cefazoline or cefalotine) or a 3rd-generation cephalosporin and an aminoglycoside. The 2nd protocol combines vancomycin and an antibiotic active on Gram-negative bacteria. In our practice, we administered a 3rd-generation cephalosporin combined with a dose of vancomycin.

PD in young people awaiting kidney transplantation is an excellent indication. The survival of the graft is identical in patients previously on PD or hemodialysis. Improvement in the kidney function of the graft is more quickly obtained in patients previously on PD [23], and this is the case for our 3 patients who benefited from a successful renal transplant by related living donors. This very low number remains below our expectations but could be explained by the kidney transplant activity still under development in our context, with 43 transplants performed in our training during the study period.

## CONCLUSION

The introduction of PD as an extra-renal treatment method at the dialysis unit of the Mohammed V military training hospital has given us a satisfactory experience in the management of ESRD patients. Indeed, this gentle and progressive technique allowed us to face various medical and social constraints and has several advantages in many types of patients. In addition, in our country,

PD represents an undeniable solution to the uneven territorial distribution of hemodialysis centers and their inability to care for all ESRD patients. Also, kidney transplants do not respond to the constantly growing number of requesting patients and those registered on the waiting list. Thus, PD represents the treatment of choice and the first line of ESRD for any patient concerned with autonomy, independence, self-control, and the maintenance of an active life. Consequently, a specific program of information on the population and training of the medical community must be established to promote this technique.

## DISCLOSURE

*The authors have no conflict of interest to declare.*

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