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Constipation and drainage kinetics in peritoneal dialysis: a nursing perspective on 2 cases

(La constipation et la cinétique de drainage en dialyse péritonéale : point de vue infirmier à propos de 2 cas)

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Summary

Constipation is a frequent occurrence in peritoneal dialysis patients. A recent study revealed a 58% prevalence of constipation in patients with end-stage chronic renal failure, underlining the need for better intestinal transit management in this population.
We have 25 years of experience in automated peritoneal dialysis (APD); our center uses weighted catheters and has accepted obese patients since 2021.

We present 2 clinical cases that demonstrate that the study of drainage kinetics recordings gives patients a better understanding of how their dialysis works and promotes treatment compliance. They also demonstrate that the use of individual therapeutic education enables patients to improve their transit management, particularly in the case of psychologically fragile patients experiencing complicated treatment initiation.

Constipation can reduce the effectiveness of peritoneal dialysis and cause peritoneal infections. The article recommends using the Bristol scale and certain questionnaires to assess the severity of constipation. It stresses the importance of therapeutic workshops to increase patient involvement. The visualization of drainage curves helps in understanding the impact of constipation, promoting better management and improved quality of life.

In conclusion, integrating drainage curves into constipation management as part of a therapeutic education approach with APD patients is essential to optimize treatment and reduce complications.

Keywords: constipation, dialysate drainage kinetics, automated peritoneal dialysis, APD.

Résumé

La constipation est une situation fréquente chez les patients traités par dialyse péritonéale. Une étude récente a révélé une prévalence de 58 % de constipation chez les patients en insuffisance rénale chronique terminale soulignant la nécessité d'une meilleure gestion du transit intestinal dans cette population.

Nous avons 25 ans d'expérience en Dialyse Péritonéale Automatisée (DPA) ; notre centre utilise des cathéters lestés et inclut depuis 2021 des patients atteints d'obésité.

Nous présentons deux cas cliniques qui démontrent que l'étude des enregistrements des cinétiques de drainage permet aux patients une meilleure compréhension du fonctionnement de leur dialyse et favorise leur compliance au traitement. Ils mettent également en évidence que le recours à l'éducation thérapeutique individuelle permet aux patients d'améliorer la gestion de leur transit, notamment pour les des patients fragiles psychologiquement, qui connaissent des débuts de traitements compliqués.

La constipation peut réduire l'efficacité de la dialyse péritonéale et causer des infections péritonéales. L'article recommande l'utilisation de l'échelle de Bristol et (des) de questionnaires pour évaluer la gravité de la constipation. Il souligne l'importance des ateliers thérapeutiques pour impliquer les patients. La visualisation des courbes de drainage aide à comprendre l'impact de la constipation, favorisant ainsi une meilleure prise en charge et une amélioration de la qualité de vie.

En conclusion, intégrer les courbes de drainage dans la gestion de la constipation dans une démarche d'éducation thérapeutique avec les patients en DPA est essentiel pour optimiser les traitements et réduire les complications.

Mots-clés : contispation, cinétique drainage dialysat, dialyse pértitonéale automatisée, DPA.

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Introduction

The PDOPPS study from Thailand [1] recently reported that constipation correlates with the risk of peritoneal infection and reduced purification efficiency due to catheter malfunction. However, this study found no link between drainage kinetics and constipation. In this article, we report on the value of assessing the drainage kinetics of the peritoneal cavity to detect episodes of constipation based on 2 clinical cases from our unit.

Clinical cases

Almost all our patients are treated with automated peritoneal dialysis (APD) using the Fresenius laboratory's Harmony® cycler. This cycler provides a graphical display of the kinetics of dialysate introduction and drainage during renewal cycles, as well as alarms triggered by a decrease in flow.

Observation 1:

The patient was 81 years old and had a body mass index (BMI) of 26.3 kg/m2 (weight 81 kg, height 1.70 m). Her program consisted of 6 cycles, including 2 cycles of 1.9 L for 40 minutes and 4 cycles of 2.6 L for 90 minutes.

The patient was admitted to hospital on 11/02/2022 in preparation for a colonoscopy scheduled for 13/02/2022. However, due to the practitioner's unavailability, this was postponed to 18/02/2022, and a second colonic preparation was necessary. As seen in (*Figure 1*), there was a clear fluctuation in the number of alarms on the patient's machine from February 9, 2022, to March 29, 2022: it fell sharply in the aftermath of colonic preparation, i.e., when the bowel was empty.

Analysis of this curve gave the patient a better understanding of the kinetics of her peritoneal exchanges and increased her compliance with the prescribed treatment.

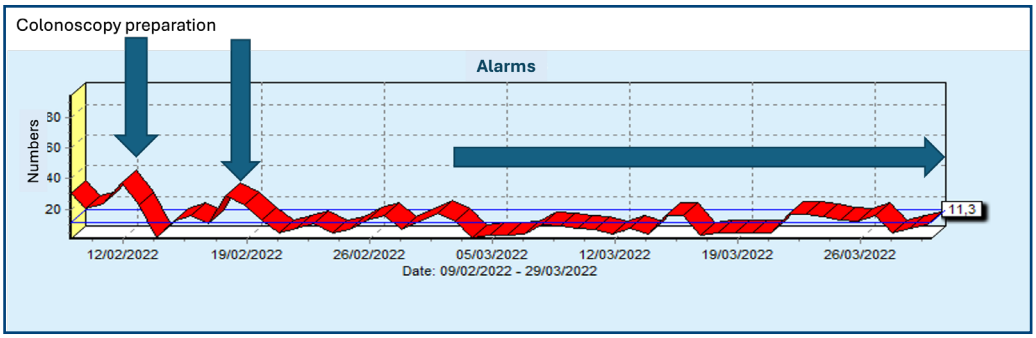

Figure 1. Recording of the number of alarms per night over the period from February 9, 2022 to March 29, 2022

Observation 2:

The patient was a 76-year-old man with a body mass index (BMI) of 33.5 kg/m2 (weight 90 kg, height 1.65 m). The patient was android obese, with an abdominal circumference of 1.24 m and a body surface area of 1.98 m^2.

Peritoneal dialysis began in October 2020 in APD using the Harmony® FRESENIUS cycler

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(with a standard program of 4 cycles of 2.3 L and 120 minutes of stasis; the authorized residual volume was prescribed at 630 ml). Abdomen without preparation (AWP) radiography performed at the start of treatment showed a significant stercoral overload with correct catheter positioning (*Figure 2*). Constipation was, therefore, present at the time of treatment.

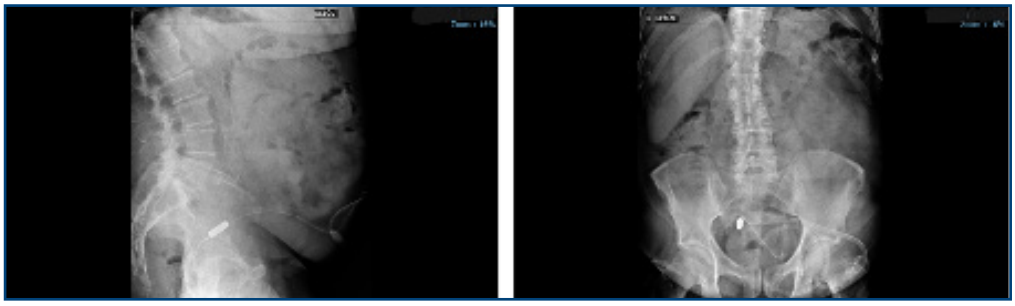

Figure 2. Unprepared abdomen radiology test performed in January 2021

Visualization of the flow curves during exchanges showed a clear decrease in flow from the very first drainage cycle, which pointed to a constipation problem (*Figure 3*). Over the course of the night, around 70 alarms occurred, and the patient, who was fed up, considered giving up the technique.

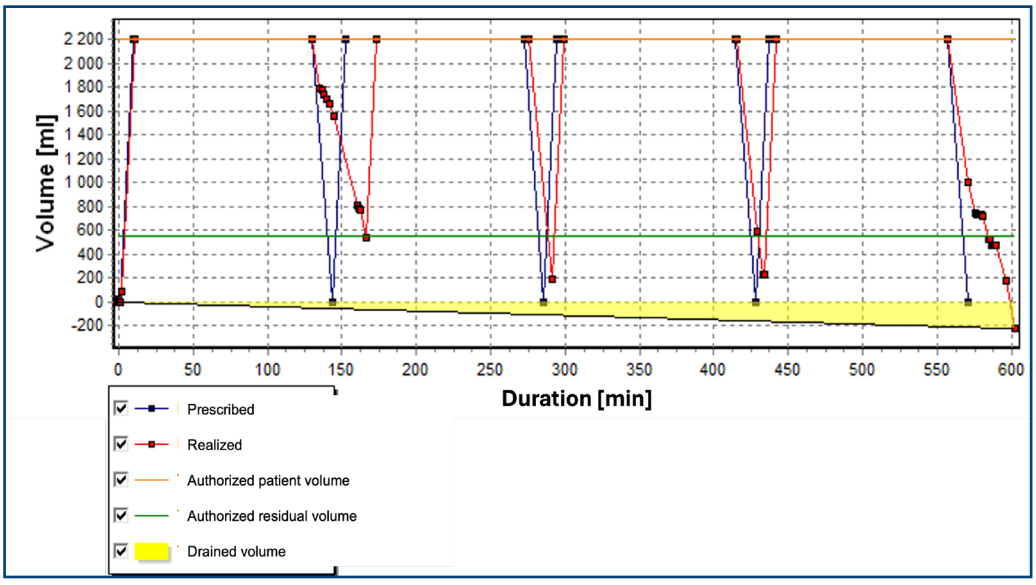

Figure 3. Recording of Mr. F's nighttime dialysis showing effect of constipation on peritoneal drainage

When questioned, the patient was convinced that his transit was good since he had a bowel movement every day. On the strength of this observation, he did not take his laxative treatment or only took it intermittently. He was offered an individual, non-systematic therapeutic education workshop on intestinal transit disorders. During this personalized support, he was shown his X-ray images and the recording of his alarms.

We found him to have the characteristic signs of constipation: his stools were lumpy and firm, he had to push hard, and he had a feeling of incomplete evacuation, a sensation of obstruction, and flatulence, but he was evacuating more than 3 times a week.

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Fiber and fluid intake appeared to be adequate. However, we decided to interview the dietician, who meets patients as soon as PD is started and then every 6 months afterward, either systematically or on request. Advice is generally given on reducing sodium intake and enriching the patient's protein ration. Fluid levels, potassium, phosphorus, and calcium intakes are only reviewed by the dietician based on medical advice.

We discussed the main causes of the patient's constipation: lack of physical activity and android obesity. This constipation was exacerbated by renal failure and associated drug therapy.
Together, the patient and the team discussed the actions that could be improved, suggesting increased compliance with the prescribed treatment and giving appropriate advice: drink a glass of ice-cold water on an empty stomach in the morning, take 1 spoonful of olive oil, and eat a kiwifruit or prunes.

Regular physical activity adapted to his abilities was also recommended. To combat a sedentary lifestyle, he chose to resume walking.

Changes were made to his dialysis program, such as increasing the volume injected to 3 L. The residual peritoneal volume (RPV) was set at 30% (equivalent to prescribing a "false fluctuator"), and up to 960 ml of RPV was authorized. Stasis times were changed to suit his lifestyle and sleep patterns (60/120/2 times 190 min).

Sharing results between the care team and the patient allowed for quick and efficient changes to laxative prescriptions.

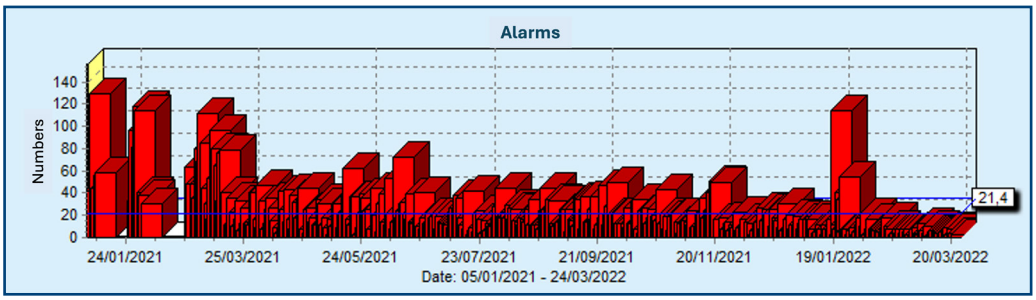

Figure 4. Recording of ultra-filtration alarms from January 2021 to March 2022

The monitoring of flow and alarm records showed a clear improvement (*Figure 4*). Within 2 months, alarms had dropped from 70 to 5 per night. The patient was once again won over by the technique.

Discussion

Our clinic has 25 years of experience in APD and has used 80 to 100% APD as a technique since we opened.

The smooth operation of the dialysis catheter owes its success to the use, since 2015, of self locating catheters [3], as well as the visceral surgeon's skill. It should also be noted that Brive Hospital has not refused patients with android obesity since 2021.

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It is known that APD can lead to a slight hydraulic dysfunction of the catheter, inherent to the prone position during drainage. However, our observations show that episodes of constipation can be a source of mechanical complications despite correct catheter positioning.

By observing when alarms occur during drainage, we can pinpoint their cause:
- If they occur at the beginning of drainage, the likely cause is constipation or external plication of the catheter since the patient has been trained to orientate and immobilize it.
- If they occur at the end, we should suspect posterior or subdiaphragmatic capture of the dialysate.

In APD, the study of drainage curves makes it possible to monitor the effect of an episode of constipation, its evolution, and its consequences for dialysis function.

The results of our two constipation observations align with the PDOPPS study conducted in Thailand from 2014 to 2017 [1]. In this study, out of 729 patients who completed the CSS questionnaire, 13% had rapid-onset constipation, and 27% had constipation within the first year of treatment.

Transit disorders not only affect the patient's well-being but also increase the risk of mortality. The inflammation caused by disorders leads to an imbalance in the intestinal flora, which can be complicated by germ translocation. In addition, the mechanical problems associated with constipation can significantly impact the quality of purification [4], ultimately leading to the discontinuation of the technique.

Drug treatments and peritoneal dialysis often require PD patients to take laxatives or even a combination of laxatives.

Poor drainage leads to reduced purification, increased alarms, and disturbed sleep. These factors can lead to fatigue, stress, and depression. Complications can also arise, such as hemorrhoidal flare-ups and the risk of translocating digestive germs.

The machines we use for APD graphically visualize the different phases of successive cycles, facilitating the analysis of variations in drainage flow from the peritoneal cavity and improving the quality of management.

The Bristol scale [5] can be used in addition to analyzing APD dialysis cycles. Questionnaires assessing the severity of constipation are also available. These measures are powerful tools that can easily be used to combat this pathology effectively and monitor patients treated with peritoneal dialysis. At present, we do not use these documents, although their obvious utility means we will likely implement and test them.

According to a review by Kosmadakis et al. [4], "Constipation is an underestimated [...] and debilitating condition that is often undertreated." He also states that "etiological factors, diagnostic strategies, and therapeutic and prophylactic measures for the management of constipation in peritoneal dialysis patients are topics that urgently require significant efforts from the therapeutic community."

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Conclusion

Automated peritoneal dialysis cyclers are now equipped with analysis tools, enabling teams to use high-performance software to visualize the kinetics of drainage curves (slopes and any alarms). These are useful tools for optimizing patient management.

Analysis of drainage curves and interruption curves enables patients to visualize constipation's direct impact on their treatment, enabling them to play a full part in improving their transit and dialysis. All of these data contribute to the evolution and improvement of the PD technique.

Our analysis of the reported facts confirms our systematic policy of providing support and therapeutic workshops for individuals or groups to reduce complications and their associated costs.

Our cases illustrate the importance of ensuring normal transit to reduce alarms during nighttime dialysis considerably, thus improving the quality of treatment and, consequently, the patient's quality of life.

Ethical considerations

Patients have given informed consent to the anonymous use of their clinical cases for this publication.

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Conflicts of interest

The authors declare that they have no conflicts of interest regarding this work.

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