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HOME HEMODIALYSIS WITH A CENTRAL VENOUS CATHETER

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Résumé

Il existe de nos jours un renouveau lent mais réel de l'hémodialyse à domicile ; plus de 300 patients actuellement sur le territoire français en bénéficient notamment sur un rythme quotidien (entre 4-7 séances/semaine, sur une courte période, entre 2 et 3 hs).

La grande majorité des patients dialysés à domicile ont comme voie d'abord une fistule artérioveineuse. Seuls 13 patients, selon le RDPLF, dialysent sur un cathéter veineux central.

Nous présentons le premier patient formé à la dialyse à domicile sur cathéter veineux central en autonomie avec le système Physidia S3.

Mots clés : hémodialyse domicile, cathéter central.

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Abstract

Nowadays, there is a trend towards the development of home dialysis ; more than 300 patients in France benefit from this technique, mostly on a daily rhythm (between 4 to 7 sessions per week, in a short period : 2 to 3 hours per session).

The majority of patients in home dialysis programs have an arterio-venous fistula as a vascular access. According to the RDPLF reports, only 13 patients dialyse regularly with a central venous catheter.

In this article we report the first patient trained for home dialysis making a self-connexion with the Physidia S3 system.

Keywords : home dialysis, central venous catheter.

INTRODUCTION

Home hemodialysis (HHD) began in the 1960s, first in Japan (1), United States (2), England, and in France from 1967. The expansion was progressive until eighty with more than 2,000 home-dialysis patients, which at that time represented about 20% of dialysis patients in our country.

Studies published at that time showed an improvement in survival following home installation (3), a better quality of life (4) and a lower cost for the health system (5).

Despite all these encouraging prognoses, it has settled down gradually following the emergence of out of hospital dialysis units both in France and internationally.

For example, Figure 1 shows the incidence of home dialysis patients over time in the United States (6).

There is now a slow but real revival of home hemodialysis, more than 300 patients in France currently benefit of it (7), including a daily rhythm (between 4-7 sessions / week, over a short period, between 2h and 3h per session).

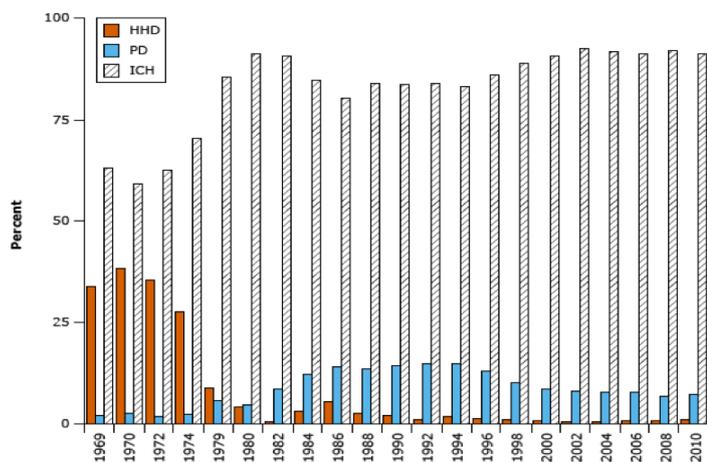


Fig. annual incidence of patients on home hemodialysis (HHD), in center (ICH) and peritoneal dialysis (PD) in US. USRDS data (6)

Indeed, there are medical indications for daily short hemodialysis (8), including the presence of cardiovascular complications: persistent arterial hypertension, left ventricular hypertrophy, malnutrition, intolerance phenomena (hypotension, cramps, malaise), excessive weight. Other indications are: pregnancy, contraindication to transplantation, erythropoietin resistance, irreducible hyperphosphatemia.

Beyond the strictly medical plan, there are also social indications: active life, employment, the main goal being to preserve the autonomy of the patient. This is possible partly thanks to the availability in France from 2005 and 2013, of 2 models of home dialysis monitors, reduced in size, portable, which allow the prescription of daily short dialyses, low dialysate flow. No need for a water treatment, the ultrapure pyrogen-free dialysate is prefabricated and packaged in 5-liter bags. The installation is thus simplified (Nx stage: pre-assembled cassette containing the dialyzer - type PUREMA, of surface 1.6m² - the blood lines and the circuit dialysate, of single use), (PhysidiaS3: pre-assembled cassette, choice of dialyzer). In this context it is necessary to have a storage space at home.

As part of the Patient Therapy Education (PTE) program of dialysis methods at the Centre Hospitalier Vendée in La Roche sur Yon, our main mission is to provide patients with a treatment method that integrates as well as possible into his projects of life. Training in home hemodialysis programs is therefore an integral part of the possibilities offered to end-stage chronic renal failure patients. Our hemodialysis center has just over 11 patients trained over the last 5 years.

According to the RDPLF, 13 home hemodialysis patients have a central venous catheter: 11 patients with the NxStage monitor and 2 patients with the Physidia S3 monitor, one of whom being the patient we are going to describe because it is the first training in HHD with central catheter in total autonomy, in a patient who chose the dialysis monitor offered by the laboratory Physidia.

In this article, we first discuss the medical context of the patient, then the process of training on HHD on the central venous catheter autonomy including practical aspects, the different stages of training, the presentation of the protocol of connection / disconnection to catheter, the follow-up protocol, the impact on the quality of life of the patient

MATERIAL ET METHODS

Medical context

This was a male patient, 49 years old, married, former independent craftsman, autonomous in his daily life. history:

- IRCT following Berger's disease. He had known hemodialysis sessions in autodialysis.
- Kidney transplant in 2002.

Post-transplant immunosuppression complicated by

high grade B stage B lymphoma with digestive localization treated with R-CHOP and suppression of immunosuppression.

- Antracycline dilated cardiomyopathy, 25-30% ejection fraction, NYHA III.
- Defibrillator carrier,
- Multiple infectious and cardiovascular complications

Back in hemodialysis in semi-emergency, in April 2017, on central venous catheter.

A heart / kidney transplant project was under consideration, but it is currently against.

The dialysis sessions were complicated by a very poor hemodynamic tolerance marked by episodes of repeated symptomatic hypotension and cramps, not allowing optimal control of its volume, which was a major issue in this cardiac and oliguric patient.

There was therefore a need to split his dialysis sessions to improve tolerance, with a short daily routine hemodialysis program, which resulted in satisfactory hemodynamic stability.

Subsequently, a daily home dialysis program was offered to her, a project that perfectly adapts to the patient's daily routine.

A right radial fistula was made. At first there was a developmental delay, then a distal ischemia appeared, amplified at the punctures times. The fistula had to be closed with regard of the appearance of a dry necrosis beginning with the right forefinger: a permanent jugular catheter was set up, thus questioning the home care project.

Nevertheless the patient's wish for a home dialysis program, it was decided to include him as part of a training on HDQ on a central catheter. The patient training lasted

6 weeks, including 2 weeks dedicated exclusively to catheter care. The patient was placed at home on November 4, 2017.

The great bases of training

The first step consisted in the nurse's description of each step of dialysis, this allowed the patient to integrate and understand the protocols in place whereas could not observe it, due to the lying position and the installation of the sterile fields.

During this period, the patient was able to «train» during the sessions, to put on the sterile gloves and to manipulate the material contained in the set.

The next step consisted to install the patient in a proper comfortable position. So he learned to connect the line while sitting at the edge of the bed with a little table support to his height. The other essential but uncommon element during the treatment was the installation of a small mirror, placed facing him, hanging on the dialysis machine. All this has made this care, till now so technical, becoming accessible. Subsequently, the practice was started: first by the connection, then once it acquired, by the disconnection, which turned out to be simpler.

Catheter connection protocol Material constraints

Once the patient became autonomous, training with the Physidia S3 monitor, chosen by the patient, the paramedical team's therapeutical education program was carried out as planned.

To consider sessions on this dialysis machine, it is necessary to install a transformer between the electrical outlet and the monitor, the latter being recommended by the manufacturer in the case of catheter connection.

Indeed, a standard relating to electromedical devices and more particularly to those in the field of dialysis (NF EN ISO

Patient	Helper
Patient gets ready, takes his constants	
Hygienic hand treatment by friction	
Prepare the equipment and open the set	
Put on sterile gloves, prepare and organize the set.	
Remove the catheter bandages, discard the gloves	
Hygienic hand treatment by friction	
2nd pair of sterile gloves: Aseptic cleansing of the skin and the catheter: centrifugal technique starting from the emergence. Cleaning the branches.	

Surround the catheter's branches with compresses soaked in antiseptic	
Put a dry and occlusive dressing on the emergence.	L'aidant place le champ non troué et fixation à la peau
Place the perforated tiue drape around the branches, clamper the 2 lanes of the catheter. Aspirate the anticoagulant lock (5cc per branch).	
	Hygienic treatment of hands by friction by caregiver and pose non-sterile gloves
	Disinfect the tip and the line on 30 cm with compresses impregnated with antiseptic by helper and Present the arterial line
Reception of arterial line with compresses impregnated with antiseptic.	
Connect the arterial line to the corresponding branch of the catheter	
	Disinfect the tip and the line on 30 cm with compresses soaked in antiseptic by the caregiver. Present the venous line
Reception of venous line with compresses impregnated with antiseptic.	
Connect the venous line to the venous branch of the catheter	
unclamp both ways of the catheter	
	Unclamp the arterial line and the venous line then actuate the pump
Protect the connections, close the sterile drape and fix the lines	
ERemove gloves, mask and haur cap	
Hygienic hand treatment by friction	
Apply the prescription settings.	

Catheter disconnection protocol

Patient	Helper
Hygienic hand treatment by friction	
Restore the extracorporeal circuit and clamper arterial and venous lines	
Hygienic hand treatment by friction	
Wear haur cap and mask	
Op»n te drape prepare the heparin and place it in the cup	
Put on sterile gloves, prepare the set, open the dressing	
Take heparin in the cup	
	Put the dressing under the branches and attach to the skin.
Clamper branches	

Disconnect the arterial and venous lines of the catheter's branches with compresses soaked in antiseptic	
	Reception of lines by the helper
Inject the heparine lock prescribed	
Close the branches of the catheter with sterile single-use plugs	
Remove gloves	
Hygienic hand treatment by friction	
Put 2 ° pair of sterile gloves	
Make a dry and occlusive bandage of the catheter's branches	
Remove gloves, mask and hair cap Hygienic hand treatment by friction	

60601-2-16 «Particular requirements for basic safety and essential performance of hemodialysis, hemodiafiltration devices and hemofiltration») defines specific requirements for central venous catheter therapy versus arteriovenous fistula access. This standard specifies in particular the leakage currents to be complied with, regardless of the conditions of use, and whose importance is of paramount importance in case of ground wire interruption on the electrical installation of the patient's home. In the case of Physidia, the leakage currents generated by the device meet the criteria defined in the standard for an arteriovenous fistula connection. However, for a central venous catheter connection, the requirements in terms of leakage currents are more restrictive because of the proximity of the connection with the heart. This is why the use of the S3 monitor with a vascular approach of central venous catheter type requires the establishment of an isolating transformer that ensures compliance with leakage currents specific to this type of connection.

Regular patient's follow up

The monthly follow-up consists of a center dialysis session followed by a medical consultation. It demonstrates to date a perfect management of dressings and the functioning of the approach. On the reports of weekly sessions we note the absence of significant alarms.

The paramedical home visits take place according to a strict calendar: the day of the installation at home, the following day, to day7, to day30, then every 3 months for 6 months, then every 6 months, and this for all the patients whatever they are they using a fistula or catheter. At the end of this visit, the patient dialyses by himself in the presence of the nurse who reviews the self-puncture,

assembly of the machine, care and hygiene in a comprehensive way; a report is recorded in the patient file.

Quality of life

A quality of life questionnaire (MOS SF36) is conducted once a year. Since the installation of the patient at home on November 4, 2017, the different items demonstrate a satisfactory adaptation of the method to its living environment.

If post-dialytic symptoms - especially asthenia - reappears when the dry weight is underestimated, the patient expresses real comfort the rest of the time. He was able to resume walking a little in the afternoon after the session. And despite his cardiovascular state marked by severe dilated cardiomyopathy, a 25% ejection fraction and a NYHA class III symptomatology.

Discussion

The main fear was to entrust a high-risk infectious care, as is the case with the sterile care of a central venous catheter, to a patient who just a few days ago had never had to put on a pair of sterile gloves! The paramedical and medical team assumes its educational convictions and is fully involved in the training in the precise gestures that represents the care of the catheter in an aseptic environment. Our patient is endowed with great dexterity and analytical abilities and his rigor with the protocol has been remarkable. These skills have made his training quite safe and serene. His caregiver intervenes only to: a) fix the sterile fields to his skin, at the time of connection and disconnection to avoid aseptic mistakes and b) disinfect the arterial and venous lines and stretch them.

It has been demonstrated that home-based dialysis with unassisted catheter can be used, an experiment conducted by Professor Goffin's Belgian team in Brussels (9). In France, however, we are governed by the legislation governing home dialysis care: Decree No. 2002-1198 of 23 September 2002 that in Article D. 712-147 states «Home hemodialysis is offered in France. patients, trained in this technique, usually able to do all the necessary actions for their treatment, in the presence of a third person from the usual entourage who can assist them. »

The presence of the caregiver is therefore legally mandatory at the time of dialysis care. As a result, our patient's caregiver has not hesitated to participate in the care that is, as we have pointed out, very punctual and that makes the procedure of connection faster.

CONCLUSION

The proposal for a home dialysis project is common practice in our dialysis technology center, and in the context of the Therapeutic Education programs, the priority is to support the patients in their planned projects. Training in HHD on a semi-autonomous central catheter meets the wishes of our patient and encourages teams to care for patients with pathway difficulties. Although strong from this observation, it is not relevant for the team to generalize this management, this practice is not transferable to all patients whose project is HHD.

On the other hand, this situation gave us another look at care, proving the learning and analysis abilities of patients, the very principle of Therapeutic Education program.

CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest in this article.

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