

Traveller treated with renal replacement therapy

Małgorzata Marchelek-Myśliwiec^{1,A}✉, Krzysztof Korzeniewski^{2,B}, Grażyna Dutkiewicz^{1,C}

Pomeranian Medical University in Szczecin, Clinic of Nephrology, Transplantology and Internal Medicine, Powstańców Wlkp. 72, 70-111 Szczecin, Poland
Military Institute of Medicine – National Research Institute, Department of Epidemiology and Tropical Medicine, Szaserów 128, 04-141 Warsaw, Poland

^AORCID: 0000-0002-1920-0972; ^BORCID: 0000-0002-7202-4736; ^CORCID: 0000-0002-9326-3429

✉ malgorzata.marchelek.mysliwiec@pum.edu.pl

ABSTRACT

In developed countries, renal replacement therapy (RRT) is available to any patient who needs it. Renal replacement therapy patients still believe that starting therapy means being tied to their home nephrology center, which prevents them from traveling. The role of specialists is to inform their patients that

they can travel. Guidelines concerning the ways in which patients should be prepared for trips are available, but they are mainly based on expert opinion. Therefore, there is a need for extensive research to evaluate the safety of long-distance travel in the discussed patient population.

Keywords: travel; renal replacement therapy; immunization.

INTRODUCTION

In developed countries, renal replacement therapy (RRT) is available to any patient who needs it. In the case of RRT patients, “travel” or “independence” are considered to be 2 of 5 key factors determining the choice of treatment method [1]. In one study, among 1300 patients on hemodialysis, there were about 200 reports of willingness to travel in the previous 6 months [2]. Hemodialysis is the most commonly used RRT option, but in the absence of medical contraindications, patients may choose peritoneal dialysis (PD). The advantage of PD is greater independence, since the patient performs the procedures at home,

using continuous ambulatory peritoneal dialysis or automated peritoneal dialysis and a machine called a cyclor. The third and best method is kidney transplantation. Patients on RRT still believe that starting treatment means being tied to their home nephrology center, which prevents them from traveling. The role of nephrology or transplantation specialists is to inform their patients that they can travel and to prepare them to do so. Since each of the listed RRTs has its own specific nature, travel must be carefully planned to avoid any impediments to the continuation of therapy. The type of RRT is also determined by the ability to choose the destination (Tab. 1).

TABLE 1. Type of renal replacement therapy, destinations, and possible complications when traveling

Renal replacement therapy type	Destination	Most frequent possible RRT-related complications when traveling	Contraindications to vaccinations recommended when planning a trip abroad
Haemodialysis	availability of a dialysis center with open slots that is willing to accept the patient for visiting or transient dialysis	too much time spent traveling to a destination, skipping a scheduled hemodialysis that poses a direct threat to life, infection with hepatotropic viruses	no contraindications
Peritoneal dialysis	availability of a place for dialysis fluid exchange that meets the required sanitary conditions, ability to deliver fluids to the patient's place of residence availability of a dialysis center in case of complications	peritonitis related to the absence of the necessary sanitary conditions to conduct exchanges	no contraindications
Renal transplantation	availability of a transplantation center	infections, acute rejection of a transplanted kidney due to lack of access to immunosuppressive drugs	live vaccines are contraindicated

The purpose of the study is to draw attention to the needs of people undergoing hemodialysis, including the possibility of travel. Data from scientific publications on this topic is too limited to provide general guidelines.

MATERIALS AND METHODS

PubMed, Embase, and Cochrane Central were searched for studies evaluating the problems and risk factors of travel in patients undergoing HD. Articles were analyzed using the following keywords: renal replacement therapy, travel, vaccinations. Due to the small number of studies, it was not possible to find studies conducted on large groups of patients.

TRAVEL OF A HEMODIALYZED PATIENT

Hemodialysis patients are an immunocompromised population that is likely multifactorial due to a combination of innate and adaptive immune dysfunction, chronic inflammation, endothelial cell dysfunction, and uremia [3]. The specific nature of hemodialysis treatment requires access to a dialysis center with the necessary equipment. Hemodialysis is usually performed 3 times a week for 4 hours each time. Traveling to Western European countries does not pose many logistical problems due to very good infrastructure, availability of open slots in hemodialysis centers, and standardized sanitary procedures – water disinfection, use of disposable dialysis lines and dialyzers, monitoring of the patient's virological status for hepatotropic viruses. Before traveling, the patient should receive confirmation from the destination dialysis center (preferably by e-mail). The physician caring for the patient on a daily basis should prepare an information sheet with the patient's hemodialysis dose, virological status, and current laboratory results. It should be emphasized that within the European Union, such treatment is covered by insurance. The EU has an established mechanism that allows patients with end-stage renal disease to receive dialysis abroad and benefit from the legal right to freedom of movement [4].

Scientific data on the safety of travel and use of dialysis services in developed countries are scarce. In a study on patients dialyzed in London, an association between Hepatitis C virus (HCV) infection and travel to India was confirmed in 2 patients. This was made possible by monitoring virological status for several months prior to travel, genetic testing – HCV-PCR, and monitoring anti-HCV antibody levels upon return to the home dialysis center. Infection with hepatotropic viruses is much more common in hemodialysis patients, so dialysis centers that are known to be hygienic should be chosen if possible [5]. Another study from the United Kingdom examined hemodialysis patients traveling both within and outside the United Kingdom. The results of the study showed that the number of infections increased especially in the group of diabetic patients and patients traveling to tropical and subtropical countries. The most common infections reported by patients were diarrhea and respiratory tract infections [6].

TRAVEL OF A PERITONEALLY DIALYSED PATIENT

As mentioned above, patients with PD perform dialysis fluid exchange autonomously. When planning a trip, it is important to consider the means of transportation the patient will use. This will determine whether dialysis fluid will be carried by the patient or shipped to the destination. The available study literature does not provide data on the incidence of CADO therapy complications directly related to travel. The only information available is on the ability to travel, which can be found on the websites of the dialysis fluid manufacturers. There are no detailed guidelines on how the patient should prepare for travel. Therefore, it is necessary to consult a nephrologist before any travel.

TRAVEL OF A POST-KIDNEY-TRANSPLANT PATIENT

Kidney transplantation is by no means the best method of RRT, as it makes the patient autonomous and not dependent on frequent stays in dialysis centers, allowing a wider choice of travel destinations. However, there is a constant need for immunosuppression, which makes these patients more susceptible to infectious diseases, including opportunistic diseases, than the immunocompetent population. Immunosuppressive agents interfere with the immunologic response following vaccination [7]. The period of greatest immunosuppression, during which the effect of prolonged T-cell compromise is most apparent, appears to be the first few months after transplantation [8]. Therefore, it is not recommended to travel during this time. In 2019, the American Society of Transplantation Infectious Diseases Community of Practice published a set of guidelines on how to prepare patients for travel after solid organ transplantation [9]. Two points in this document are of particular interest to us. First, the physician must discuss the patient's future travel plans with the patient at the time of KTx eligibility. One has to take into account possible vaccinations that are contraindicated after transplantation due to the applied immunosuppression [10]. Second, before traveling, especially to tropical countries, it is recommended to consult a doctor specializing in travel medicine [6]. Studies of vascularized organ recipients traveling outside the United States and Canada have shown that more than 1/2 of the subjects chose countries with endemic hepatitis A, and only 5% of the patients were vaccinated prior to travel. Among KTx patients who traveled to countries with mosquito-borne diseases, malaria, and dengue, only 25% of patients took the recommended prophylaxis [11]. The risk of developing various types of infections among travelers in the same population is significantly higher. Both the illness, typically diarrhea, and the use of antibiotics can affect the levels of immunosuppressive agents, which have a narrow therapeutic index [12]. Too high concentrations are nephrotoxic, while too low concentrations can lead to acute rejection of the transplanted kidney.

In highly developed countries, travel is common among RRT patients despite the significant logistical problems associated with it. A change in location and climate has a positive effect on their well-being. However, there is a group of patients who do not benefit from travel. Factors that negatively affect the health of RRT travelers include increased risk of anemia, infections, unfamiliar dialysis staff – in the case of hemodialysis patients, language barriers, and difficulties in maintaining proper nutrition [2]. Communication and coordination of quality care across borders can be facilitated by increased standardization of standards and continuity of care documents, such as care plans and discharge summaries.

Vaccination is an important component of preventive care for patients with kidney disease. Unfortunately, patients with advanced kidney disease and/or using immunosuppressive agents generally have lower rates of seroconversion, lower antibody titers, and less durable responses after immunization compared to healthy controls [10].

SUMMARY

In the 21st century, long-distance travel by RRT patients is possible. Patients may benefit from traveling in terms of improving their quality of life. However, some of them will be exposed to infectious and non-infectious complications related to travel. Guidelines on how to prepare patients for travel are available, but they are mainly based on expert opinion. Therefore, extensive research is needed to evaluate the safety of long-distance travel in this patient population. Consultation with a physician specializing in travel medicine should be an integral part of preparing the RRT patient for travel. Communication and coordination of quality care across borders may be facilitated by increased standardization of standards and documents for continuity of care, such as care plans and discharge summaries.

REFERENCES

1. Wongboonsin J, Merighi JR, Walker PF, Drawz PE. Travel arrangements in chronic hemodialysis patients: a qualitative study. *Hemodial Int* 2021;25(1):113-22.
2. Corbett RW, Prout V, Haynes D, Edwards C, Frankel AH. Problems associated with hemodialysis and travel. *J Travel Med* 2014;21(4):255-9.
3. Kato S, Chmielewski M, Honda H, Pecoits-Filho R, Matsuo S, Yuzawa Y, et al. Aspects of immune dysfunction in end-stage renal disease. *Clin J Am Soc Nephrol* 2008;3(5):1526-33.
4. Footman K, Mitrio S, Zanon D, Glonti K, Risso-Gill I, McKee M, et al. Dialysis services for tourists to the Veneto Region: a qualitative study. *J Ren Care* 2015;41(1):19-27.
5. Shiina M, Kobayashi K, Hiroishi K, Imawari M. Hepatitis C patients on maintenance hemodialysis show complex immune disturbances in the peripheral blood. *Viral Immunol* 2013;26(5):351-6.
6. Roukens AHE, van Dissel JT, de Fijter JW, Visser LG. Health preparations and travel-related morbidity of kidney transplant recipients traveling to developing countries. *Clin Transplant* 2007;21(4):567-70.
7. Arora S, Kipp G, Bhanot N, Sureshkumar KK. Vaccinations in kidney transplant recipients: clearing the muddy waters. *World J Transplant* 2019;9(1):1-13.
8. Grandaliano G, Losappio V, Maiorano A. Immunosuppression in kidney transplantation. *Kidney Transplant Challenging Future* 2012;86(3):186-207.
9. Buchan CA, Kotton CN. Travel medicine, transplant tourism, and the solid organ transplant recipient – Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clin Transplant* 2019;33(9):e13529.
10. Krueger KM, Ison MG, Ghossein C. Practical guide to vaccination in all stages of CKD, including patients treated by dialysis or kidney transplantation. *Am J Kidney Dis* 2020;75(3):417-25. doi: 10.1053/j.ajkd.2019.06.014.
11. Boggild AK, Sano M, Humar A, Gilman M, Salit I, Kain KC. Travel patterns and risk behavior in solid organ transplant recipients. *J Travel Med* 2004;11(1):37-43.
12. Tielemans MM, van Boekel GAJ, van Gelder T, Tjwa ET, Hilbrands LB. Immunosuppressive drugs and the gastrointestinal tract in renal transplant patients. *Transplant Rev* 2019;33(2):55-63. doi: 10.1016/j.trre.2018.11.001.