




Lifesaving Care for Patients with Kidney Failure during the War in Ukraine 2022

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Introduction

The health and survival of patients living with kidney failure have been threatened by the ongoing conflict in Ukraine. Commencing February 24, 2022, the Russian invasion scaled up to become the largest and most ferocious military assault in Europe since World War II. The war triggered forced migration, leading to the displacement of >13.3 million Ukrainians, equivalent to 32% of the nation's 44.1 million citizens. This figure included 5.6 million refugees (1) who fled to European nations and 7.7 million internally displaced persons (2) inside Ukraine as of May 3, 2022. Estimates from Ukrainian officials place future refugee numbers—persons living outside Ukraine—in the range of 10 million.

Risks for Patients with Kidney Disease in Wartime

Ukraine's medically vulnerable patients, persons living with disabling medical conditions that require specialized care and customized approaches to safeguarding them from harm, have been incommensurately affected by the war (3). Among these are >11,000 patients who receive KRT. More than 1500 have received kidney transplants, 6000 depend upon hemodialysis, 2700 receive hemodiafiltration, and almost 1000 receive peritoneal dialysis (PD) (4).

In peacetime, optimizing the health of patients on KRT requires frequent laboratory monitoring, provision of immunosuppressants, care for vascular or PD access, management of anemia with erythropoiesis-stimulating agents, and iron supplementation and care of mineral bone disease (5). In consultation with their nephrologists, patients select the most appropriate form of KRT and identify accessible dialysis centers in their communities. However, in the context of ongoing hostilities, the reliance of these patients on multiple weekly visits to a hemodialysis center jeopardizes their survival.

In addition to Russia's bombardment of civilian residences and neighborhoods, leading to mass displacement, the World Health Organization's Surveillance System for Attacks on Health Care enumerated 186 attacks on health facilities—including dialysis centers—and on their patients, health care personnel,

ambulances, and medical warehouses stocking PD supplies through May 3, 2022 (6).

Dangers Faced by Ukrainian Patients Receiving Kidney Replacement Therapy

The safety and clinical disposition of Ukrainian patients receiving KRT vary by geographic region amid the dynamically changing conflict. First, some patients live in portions of eastern Ukraine that were seized at the outset of the war and came under Russian control; unfortunately, these patients' access to kidney care and vital supplies cannot be controlled by the Ukrainian health care system. Second, other patients live in communities experiencing heavy bombardment and disruption of infrastructure while lacking reliable humanitarian corridors for evacuation. In Mariupol, Volnovakha, Chernihiv, Bucha, Irpin, and many other cities and towns under siege, patients were cut off from hemodialysis services while experiencing power outages during bitterly cold weather, severe food shortages, and lack of one of the most essential necessities for patients with kidney disease—ample supplies of clean water. The devastating bombardment of Mariupol deprived patients on hemodialysis from accessing their clinics; one patient who successfully evacuated Mariupol reported that 49 of 50 patients at his center had died.

Third, some patients requiring KRT are among the 7.7 million internally displaced persons who evacuated their home communities but still reside inside Ukraine. Numerous dialysis centers were deployed in areas that were less frequently under attack to provide free hemodialysis services. Courageous nephrologists and staff remained in their clinics, sometimes moving dialysis equipment into basements, to continue treating their patients. Austere living conditions experienced by displaced patients on KRT, some of whom were actually living in the dialysis centers, prompted some patients to return to liberated home communities or travel abroad.

Fourth, fortunately, patients receiving KRT have been prioritized for immigration into European Union (EU) countries, including Poland, Romania, Slovakia,

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France, Germany, Italy, and the Republic of Moldova, where they will be able to resume regular hemodialysis treatments (7).

Fifth, medical trauma sustained by civilians during bombardment and military personnel engaged in battle is creating a growing cohort of individuals who will require dialysis or transplant due to war-related AKI (5).

Support for Ukrainian Patients on Kidney Replacement Therapy inside Ukraine and Evacuated to Europe

During the first 2 months of the war, an unknown number of Ukrainian patients receiving KRT were able to reach the relative safety of western Ukraine and neighboring EU countries. The receiving countries have generously supported special needs patients. For example, Poland, the nation that has received 3.1 million Ukrainian citizens (1), announced that refugees requiring medical support would be treated in accordance with the rules that apply to its own citizens. For example, costs for dialysis services for Polish citizens are reimbursed by the Polish National Health Fund; this funding was extended to cover Ukrainian refugees on KRT who require dialysis. Poland also provides coronavirus disease 2019 (COVID-19) vaccination to refugees upon entry.

International organizations providing kidney care services with an established presence in Europe have been instrumental in providing dialysis services for Ukrainian refugees requiring KRT as they arrive in EU countries. These private providers have been handling about two thirds of refugee patients receiving KRT, and the public sector has signaled its willingness to further assist these patients. As of mid-April, kidney care providers estimated that about 200 Ukrainian patients with kidney disease on KRT were receiving regular dialysis treatments in Poland.

In addition to providing direct dialysis services for Ukrainian refugees in receiving countries, international organizations providing kidney care services have shipped supplies to dialysis centers that are still operating inside Ukraine. For example, one private dialysis service provided sufficient materials for 6000 treatments to clinics in Lviv and Rivne.

More broadly, the European Kidney Health Alliance drafted an open letter regarding what the world nephrology community can do to protect Ukrainian patients on KRT, including providing reliable lifesaving therapies, rapidly training relevant health care professionals, enhancing telemedicine capabilities, ensuring free access to care in refugee-receiving countries, and facilitating air transport (8).

Superimposed Risks from Coronavirus Disease 2019

For patients on KRT currently living in war-torn communities inside Ukraine or attempting a lifesaving migratory journey to a border nation, overt threats to health and life are vividly evident. Less outwardly visible are the ubiquitous risks posed by the ongoing COVID-19 pandemic.

First, persons living with CKD who receive KRT are at elevated risk for COVID-19 infection and progression to severe or fatal disease (9). Second, COVID-19 rates in Ukraine were moderately high when the war began, and the

highly transmissible Omicron variant (and the extremely infectious BA.2 Omicron sublineage) was predominating throughout the first months of the war. Third, COVID-19 vaccination rates in Ukraine were extremely low. Less than 35% of the population had received the two-dose regimen, and only 2% had received a “booster” dose, which is much more protective against the severe disease caused by Omicron. Fourth, behavioral mitigation strategies, including wearing masks, physically distancing, and limiting the size of gatherings, were unfeasible during the conflict. Fifth, individuals on KRT shared bomb shelters during air raids, packed trains while evacuating, and jammed reception centers when arriving in receiving countries. In all instances, these patients could not avoid sharing the airspace and the respiratory aerosols produced by those around them, thereby elevating their risks for contracting COVID-19.

Mental Health Considerations

For persons living with CKD, mental health effects are multilayered. First, patients receiving KRT grapple daily with their medical condition. Lifestyles are transformed and revolve around the imperative to receive dialysis or immunosuppressant therapies multiple times weekly. Psychosocial stressors associated with their diagnosis, the rigors of treatment, and shortened life expectancy exert a toll on mental wellness. Being diagnosed with CKD increases the incidence of common mental disorders, most notably major depression, anxiety disorders, and post-traumatic stress disorder.

Second, the COVID-19 pandemic produced a global upsurge in the prevalence of mental disorders. With baseline rates of psychopathology elevated worldwide due to COVID-19, the add-on stressors of living with CKD are more likely to significantly impair function (10).

Third, the inescapable exposures to the hazards of war and the constancy of being under attack amplify the intensity of the life stressors just described—living with CKD during the COVID-19 pandemic. The entire population of Ukraine has experienced repetitive, potentially traumatizing exposures to the horrors of war. Many Ukrainian citizens have experienced direct threats to their own lives, physical injury during the bombardment, or loss of a loved one. Displacement from home and community, experienced by more than three of ten Ukrainians, is associated with compounding losses of property, possessions, identity, and social support.

One other element of the Russian assault is riveting in its psychologic power and significance: these continuing deadly fusillades are perpetrated acts of mass violence.

In conclusion, Ukrainian citizens living with kidney failure are challenged in their abilities to cope simultaneously with their diagnosis, the pandemic, and the war. They are attempting to do so while access to their lifesaving treatments, care providers, and support networks is disrupted. Nonetheless, all Ukrainians, including nephrologists and their patients, stand together with their army, fearlessly fighting for the independence of Ukraine. Among them, there are many volunteers, including those traveling abroad for the sole purpose of getting a kidney transplant and returning to the front. Ukrainian nephrologists endure the cruel war with, and for, their patients.

Disclosures

S. Brzosko reports employment with DaVita Poland. J. Giullian reports employment with DaVita, Inc., ownership interest in DaVita, Inc., and serving on the board of directors of Nephrosant, Inc. and on the editorial board of *Nephrology News and Insights*. J.L. Hymes reports employment with Fresenius Medical Care North America; ownership interest in DaVita, Inc., Fresenius Medical Care, and Nephroceuticals; and other interests or relationships with Kidney Care Partners. M. Kolesnyk reports employment with the Institute of Nephrology of the National Academy of Science of Ukraine and serving as a member of European Renal Association. Z. Mithani reports serving as a board member of the Florida Society of Nephrology. V. Novakivskyy reports employment with Fresenius Medical Care Ukraine. J.M. Shultz reports royalties from Springer Publishing Company. N. Stepanova reports employment with and serving in an advisory or leadership role for Medical Center LLC “Nephrocenter.” All remaining authors have nothing to disclose.

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Author Contributions

B. Alkofair, J. Giullian, J.L. Hymes, M. Kolesnyk, Z. Mithani, V. Novakivskyy, A. Petrova, R.L. Shakour, J.M. Shultz, and N. Stepanova conceptualized the study; B. Alkofair, S. Brzosko, J.L. Hymes, M. Kolesnyk, V. Novakivskyy, and R.L. Shakour were responsible for data curation; Z. Mithani, J.M. Shultz, and N. Stepanova were responsible for formal analysis; J.L. Hymes was responsible for resources; J.M. Shultz provided supervision; Z. Mithani, and J.M. Shultz wrote the original draft; and B. Alkofair, Z. Espinel, J. Giullian, J.L. Hymes, M. Kolesnyk, Z. Mithani, V. Novakivskyy, A. Petrova, R.L. Shakour, J.M. Shultz, and N. Stepanova reviewed and edited the manuscript.

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