



Transition and management of Ukrainian war refugee children on kidney replacement therapy

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Received: 25 August 2022 / Revised: 28 August 2022 / Accepted: 29 August 2022
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Introduction

The Russian invasion of Ukraine on 24 February 2022 resulted in a massive influx of refugees into the European Union, mainly to neighboring Poland, Slovakia, Romania, and further to other western countries. According to data from the UNHCR (United Nations Refugee Agency), from 21 June 2022, overall 3,514,970 refugees from Ukraine were registered for Temporary Protection or other national protection schemes in Europe following the first 4 months of war [1]. The main stream of refugees numbering over 1,200,000 people crossed the border into Poland during the first days of the war with an immediate significant increase in patient numbers noted in hospitals and outpatient clinics.

Most of the fugitives escaping to Poland were relocated to private homes of volunteering Polish families; therefore, the formation of transient refugee camps by the government was not undertaken. The vast majority of refugees were women, children and the elderly and among them were vulnerable children with severe medical conditions including patients on kidney replacement therapy (KRT). According to the

2019 published report from the ERA/EDTA/ESPN Registry, which provides data on the incidence and prevalence of patients on dialysis or with a kidney transplant (KTx), there were 119 children on KRT below 14 years of age in Ukraine, a nation of 39 million inhabitants. The prevalence for the different forms of KRT were calculated for children to be 4.9 for hemodialysis (HD), 3.6 for peritoneal dialysis (PD), and 10.2 for KTx per million age-adjusted population (personal communication from Registry Representative Prof. Dmytro Ivanov, Kiev).

Children on KRT transferred from Ukraine

During the first 3 months of the war, 31 children requiring KRT and 3 children with advanced chronic kidney disease due to congenital nephrotic syndrome, atypical hemolytic uremic syndrome (aHUS), and nail-patella syndrome, accompanied by 40 of their family members, crossed the Polish border. Among them, 12 were on PD, 10 on HD, and 9 were kidney transplant recipients. The 31 patients requiring KRT were immediately allocated to Polish pediatric nephrology centers (Warsaw, Krakow, Lublin, Gdansk, Wrocław, Białystok, Poznan, Szczecin), and the 3 patients with advanced chronic kidney disease were transferred to Germany for further treatment (Marburg, Cologne and Hamburg). At the start of the war, KRT was offered to children who required evacuation at 2 major Ukrainian centers: in Lviv close to the western border and in centrally located Kyiv. This increased the centers' workload immensely: in Lviv the number of children on HD increased suddenly from 8 to 22 and those on PD from 13 to 33. This created an abrupt significant increase in the work burden for the medical staff and a challenge for existing facilities, problems that were different from those described in the Syrian crisis of 2015–2017. In the Syrian crisis, data on the pediatric refugee population requiring KRT in German centers identified 69 successive patients over a 3-year period [2]. The challenges of

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the Ukrainian crisis were associated with the requirement of a prompt transfer and immediate continuation of KRT therapy for 31 children over a very short 3-month period. The outcome of the children on KRT who remained in Ukraine is not documented to date.

Initial organization of transfer of children on KRT during the Ukrainian crisis

The cost of KRT was covered by the Polish government, following an administrative decision which categorized all Ukrainian citizens crossing the border after 24 February as war refugees enabling them to receive the same health care as Polish citizens.

At the same time, the Polish Society for Pediatric Nephrology (PSPN) issued a declaration that pediatric nephrologists would offer free treatment including dialysis and transplantation to all Ukrainian children with kidney disease, who needed to leave their country due to the war. Simultaneously, the ESPN organized a task force to address the needs of children with severe kidney disease in Ukraine and those who were seeking assistance in the EU as refugees. The statements of the organizations were published on 1 March 2022 on the web sites of ESPN and the PSPN in English, Polish, and Ukrainian [3, 4]. Nevertheless, major challenges remained in the prompt identification of patients and timely provision of further KRT to this vulnerable group of children (see Table 1).

Challenges

The European Society of Emergency Medicine has recognized that children with complex medical needs who are from war zones are at high risk of severe complications and their access to healthcare should be prioritized [5]. Patients on KRT are prone to the fatal consequences of the sudden interruption of their life-saving treatment during a severe crisis due to multiple factors which include infrastructure damage, water, and electricity supply interruptions, dialysis unit closures, unavailability of disposables due to transport problems, lack of trained dialysis staff, and lack of transportation to reach a dialysis center [6]. The encountered dangers drive parents or caregivers of children on KRT to escape from their own country in search of access to professional healthcare abroad. In accordance with the above recognized risks, national efforts were undertaken to coordinate the spontaneous offers of assistance from many specialists from national and European societies and individual volunteers, ready to help Ukrainian children who required complex medical service. At the beginning of the second week of the war, a task force to aid sick Ukrainian children was organized by the Healthcare Council of the President of the Republic of Poland. During its first meeting, it was agreed with Ukrainian partners that the West Ukrainian Specialized Children's Medical Center in Lviv located near the Polish border would become the humanitarian hub for all sick children, who would require further treatment abroad. The majority of children requiring urgent transfer were oncology patients and those on KRT. The further transport

Table 1 Actions undertaken in the organization of cross-border transfer of children on KRT in the Ukrainian war crisis

DATE	ACTION
24 February 2022	Invasion of Ukraine by Russia
27 February 2022	First contact and offer of help to West Ukrainian Specialized Medical Center for Children in Lviv, a pediatric dialysis center
1 March 2022	PSPN offers treatment to Ukrainian children with kidney diseases who are escaping the war in Ukraine. The statement is published on the websites of ESPN and PSPN
3 March 2022	First meeting of Polish Task Force to help sick Ukrainian children. West Ukrainian Specialized Medical Center for Children in Lviv is established as a humanitarian hub for all sick children who need to be transferred abroad for further treatment
3–5 March 2022	First children with families reach Polish nephrology centers with the initial massive wave of war refugees
6 March 2022	Transfer of 15 children on KRT from Kyiv to Lviv by train after heavy rocket attack on Kyiv hospital
8 March 2022	First organized transfer of children on KRT from Lviv to pediatric dialysis centers in Warsaw and Krakow
16 March 2022	Second organized transfer of children on KRT from Lviv to Lublin, Warsaw, Bialystok and Gdansk
19 March 2022	Third organized transfer of children on KRT from Lviv to Warsaw and Lodz
24 March 2022	Fourth organized transfer of children on KRT from Lviv to Wroclaw and Marburg (Germany)
4 April 2022	Fifth organized transfer of children on KRT from Lviv to Wroclaw and Cologne (Germany)
6 April 2022	Individual transfer of child with congenital nephrotic syndrome from Lviv to Warsaw
29 April 2022	Transfer of child after kidney Tx complications from Lviv by military aircraft to Warsaw
4 May 2022	Sixth organized transfer of children on KRT from Lviv to Lublin
28 June 2022	Individual transfer of a child for combined liver and kidney transplantation from Lviv by military aircraft to Hamburg (Germany)

and treatment of the latter group was coordinated by Polish pediatric oncologists together with the St. Jude Global Foundation from the USA. A Nephrology Coordinator was appointed on the Polish side in Gdansk, whose role was to coordinate the flow of information, organization of transfer and centralization of updated information in order to avoid dispersion of forces, and to enable personalized medical transport facilities and pre-scheduled treatment for children crossing the Polish border.

Dissemination of information to patients and health care providers in Ukraine

One of the early major challenges was the dissemination of information to the patients and their families regarding the possibility of obtaining KRT for refugee children escaping Ukraine. Recognizing the immediate need for action, the Boards of PSPN and ESPN directed their efforts to reach partners on the Ukrainian side for cooperation. Centers in Kiev and Lviv, previously recognized as centers providing KRT for children, were contacted and offered any necessary aid. This included the proposal of evacuating children on KRT to continue treatment in Poland. A list of the 12 Polish centers providing KRT for children was provided, with all relevant information including the name of the institution, exact address, phone numbers, emails, and names of the physicians on duty. This announcement was presented in English, Polish, and Ukrainian on the ESPN and PSPN websites. Personal contacts with physicians, who underwent medical training in Polish centers in the past, were used to provide relevant information to individual Ukrainian patients about the humanitarian hub in Lviv and the possibility of receiving medical care abroad with no personal financial costs. Patients who had already reached Poland were also asked to contact the other families of sick children to further disseminate the information on possible availability of aid. Different forms of communication were used including direct telephone contact, emails, or internet chatting among patient groups. The provider of PD equipment in Ukraine was asked to assist in defining the current localization of children requiring PD fluids at home. The information about Polish centers for children on KRT was provided at the medical points localized at the Polish-Ukrainian border.

Reaching the vulnerable population among the massive wave of refugees

During the first week of the war a huge number of people reached the Polish border, which resulted in long lines waiting to cross the frontier. Among them were pediatric patients on dialysis or after kidney transplantation, who were difficult to identify and pick up as vulnerable patients. The position of an official Coordinator was extremely helpful

in providing a facilitated fast border crossing for identified children through official contact with personnel in charge at the border passes. Dedicated medical ambulances and regular cars driven by volunteers were organized for the patients and their families at the border, which enabled immediate transfer to the pre-selected and alerted Polish nephrological centers. Of paramount importance in the initial days and weeks of the war was the huge number of volunteers who spontaneously participated in the transport and direct care of children in need [7]. From the beginning of March 2022 regular organized transport from Lviv hospital to the border was established.

Evaluation of resources and allocation of children to pediatric nephrology centers

From the onset of the refugee crisis, the Polish Society for Pediatric Nephrology was aware of the possible increase of patients who might require specialized nephrological services and the associated risks of such a situation. A short survey was performed among the existing 12 Polish pediatric nephrology centers in order to evaluate their capacity, especially for the provision of KRT. Each center was asked to estimate the number of patients they could possibly accept for in-center hemodialysis, ambulatory peritoneal dialysis, and availability of PD cyclers along with their experience in post-transplant care. The data on center capacity was quickly established, enabling the Coordinator to distribute patients in an optimal way. It was also important to maintain regular KRT services for the existing Polish patients, to avoid any conflict of interests that might emerge.

Establishing regular contact for safe, prepared transfer of children on KRT and their families

Having established contact with the pediatric nephrology colleagues from the humanitarian hub in Lviv, regular weekly online meetings were held to discuss the number of potential patients requiring transition. Issues which were discussed included the form of transport to the border of individual patients and their families and their further connecting transport from the border to the pre-defined center (by car, ambulance, or medical air transportation). This depended on the condition of the child and the assessed duration of transport, with the patient's safety always being the priority. The distances between Lviv and the different nephrology centers in Poland varied from 200 km — 3 h (Lublin) to 750 km — 9 h (Gdansk). This regular weekly contact was crucial to enable a safe and well-prepared organization of the transfer. During the first 2 months of the war, due to the large number of patients requiring transfer, 8 successive weekly contact sessions were organized. Further sessions were organized when necessary.

Overcoming language barriers at host centers

Proper communication is crucial for providing accurate medical service. It is well-recognized that language barriers result in longer hospital stay and unnecessary medical procedures [8]. Ukrainian medical documentation was immediately translated into Polish by volunteer Ukrainian medical students and Ukrainian medical doctors studying or working in Poland before the onset of the war or those who arrived as refugees. Lists of available semi-professional translators were available in each center, so that they could be reached rapidly for each new patient.

Supporting the socioeconomic needs of patients and families

Patients on KRT and their family members usually reached their hosting hospitals directly from the border with minimal belongings. This created an additional challenge to cover their non-medical needs. For the first weeks following transition they remained in hospitals and numerous NGO and charity foundations were involved in delivery of food, clothes, and other necessities for them. When ready to be discharged from the hospital, dedicated housing was prepared with adequate conditions to enable home PD or regular transport to a nearby pediatric HD center as outpatients. Avoidance of overcrowded living places by children on immunosuppressive therapy was also recognized as an important issue. Most children on PD left Ukraine without their PD cyclers or were on manual therapy, and this created an immediate need to provide new cyclers and technical education in their use. This problem was solved by adequate financial donations and by dedicated medical personnel.

Transplantation-related issues

There were 9 kidney transplant recipients among Ukrainian refugees, including patients with maintained graft function and patients who lost the graft due to interruption in immunosuppression and/or other unsolved medical problems. All children were preliminarily evaluated in the pediatric transplant center in Warsaw, and relevant cases were immediately hospitalized, while children who were stable remained under regular post-transplant care as outpatients. All required medication (including immunosuppression) was provided and refunded. According to official regulations, all relevant Ukrainian patients (who came to Poland) on dialysis or with an eGFR < 15 mL/min/1.73 m² were placed on the national Polish transplant waiting list. Additionally, candidates for kidney transplantation, still living in Ukraine, have been identified by personal contacts with Ukrainian physicians and further planning in terms of their transplantation in Poland has been established.

Conclusions

Children on KRT are an extremely vulnerable group among war refugees and their complex medical needs require prioritization from the onset of the process of humanitarian evacuation with prompt access to identified medical centers ready to accept them in other countries.

The process of safe and timely transfer of children on KRT from a war zone requires an enormous organizational effort of local medical and paramedical personnel from both the country involved and the hosting countries at regional and national levels as well as that of charity organizations and individual volunteers. A collaborating network of pediatric nephrologists working through national and regional organizations such as the ESPN is of paramount importance in coordinating such a complex effort which can be successful even in the relatively short timeframe that is created by an unpredicted refugee crisis.

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