

Maintaining kidney replacement therapy during armed conflicts

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'When the rich wage war it's the poor who die' (Jean-Paul Sartre)

The world should be heaving a collective sigh of relief that the COVID-19 pandemic is over, but there has been no respite. A recent consensus statement from the Renal Disaster Relief Task Force of European Renal Association (ERA) highlighted that despite calls from the United Nations for a global ceasefire, in 2020 the number of active conflicts reached a record high since World War II [1]. Hot on the heels of the pandemic came the Russian invasion of Ukraine, the civil war in Sudan, the conflict between Israel and Hamas. Many other conflicts are broiling worldwide, but given less air time [2]. The conflict in Syria is now 12 years old and has become chronic [2]. The war in Yemen has been ongoing for 9 years, the war in Tigray (Ethiopia) continued for 2 years, the war in the Democratic Republic of Congo has persisted for decades, and elsewhere, conflicts of varying magnitudes are ongoing in many countries [2]. By September 2023, over 114 million people had been displaced by conflict and violence worldwide [3].

Every armed conflict has long-term public-health consequences in terms of physical, mental, social and environmental health. Everyone living in a conflict zone carries their share of tragedy—loved ones are lost, people become homeless overnight and face life-threatening, disabling wounds—leaving life-long physical and psychological scars. In the midst of armed conflicts, societal structures and norms often disintegrate, leaving countless people, particularly those living in poverty, women, children and the elderly, who are exposed to heightened risk. Inequities that exist within populations in times of peace become exacerbated in times of war. For those living with chronic illness, disruptions of health services, challenges imposed by displacement and breakdown of essential infrastructure further compound these vulnerabilities. Governments, and international and non-governmental organizations (NGOs) are often overwhelmed supporting the general population, providing shelter, food and sanitation, therefore the special needs of some groups may not be immediately prioritized. Among the most acutely vulnerable in times of war are people who require kidney replacement treatment (KRT) [2, 4–6]. Here we reflect on challenges and observations experienced in trying to support people living with kidney disease and those taking care of them in recent wars/armed conflicts.

EXPERIENCES IN RECENT CONFLICTS

Three ongoing major armed conflicts, the Russia–Ukraine war, civil war in Sudan and the Israel–Hamas conflict, are once again highlighting how vulnerable people requiring KRT become in times of man-made disasters. The respective patient numbers, and the major challenges and needs in these three conflicts are summarized in Table 1.

In all three crises, hemodialysis care was disrupted from the start and patients had to flee to safer zones, although this is not always possible. In each conflict, doctors and nurses continue to serve their patients, often at great personal risk. Host units were overwhelmed, supplies became critical, and power and water supplies were interrupted, therefore hemodialysis sessions were reduced to once or twice a week and sometimes shortened to 2 hours [9]. Major medications including those for dialysis and immunosuppressants for patients living with kidney transplants rapidly became scarce and treatment regimens had to be adapted. All patients therefore face major uncertainty and risk. The global response to the three crises has, however, been different.

In Ukraine, soon after the invasion, the European Union (EU) Protection Act was activated. The nephrology community demonstrated great solidarity and around 600 displaced patients were hosted and treated at EU expense, with some even receiving kidney transplants within a short time [5]. Around 400 patients were treated in Russia. The majority of patients, however, chose to remain in Ukraine (Table 1), and support was rallied relatively rapidly through the World Health Organization (WHO), dialysis companies and Direct Relief* (Direct Relief is a humanitarian aid organization) in collaboration with the local nephrologists and ministry of health, to ensure continuity of dialysis supplies and medication. Dialysis staff also fled to safer zones and assisted with managing the increased patient numbers in these areas. A number of patients were converted from hemodialysis to peritoneal dialysis (PD) and vice versa for logistical reasons. Generators maintained electricity supplies in in-centre hemodialysis units, and batteries were procured for patients receiving automated PD [10]. The war continues and the nephrology community in Ukraine has persevered to maintain and even improve on pre-war care delivery.

Table 1: Impact of three ongoing major conflicts on people requiring kidney replacement therapy.

	Ukraine	Sudan	Israel–Hamas (Gaza)
Date war began	February 2022	April 2023	October 2023
Pre-war dialysis funding	State	State	Donors
Patients on HD	8717	8000	1000
Patients on PD	913	120	0
Patients with transplants	1533	4500	500
Cost ESKD care pre-war (USD)	Total: 107 443 382 per year (2018) ^a	2000 000/month ^b	16 000/patient/year ^c
Crush injury	Unknown	Unknown	Unknown, many
MOH involved	Yes	Yes	Yes
Support for supplies	Rapid procurements, global donations	Slow donations, slow procurements	Rapid donations, procurements initiated immediately
Displacement within country	East to West	Out of Khartoum	North to South
Potential evacuations	Europe, EU Protection Act	Egypt, visa challenges, expensive	Egypt, movement restricted
Evacuated patients	602 to EU, >400 to Russia	Unknown	None
Dialysis modality switch	HD → PD, PD → HD	PD → HD where possible (few)	PD not possible
Electricity	Batteries procured for patients on APD	Interruptions, fuel very expensive	Some solar power, critical fuel shortage
Water	Some interruptions	Some interruptions	Critical shortage
Transplant challenges	Shortages of tacrolimus, mycophenolate early on Monitoring of drug levels New transplants proceeded	Donations of cyclosporine, tacrolimus Months with no antimetabolites No drug monitoring Patients on higher doses of steroids for months	Shortages of tacrolimus, mycophenolate
Ongoing challenges	Chronically tenuously stabilized	Immunosuppression, sustainable funding, dialysis supplies, machine maintenance Water system maintenance Electricity Fuel Unable to obtain PD supplies (small donation of leftover solutions pledged)	Procurement of supplies Delivery of supplies Dialysis cannot continue without fuel/electricity Peritoneal dialysis not possible—no experience

^aKolesnyk et al. [7].^bpersonal communication.^cYounis et al. [8].

HD, hemodialysis; ESKD, end-stage kidney disease; MOH, ministry of health.

Sudan was one of the few countries in Africa where KRT has been provided under universal coverage for several decades (Table 1) [11]. From the start of the civil war, dialysis services, mostly located in Khartoum, were severely damaged or inaccessible. Patients with enough personal resources moved to dialysis units in other cities, which rapidly became overwhelmed. Dialysis staff continued to work without being paid, despite themselves being under great personal stress. Egypt offered to accept patients needing dialysis, but visas, cost and risks associated with the journey were prohibitive for most patients. One dialysis company donated hemodialysis supplies sufficient for a third of the patients for 3 weeks, other donations were incomplete and therefore not usable until further procurements followed. Hundreds of tragic deaths have been reported due to repeated weeks of unavailability of dialysis supplies [12]. PD supplies have been almost impossible to obtain. The WHO and Direct Relief continue to provide support with procurements and donations but the process is slow. For patients with kidney transplants, anti-metabolite medication has been unavailable for many months [11].

The Israel–Hamas conflict has again severely impacted patients on KRT. Patients living close to the conflict zones within Israel were immediately relocated to other facilities. Medical services in

Gaza have been severely disrupted and supplies of food, electricity, water and fuel to the area are restricted. Functional hospitals are overwhelmed with victims rescued from under the rubble arriving with major trauma, including many cases of acute kidney injury due to crush syndrome. Most patients on dialysis in the North of Gaza were forced to move south [13]. Hospitals previously providing dialysis have had to double or triple their sessions. Fuel supplies are critical. Medical staff continue to work despite the significant risk of bombardment, with many having experienced personal tragedy. Procurement processes and donations for dialysis supplies and transplant medication began immediately, with the support of WHO, Egyptian Red Crescent and Direct Relief, however delivery of supplies into Gaza remains a major challenge.

REFLECTIONS ON WAR AND SUPPORT FOR KIDNEY CARE

Wars/armed conflicts differ from other natural disasters given the protracted duration and continued deterioration of circumstances [2]. Sustaining (quality) care for patients requiring KRT, be it dialysis or kidney transplantation, becomes extremely challenging given the necessity for large volumes of supplies,

the huge costs and the urgency (Table 1). Partnership with governments, global organizations and NGOs experienced in procuring and delivering humanitarian aid to the war/armed conflict zones has been essential to support relief efforts. If at all possible, patients requiring KRT should be prioritized for medical evacuation to safer places where they can receive care. Patients may, however, not always want to be displaced due to multiple reasons, as was observed in Ukraine. In other cases, as in Gaza, evacuation is not yet an option, or as in Sudan evacuation is too costly and too risky for most.

Hemodialysis requires an uninterrupted supply of electricity/fuel, water, supplies, medical and nursing staff. Innovation in KRT becomes very crucial during disasters [4]. Availability of alternative energy sources like solar energy can save lives, further supporting the push towards greener nephrology globally. Dialysis supplies are expensive, bulky and costly to transport and therefore require enormous financial resources and long lead times for procurement and distribution. Planning ahead is critical to avoid gaps without dialysis supplies, which rapidly become deadly. Immunosuppressive medication is expensive and large quantities are required to ensure continued access to treatment for people with functioning transplants. Patients should be well informed of potential medication adjustments in the event of shortages, but the goal must be to continue stable regimens [1]. Clinical monitoring may be extremely challenging. No tangible support can be achieved without financing. Maintaining supplies and medications through donations is not sustainable. Development of a global dialysis relief fund to coordinate and plan potential donations and negotiate emergency supply pricing would reduce dangerous delays in procurement of supplies.

Many questions arise as to the obligations and responsibilities of the broader kidney community to support patients during conflicts. As observed recently, the world responds differently to conflicts in different places (Table 1). The world rallied, rightly, around Ukraine, and Ukraine, having been a relatively robust country before the war, has proven resilient in many ways. Existing logistics, the ability to maintain outside communication, pre-existing networks, proximity to countries with the capacity to help, and pre-existing procurement networks and registries permitted rapid assessment and communication of needs and rapid assistance. Dialysis companies were highly engaged and continued to maintain supplies even early in the war. Despite the fact that there are a similar or even higher number of patients living with KRT in Sudan, and that KRT was being provided under universal health coverage, it proved much harder to rally support for these patients (Table 1). Most dialysis companies are reluctant to engage and donate, procurement prices were maintained at least at peace time levels, and the logistics of transportation of dialysis supplies are extremely challenging and expensive. Very poor internet reduces the possibility of understanding real-time needs and the tenuous baseline financing and health system functioning precludes significant resilience. The world is now watching the plight of the civilians who cannot leave Gaza, and despite willingness to help and donations being offered, the logistics and safety of delivery of dialysis supplies are proving very challenging, also because of the lack of fuel to run machines. Chronic dialysis patients in other chronic war zones in Africa, including the Democratic Republic of Congo and the Tigray region in Ethiopia, have been left to die because these regions have not received external support to continue dialysis services [2]. Although PD done at home may seem logical in a conflict, many challenges exist which include procurement and transport of supplies, infection risks and the need for

skilled healthcare personnel and specialized resources if patients are switched from hemodialysis to PD.

As a kidney community we should develop a common understanding of our obligations and responsibilities towards patients and colleagues affected by wars. Physical deployment is often not safe for outsiders, but financial donations, telehealth or telephone support, and coordinating and advocating for the necessary support may be of great help. Not forgetting to continue to advocate once conflicts become chronic and leave the front pages is important as well. Preparedness during peacetime is key to mitigate the effects of any disaster, including armed conflicts. Special consideration should be given to developing local renal disaster relief coordination structures, educating patients, healthcare workers and communities, and to anticipate logistical requirements for dialysis and include potential palliative care needs [1]. Protracted armed conflicts place strain on remaining dialysis infrastructure, which must often cope with additional refugee patients. The ethical principles that apply to humanitarian interventions should guide all aid and support activities, including dialysis. Relevant principles include respecting the right to health, non-discrimination (e.g. of refugees, women etc.), protection for the wounded and sick, and protection of healthcare workers and health facilities, including dialysis units and medical storage facilities [14].

The responsibilities and obligations of industry must be considered. They may become gatekeepers of life and death in conflicts and disasters given that they are often in a more powerful position to provide tangible support than kidney health professionals/societies. How much can or should be expected in terms of donations, price adjustments and logistical support requires transparent discussion. Compromises should be sought between achieving common humanitarian goals and ensuring fair remuneration through emergency funds. Assistance with transportation and logistics can be achieved through specialist NGOs.

The responsibilities and obligations of professional kidney societies also requires thought. Many expect these organizations to step up and issue statements and calls for action during conflicts, but their desire to be impartial may at times preclude such overt actions. Their support extends through their members and facilitation of networks, given they have no funds to procure supplies. Other international organizations and NGOs have many priorities in addition to considering the needs of people requiring KRT, therefore the international and regional kidney organizations can provide important input, guidance and coordination of information, to ensure that the needs of patients requiring KRT are visible, clearly communicated and can be supported through these organizations.

As kidney care professionals we acutely understand the vulnerability of patients living in regions where war/armed conflicts occur. The same urgency is felt by other stakeholders, such as professional medical societies, and individual representatives of dialysis and pharmaceutical companies. We need to work collectively as a kidney community to engage with all relevant stakeholders, acknowledge disparities in humanitarian responses—in terms of overlooking the needs of people requiring KRT and between conflict situations—and work towards improving preparedness and improving equity, to translate needs and obligations into action. Man-made disasters, especially wars and armed conflict, should be preventable. By highlighting the vulnerability of people struggling to survive on dialysis or with kidney transplants in conflicts, we add our voices to calls for peace and respect for every human life.

CONFLICT OF INTEREST STATEMENT

None declared.

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