min (10). All in all, the expanding use of PICCs is associated with vascular injury and subsequent venous thrombosis and stenosis. Moreover, even with the current guidelines from different societies, there is a tendency to choose the PICC mostly for convenience and for a short dwelling time. In view of this reality, we are far from winning the battle for preserving the patient’s venous real estate. To overcome the PICC tide, more coordinated collaborative efforts are required among different disciplines and specialties, mainly interventionists, nephrologists, hospitalists, and oncologists. In addition, PICCs should be inserted for valid indications, not out of convenience. Finally, more efforts by the stakeholders, mainly nephrologists, at the grassroots level are needed. One such effort is to advocate the use of small-bore (4-Fr or 5-Fr) catheters rather than the current (6-Fr) central venous catheters as good alternatives to the current use of PICCs in patients with advanced CKD.

Ammar Almeehni, MD, is with the department of medicine and radiology and Shan E. Almeehni, BS, MA, is with the department of biology, University of Alabama at Birmingham.

References

Fellows Corner

Impact of a Hurricane on Dialysis Patients: A Case Study

By A. Oussama Rifai and Harini Bejjanki

Hurricane Michael made landfall as an unprecedented category 5 hurricane in the Florida Panhandle, with maximum wind speeds of 155 mph at 1 p.m. on October 10, 2018. Along the Florida panhandle, the cities of Mexico Beach and Panama City suffered the worst of Michael, with catastrophic damage reported (1).

According to US Renal Data System 2015 data, a total of 468,000 patients were receiving dialysis in the United States (2). Of those patients, 26,382 were in Florida, and about 350 patients were in Bay County. Dialysis patients are a very vulnerable group, and it is necessary to plan how to care for them in special circumstances, such as anticipated natural disasters. Hurricane Michael gave 5 days of warning.

Hurricane Michael brought with it a significant decline in quality of life; loss of infrastructure, including electricity, phones, and the internet; evacuation of medical personnel; a severe shortage of medicines; unavailability of pharmacies; lack of essential supplies; and an increased risk of infectious diseases and mortality in the Panama City area for weeks after it landed. All hospitals in Bay County were severely damaged and were no longer able to provide inpatient care. The only functioning facility was an emergency depart- ment, which transferred all patients who needed admission. Inpatient dialysis services were suspended as well. Accumulated figures are lacking, and most of the information in this article is based on observations by the authors—Dr. Oussama Rifai, MD, a practicing nephrologist in the Panama City area, and Dr. Harini Bejjanki, MD, a renal fellow at the University of Florida, Gainesville—who were involved in the care of dialysis patients from Panama City admitted to the University of Florida, Gainesville. Our dis- tinct observations revealed that the care of dialysis patients was severely compromised because of a lack of access to out- patient dialysis units, electricity outages, lack of medications and equipment, destruction of healthcare infrastructure, and shortage of medical care providers, including dialysis techni- cians, patient care technicians, and dialysis nurses.

Lessons learned after Hurricane Michael: how did we handle it and what can we do better?

Predisaster emotional dialysis
There are five dialysis centers in the Panama City area, serving 350 patients. Hurricane Michael made landfall on a Wednesday. Knowledge of this information ahead of time led to “emotional dialysis,” whereby we provided 2-hour or 3-hour dialysis sessions to all the patients on Tuesday, a day before landfall. In retrospect, we propose that dialysis not be provided to everyone for the best use of resources. We sug- gest making phone calls to all dialysis patients to find out who will evacuate, using resources for those who stay back, and providing them 4 hours of dialysis instead of 2 hours, in anticipation of missed dialysis sessions during the hurricane after the landfall. We also suggest administering dialysis only to patients who plan to evacuate and describe symptoms of volume overload, and providing information on where pa- tients may go for future dialysis sessions depending on the location to which they are evacuating.

Hemodialysis companies and the need for disaster relief teams
Day T-1 should be the day when the dialysis centers pro- vide dialysis for all patients who have decided to stay and not evacuate, a full treatment being given by both the Mon- day-Wednesday-Friday and the Tuesday-Thursday-Saturday shifts.

The team of nurses and technicians providing this dialysis should consist of seasoned patient care tech- nicians, nurses, and volunteers brought in from outside the projected affected area. They arrive on day T-2 to a staging safe area, then get a bus and work all of day T-1, possibly in two 16-hour shifts, and depart before the hurricane makes landfall, when it is still safe to leave. This allows the local team members to attend to their personal lives if they decide to stay and places them in a better position to emerge and care for patients during the days after day T-1 onward. Our staff in Bay County and the surrounding counties did not have time to care for their families, homes, and personal lives before the hurricane. The disaster team members will have more energy by working in teams of two (disaster shifts) during these situations, providing efficient services.

Large dialysis organizations should send disaster response
teams for assessment and rebuilding. The teams should be on standby to ensure continuity of service for this vulnerable group of patients. Fresenius mentions on its website that it routinely conducts mock disaster training sessions to make sure teams know their roles and responsibilities so that disaster operations will run as smoothly as possible.

A contingency plan
During times of disaster, people, communities, and organizations often come together. It is important to have a contingency plan with other dialysis units in the surrounding areas and to have patients receive dialysis at these surrounding facilities. Although dialysis units must have emergency generators and water tanks, we had some unpredictable challenges. A contingency plan to provide patients access to surrounding hemodialysis centers should have been prepared because most units were nonfunctional after Hurricane Michael, owing to destruction of the infrastructure and lack of utilities. Four hours away in Gainesville, at the University of Florida, patients presented to the emergency department with shortness of breath, volume overload, and life-threatening hyperkalemia requiring urgent dialysis. The other problem we noticed was an increase in the length of stay because three patients could not be discharged to their skilled nursing facilities. A successful contingency plan was implemented in Puerto Rico after Hurricane Maria because of previously established agreements with surrounding hospitals; consequently, the entire team, including nurses and nephrologists, were able to move to the new location, which made the transition easier (3). At least four of our dialysis patients died during the hurricane because of their inability to communicate and reach a hospital.

Providing an emergency hurricane packet
Hurricane packets should be available at the dialysis facility to be provided to patients. Each patient’s hurricane packet should at the minimum include the dialysis prescription, laboratory results from the prior months, a prescription for monthly dialysis laboratory tests, hepatitis B status, any other needs for isolation, results of a recent history and physical examination, prescription for medications, and names, locations, and phone numbers of backup dialysis units and hospitals in the area and surrounding area. Many people in Panama City had catastrophic damage. While they were swimming in their own homes trying to get out, looking for the hurricane package would have been the last thing on their mind. Hence, there should be an online repository with each patient’s pertinent information that can be easily accessed by patients or family members and by receiving dialysis facilities.

Hyperkalemia
Availability of a point-of-care or iSTAT portable clinical analyzer in the dialysis clinic is essential and could be lifesaving. In our case, all local hospitals were damaged, and there were no inpatient dialysis services. Outpatient laboratory services were shut down as well. The long lines in the emergency departments made checking potassium levels a major undertaking (4). Formal data are lacking, but according to our observations, the increased days after, more compilation than usual and different techniques with pressures on the access to expedite dialysis for the next patients might have contributed to this anecdotally observed phenomenon.

Increased mortality
This observation was also reported in local newspapers after the hurricane-michaels-panhandle-victims-photos. Most of our peritoneal dialysis patients evacuated with 1 month’s worth of supplies. We recommend including in the emergency medication pack a 5-day supply of the antibiotic for peritonitis in line with recommendations in the National Kidney Foundation’s disaster brochure (4). If a disaster occurs, it may be difficult to maintain a clean environment, and the risk of peritonitis may be higher. Almost all the peritoneal dialysis patients evacuated. By default, peritoneal dialysis is a modality of freedom, so patients can easily evacuate and can take the cyclor with them or do manual exchanges.

Clotted access
It was observed that dialysis accesses had more frequent clotting. Formal data are lacking, but according to our observations of emotional dialysis for 2 hours the day before and the ensuing days after, more compilation than usual and different techniques with pressures on the access to expedite dialysis for the next patients might have contributed to this anecdotally observed phenomenon.

Postdisaster dialysis
Day T+1 should be the day to dialyze patients and provide full treatments, if possible. Transportation, gasoline, roadblocks, and curfews lead to difficulty in reaching the dialysis centers, so 2-hour “emotional dialysis” should be avoided if possible. This can be achieved by proper screening and continued dialogue with each patient. A patient accounts liaison person should update contact information and plans for each patient.

Encourage patients to have a 1-month supply of all medications and to have all prescriptions with at least a few months of refill instructions.

Emotional dialysis
We do not recommend 2-hour short runs, before and after a hurricane. Adequacy of twice-a-week dialysis with patient in between should be considered, especially for patients with residual kidney function. Telemedicine infrastructure should be available in the dialysis center for dialysis patients, with nephrology providers on the other side, along with another channel for clinical staff supported by seasoned nurses and technicians on the other side.

During the Syrian political and humanitarian crisis, “The standard of care regarding the frequency of dialysis was one per week and sometimes two but very rare to have a dialysis schedule of three times a week,” and this did not seem to result in adverse outcomes as of 2014 (6).

A. Oussama Rifai has been a practicing nephrologist for more than 20 years in the Panama City, Florida, area, and is affiliated with Hypertension Kidney & Dialysis Specialists. Harini Rajendrak, MD, FACN is an onconephrology fellow at the University of Pittsburgh Medical Center.

References

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**Recommendations for dialysis during hurricane season**

1. Screen every patient regarding evacuation plans and encourage them to maintain a 1-month supply of all medication prescriptions.
2. Have disaster relief team arrive on day T-1 to dialyze all patients staying behind for a complete treatment, to support the local staff.
3. Use a cloud-based repository for evacuation packages.
4. Use point-of-care or iSTAT devices for laboratory results, especially for potassium and patiromer availability in dialysis clinics.
5. After the hurricane, consider twice-a-week dialysis for a few weeks for patients with residual renal function (complete treatment) until normal conditions return. Use patiromer in between dialysis sessions to control hyperkalemia.
6. Establish collaboration protocols with nearby centers outside the danger zone with access centers and dialysis clinics.
7. Use social media for updates, and form groups with WhatsApp and Facebook.

**It is important to have a contingency plan with other dialysis units in the surrounding areas and to have patients receive dialysis at these surrounding facilities.**

**Hyperkalemia**
Providing an emergency hurricane packet

For K 5.5 to 6.0 mEq/L, patiromer 16.8 g daily
For K 5.0 to 5.5 mEq/L, patiromer 8.4 g daily
Patiromer should be available at the dialysis clinic before and to have patients receive dialysis at these surrounding facilities.

Low-sodium resin, which is a consideration especially when sodium is an additional risk with meals-ready-to-eat and when lack of regular dialysis is possible.

**Peritoneal dialysis**
This has not yet been a problem. Most of our peritoneal dialysis patients evacuated with 1 month’s worth of supplies. We recommend including in the emergency medication pack a 5-day supply of the antibiotic for peritonitis in line with recommendations in the National Kidney Foundation’s disaster brochure (4). If a disaster occurs, it may be difficult to maintain a clean environment, and the risk of peritonitis may be higher. Almost all the peritoneal dialysis patients evacuated. By default, peritoneal dialysis is a modality of freedom, so patients can easily evacuate and can take the cyclor with them or do manual exchanges.

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