

Renal Support for Acute Kidney Injury in the Developing World



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There is wide variation in the management of acute kidney injury (AKI) and the practice of renal replacement therapy (RRT) around the world. Clinicians in developing countries face additional challenges due to limited resources, reduced availability of trained staff and equipment, cultural and socioeconomic aspects, and administrative and governmental barriers. In this article, we report the consensus recommendations from the 18th Acute Dialysis Quality Initiative conference in Hyderabad, India. We provide the minimal requirements for provision of acute RRT in developing countries, including patient selection, choice of RRT modality and monitoring, transition, and termination of acute RRT. We also discuss areas of uncertainty and propose themes for future research. These recommendations can serve as a foundation for clinicians to implement renal support for AKI in low resource settings.

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KEYWORDS: acute kidney injury; CRRT; developing countries; dialysis; dose; IHD; modality; PD; renal support; resources; SLED

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Acute kidney injury (AKI) has been recognized as a major public health problem.^{1,2} The epidemiology, management, and prognosis of AKI vary considerably worldwide. Renal replacement therapy (RRT) is acutely applied to 20% to 25% of critically ill patients with AKI, but major variations in practice have been seen. In 2016, the Acute Disease Quality Initiative (ADQI) published consensus recommendations for the management of continuous renal replacement therapy (CRRT) to develop best clinical practice and standards of care.^{3–6} However, clinicians in developing countries face additional challenges due to limited resources, reduced availability of trained staff and equipment, cultural and socioeconomic aspects, and administrative and governmental barriers, all of which affect patient selection, choice of RRT modality, and management of RRT.^{7,8} Although some facilities for

RRT are available in most metropolitan cities in these regions, children usually receive hemodialysis or peritoneal dialysis in adult units, whereas input from a dedicated pediatric team involved in multidisciplinary care are limited. Guidelines and recommendations for acute RRT need to incorporate these particular aspects of the condition.

Methods

This consensus meeting followed the established ADQI process, as previously described.⁹ The broad objective of ADQI is to provide expert-based statements and interpretation of current knowledge for use by clinicians according to professional judgment, as well as identify evidence care gaps to establish research priorities. The 18th ADQI Consensus Conference focused on “Management of AKI in the Developing World,” convening a diverse panel for a 2-1/2 day meeting in Hyderabad, India from September 27 to 30, 2016. The consensus-building process was informed by pre-conference, conference, and postconference activities. Before the conference, the workgroup searched PubMed for English language articles on dialysis support for AKI. This search included the terms “acute

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kidney injury” and “acute renal failure,” combined with “renal replacement therapy,” “continuous venovenous hemodialysis,” “continuous venovenous haemofiltration,” “hemodialysis,” “peritoneal dialysis,” “sustained low efficiency dialysis,” “CRRT,” “PIRRT,” “SLED” and “extracorporeal therapy.”

A preconference series of emails that involved the work group members was used to identify the current state of knowledge and enable the formulation of key questions. At the in-person meeting, the work group developed consensus statements through a series of alternating breakout and plenary sessions. In each breakout session, the work group refined the key questions, identified the supporting evidence, and generated consensus statements. Work group members presented the results for feedback to all ADQI participants during the plenary sessions, and then revised the drafts based on the plenary comments until a final version was accepted. We developed recommendations and consensus of expert opinion with evidence, where possible, to distill the current literature. To address important unanswered questions, we articulated a research agenda.

Following the conference, this summary report was generated, revised, and approved by all members of the work group.

Q1: What Are the Minimal Infrastructure Requirements for RRT?

Consensus Statements

- 1.1. We recommend the availability of an essential core team of trained personnel, consisting of at least 1 physician and healthcare professional dedicated to managing the dialysis therapy. If intermittent hemodialysis (IHD), prolonged intermittent renal replacement therapy (PIRRT), sustained low efficiency dialysis (SLED), and/or CRRT are used, a technician for machine maintenance should be available.
- 1.2. We recommend the availability of peritoneal dialysis (PD) catheters and vascular access catheters for PD and hemodialysis (HD) techniques.
- 1.3. We recommend the availability of appropriate fluid bags and tubing in case of PD, and appropriate filters, circuits, and fluids in case of extracorporeal RRT.
- 1.4. We recommend that the essential core team and equipment be available at all times.
- 1.5. We recommend that units managing children who need acute RRT have the appropriate infrastructure, equipment, and trained personnel to provide appropriate standards of care.

Context

Barriers to providing RRT in developing countries or resource-limited regions can be due to regional impediments, RRT-related aspects, and patient-related factors (Table 1). Examples of regional barriers include environmental challenges, logistics, and inadequate administrative or policy support by the government or institution. Delivery of RRT can be hindered by decreased availability of equipment, lack of trained healthcare personnel, absence of a regulatory framework to ensure quality of dialysis, decreased availability of laboratory tests for monitoring of RRT, and financial costs.⁸ Inadequate technical support leads to poor equipment maintenance, frequent machine breakdowns, and interruptions or delay in treatment. Patient barriers to RRT include cultural beliefs and socioeconomic aspects that influence the decision to start RRT and the type of modality, including the ability to pay for such services. Important geographic factors are the availability of transportation and the distance patients would have to travel to receive RRT, because RRT is usually only obtainable in larger cities for those who can afford to pay.

For RRT to be safe and effective, a minimal infrastructure has to be in place. This can only be achieved with full local commitment, a viable financial model, and the availability of skilled staff and equipment.

Table 1. Barriers at several levels for receiving renal replacement therapy in developing countries

| | |
|----------------------------|--|
| Population | |
| Sociocultural: | Customs, health beliefs, accessibility and beliefs in other health systems |
| Policy and financial: | Lack of legislation to provide health care |
| Medical and scientific: | Lack of scientific data from the developing countries, scepticism to accept the scientific data derived from developed countries |
| Socioeconomic: | Lack of infrastructure, such as continuous provision of electricity, good quality water, and sanitation |
| Healthcare system | |
| | Lack of administrative support at the level of hospital, local, state, and national governments |
| | Lack of physicians trained to provide RRT |
| | Density of physicians and geographic distance from centers providing RRT |
| | Existence of several different health systems, especially indigenous systems |
| Healthcare provider | |
| | Lack of infrastructure to provide RRT |
| | Wide variation in the quality of care and infrastructure to provide RRT |
| | Lack of trained personnel to provide RRT at all times; limited training to manage RRT in children |
| | Lack of technical support to maintain and service the dialysis machines |
| | High cost of RRT |
| | Lack of laboratory facilities and high cost of laboratory tests |
| | Late referral of patients to centres providing RRT |
| Patients | |
| | Fear and anxiety of the patient and family regarding RRT |
| | Health insurance availability, access and coverage |
| | Financial constraints |

RRT, renal replacement therapy.

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