KI REPORTS
KIReports.org

Acute Kidney Injury Recognition in Low- and Middle-Income Countries

Jorge Cerdá[1], Sumit Mohan[2], Guillermo Garcia-Garcia[3], Vivekanand Jha[4], Srinivas Samavedam[5], Swarnalata Gowrishankar[6], Arvind Bagga[7], Rajasekara Chakravarthi[8] and Ravindra Mehta[9], on behalf of the Acute Disease Quality Initiative (ADQI) Consensus Group

[1]Department of Medicine, Division of Nephrology, Albany Medical College, Albany, New York, USA; [2]Department of Medicine, Columbia University College of Physicians and Surgeons, New York, New York, USA; [3]Nephrology Service, Hospital Civil de Guadalajara "Fray Antonio Alcalde," Hospital 278, Guadalajara, Mexico; [4]George Institute for Global Health India, New Delhi and University of Oxford, Oxford, UK; [5]Department of Critical Care, Virinchi Hospitals, Hyderabad, India; [6]Department of Histopathology, Apollo Hospitals, Jubilee Hills, Hyderabad, India; [7]Division of Nephrology, Department of Pediatrics, All India Institute of Medical Sciences, New Delhi, India; [8]STAR Kidney Center, STAR Hospitals, Hyderabad & Renown Clinical Services, Hyderabad, India; and [9]Division of Nephrology and Hypertension, Department of Medicine, University of California San Diego, San Diego, California, USA

Acute kidney injury (AKI) is increasingly common around the world. Because of the low availability of effective therapies and resource limitations, early preventive and therapeutic measures are essential to decrease morbidity, mortality, and cost. Timely recognition and diagnosis of AKI requires a heightened degree of suspicion in the appropriate clinical and environmental context. In low- and middle-income countries (LMICs), early detection is impaired by limited resources and low awareness. In this article, we report the consensus recommendations of the 18th Acute Dialysis Quality Initiative meeting in Hyderabad, India, on how to improve recognition of AKI. We expect these recommendations will lead to an earlier and more accurate diagnosis of AKI, and improved research to promote a better understanding of the epidemiology, etiology, and histopathology of AKI in LMICs.

Kidney Int Rep (2017) **2,** 530–543; http://dx.doi.org/10.1016/j.ekir.2017.04.009
KEYWORDS: acute kidney injury; biomarkers; detection; developing countries; diagnosis; recognition; resources

The incidence of acute kidney injury (AKI) is increasing around the world.[1–4] The ongoing search for supporting procedures and interventions has produced improved guidelines and recommendations.[5,6] Demonstration of increasing AKI incidence has led to an emphasis on prevention or early intervention,[5] but unfortunately, analytical methods that predict AKI, or preventive and therapeutic approaches to accelerate recovery or prevent progression to chronic kidney disease (CKD), are only beginning to be understood.[7–9]

Early recognition of AKI is essential to ensure prompt and appropriate management, and to avoid progression to deadlier stages of the disease[10,11] (Figure 1). In the appropriate context, early detection requires a high degree of suspicion that AKI is occurring. Diagnosis requires a combination of a clinical history, a thorough physical examination, an accurate assessment of kidney function, appropriate imaging, and when indicated, a kidney biopsy.

In low- and middle-income countries (LMICs), early detection is impaired by limited resources and poor understanding of the condition.[1,2,9,12–15] Such limited understanding—to a large extent determined by inadequate reporting and education—limits awareness and early recognition, and delays the implementation of measures that permit early and adequate management.[16]

To address this goal, the steering committee of the 18th Acute Dialysis Quality Initiative (ADQI) conference dedicated a work group with the task to identify what elements affect the recognition of AKI within the limited resource constraints prevalent in LMICs. Using a modified Delphi process, this group reached consensus regarding strategies to recognize and diagnose AKI focusing on low resource countries. The group addressed the following 3 questions that served as the basis for accompanying consensus statements:

Correspondence: Jorge Cerdá, MD, MS, FACP, FASN, Division of Nephrology, Department of Medicine, Albany Medical College, Albany, NY 12209. E-mail: cerda@nycap.rr.com and cerdaj@mail.amc.edu

Received 28 February 2017; revised 17 April 2017; accepted 19 April 2017; published online 25 April 2017

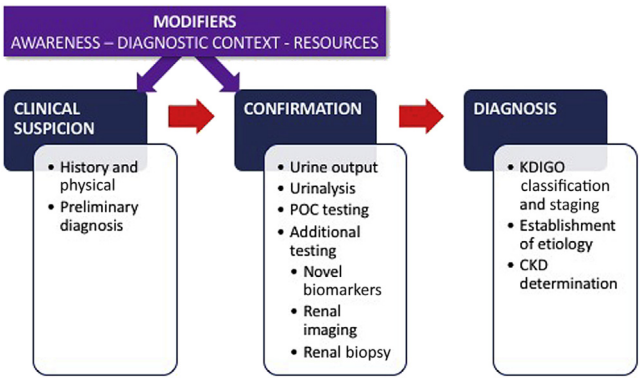

Figure 1. Acute kidney injury (AKI) recognition: the process and its modifiers. In addition to the usual AKI trajectory from clinical suspicion to confirmation to diagnosis, other factors modify the process. The degree of AKI awareness, the context in which the patient is encountered, and the available diagnostic resources may facilitate, delay, or impede the achievement of early AKI diagnosis. CKD, chronic kidney disease; KDIGO, Kidney Disease: Improving Global Outcomes; POC, point of care.

1. When should AKI be suspected?
2. What tests are needed when AKI is suspected?
3. How do we confirm the diagnosis of AKI in patients with an initially elevated serum creatinine (Scr) level?

Methods

The ADQI process has been described previously.[17,18] Complete ADQI methodology description is available at www.adqi.org and in the editorial accompanying the ADQI 18 conference papers.[19] The broad objective of ADQI is to provide expert-based statements and interpretation of current knowledge for use by clinicians according to professional judgment, and to identify clinical research priorities to address these gaps. The 18th ADQI Consensus Conference Chairs convened a diverse panel that represented relevant disciplines (i.e., adult and pediatric nephrology, critical care, and renal pathology) from several continents (e.g., Africa, Asia, North America, Latin America, and Europe) around the theme of "Management of Acute Kidney Injury in the Developing World" for a 2-1/2–day consensus conference in Hyderabad, India on September 27 to 30, 2016.

The preconference activities involved a search of the literature for evidence on the epidemiology, recognition, and management of AKI in developing countries and their differences with developed countries. A literature search was conducted using the following terms: recognition; awareness; diagnosis; point of care; and low income countries or developing countries, together with either acute kidney injury and acute renal failure in PubMed. This work group was also tasked to summarize the scope, implementation, and evaluative strategies for AKI recognition and diagnosis based on the location, resource availability, and a critical evaluation of the relevant literature. A series of phone conferences and emails that involved work group members before the meeting identified current knowledge to enable the formulation of main questions from which discussion and consensus would be developed. A formal systematic review was not conducted. During the conference, the work group developed consensus positions, and plenary sessions that involved all ADQI contributors were used to present, debate, and refine these positions. Following the meeting, this summary report was generated, revised, and approved by all members of the ADQI participants. All the participants interacted throughout the meeting in the general session, and all group deliberations were subjected to review and consensus agreement in the final versions. In addition, all participants discussed and approved the contents of this paper. The participants did not represent specific societies, but were invited because they had domain knowledge expertise. Their affiliations are provided in the Supplementary Appendix.

For the purposes of all work group discussions, we used the current Kidney Disease Improving Global Outcomes (KDIGO) definitions for AKI and stages of AKI, which defines AKI as an episode that occurred within a 7-day timeframe.[5] Community-acquired AKI was defined as an episode of AKI when the initial event occurred outside of the hospital setting and where the patient was admitted to the hospital with AKI; hospital-acquired AKI was defined as an episode of AKI due to a kidney insult that occurred to hospitalized patients who developed de novo AKI during their hospital stay.[15]

Q1: When Should AKI Be Suspected?

Consensus Statement

1. In the appropriate clinical context, AKI should be suspected in patients who present with the signs and symptoms listed in Table 1.

During the initial interaction of a patient with the health care system, the diagnosis of AKI is influenced by the clinical presentation and the context of the encounter[11,20] (Figure 2). Improved awareness that the presenting symptoms and signs might correspond to AKI is the first step toward timely recognition. Unfortunately, AKI is frequently not recognized or is recognized too late, at a more severe stage.[21] Failure to recognize early AKI is frequently associated with disease progression that requires more aggressive therapies and support when recovery is less likely and mortality is heightened.[22]