

Defining Acute Kidney Injury in Dengue Infection. What Criteria Do we Use?

Sir,

Acute Kidney injury (AKI) is common among hospitalized patients with mortality rate between 30% - 90% and found to be an independent predictor of mortality. Therefore, early and accurate detection of AKI is crucial to prevent its progression, and thereby, potentially improve its outcomes. The term 'AKI' is currently recognized as the preferred nomenclature for the complex clinical syndrome, formerly known as Acute Renal Failure (ARF). This transition in terminology also serves to emphasize that the spectrum of disease is much broader than the subset of patients who experience renal failure requiring dialysis treatment. Currently, AKI is defined by more than 30 definitions that made it difficult or even impossible to compare findings across studies.¹ Proper study design and comparison of different studies can only occur when there is a consensus on definitions of the condition of interest.

Dengue-Induced Acute Kidney Injury (DAKI) has been defined by several definitions and resulted in variations in incidence and clinical features. The reported incidence of AKI is 0.9% and 3.3% in DHF/DSS,^{2,3} while AKI constitutes 10.8% and 13.3% in all types of dengue infection,^{4,5} irrespective of severity. This great disparity in incidence of DAKI might be due to use of several criteria to stratify AKI, heterogeneous population and methodological differences. Laoprasopwattana *et al.* and Lee *et al.* used conventional definition to identify AKI among patients with Dengue Hemorrhagic Fever (DHF), but the reported incidence of AKI by them were comparatively lower^{2,3} than the incidence reported by Mehra *et al.* and Khalil *et al.*^{4,5} Conventional definition stratifies only severe cases of AKI with serum creatinine levels $\geq 176.8 \mu\text{mol/L}$ or $\geq 2 \text{ mg/dl}$; therefore, studies using this definition reported low incidence of AKI in dengue infection.^{2,3} On the other hand, it has been documented that small rise in serum creatinine is independently associated with increased mortality.¹ The rise in incidence of DAKI to 10.8%⁴ and 13.3%⁵ in recent investigations was due to stratification of AKI by using Acute Kidney Injury Network (AKIN) criteria. Similarly, Basu *et al.* reported comparatively higher incidence of DAKI by using Risk, Injury, Failure, Loss of function and End Stage Renal Disease (RIFLE) criteria.⁶ The higher incidence (35.7%) reported by Basu *et al.* is contributed to limited number of patients, as RIFLE criteria was

validated in 28 patients only.⁶ Both AKIN and RIFLE criteria identify AKI as rise in serum creatinine (SCr) 1.5 times from baseline. In addition, AKIN criteria also stratify patients with acute change in SCr $\geq 26.4 \mu\text{mol/L}$ from baseline within 48 hours. Recently, we presented preliminary findings of our study in European Renal Association - European Dialysis and Transplant Association (ERA-EDTA 52nd Congress, London) and reported DAKI in 11.8% of total population.⁷ The true incidence of AKI among dengue patients is still needed to be determined, as previously published studies had heterogeneous population and methodological differences.

In this context, we determined the incidence of AKI among dengue patients by three commonly used criteria in the same cohort of patients (n=413). The incidence of AKI during dengue infection in our population was 12.4% by AKIN criterion, 11.3% by RIFLE criterion, and 5.1% by conventional definition of AKI. The incidence of AKI estimated by AKIN criterion was higher than the RIFLE and conventional definition. It can be explained by the inclusion of cases with increased SCr $\geq 26.4 \mu\text{mol/L}$ from baseline within 48 hours in AKIN criteria, while such cases were neglected by both RIFLE and conventional definition. These findings have been recently presented in National Conference of Medical and Health Sciences 2015,^{8,9} and are comparable to previously published literatures using these criteria to define AKI.²⁻⁵

Dengue-induced AKI is the least appreciated area that can be explained by the reason of under-recognition of AKI due to use of less sensitive definitions. Additionally, use of several definitions lead to variations in incidence as well as clinico-laboratory characteristics of DAKI. Therefore, concordance to define AKI is essential for its timely identification and management among dengue patients. We propose AKI definition in dengue infection be based on the criteria of AKIN or RIFLE. The AKIN definition allows earlier recognition of AKI rather than RIFLE and thus might constitute the preferred criterion, but it needs further validation by multi-centric follow-up trials.

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