

Diagnosis and Management of Community Acquired Acute Kidney Injury using Point of Care Testing in Nigeria. Technology Evaluation and Study Design.

Dr Dimitrios Poulidakos¹, Dr Ibi Erekosima¹, Dr Prelador Fakrogha², Dr Pedro Emem-Chioma², Dr David Lewis¹, Professor FS Wokoma², Dr RI Oko-Jaja², Dr Nkoyo Utein², Dr Manda David-West², Professor Philip Kalra¹, Dr Victor Ndu², Dr Duru Stephen Ugochukwu², Dr John Ohiri Johnnyohiri², Dr Agba M Harry³
¹Salford Royal NHS Foundation Trust, Manchester, United Kingdom, ²University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria, ³Rivers State Primary Health Care Board, , Nigeria

Background and Aims: Community acquired Acute Kidney Injury (AKI) is a major health problem in low- and middle-income countries. Delayed diagnosis due to limited laboratory infrastructure is associated with life threatening complications and high morbidity and mortality. Early detection of AKI using point of care (POC) creatinine (Cr) testing can improve outcomes. Collaboration has been established between a renal unit in UK and a renal unit and regional primary care health centers in Port Harcourt Nigeria to evaluate POC Cr technology and design a pathway for early identification and management of community acquired AKI.

Methods: The evaluation phase investigated the accuracy of POC Cr technology. Patients underwent concurrent measurement of Cr using venous samples analysed by the laboratory (Lab) assay (Jaffe) and a point of care Cr measurement using a capillary sample with the NOVA Stasensor Xpress Cr analyser. Pearson Correlation and Bland-Altman plots were used to assess correlation and agreement between the two methods. The results of the evaluation phase were reviewed at a focused AKI workshop and pathway for the use of POC Cr was agreed.

Results: During the evaluation phase at the University of Port Harcourt Teaching Hospital in Nigeria, 96 paired POC Cr capillary and venous Lab Cr samples were analysed. 66 subjects were females and mean age was 49±14 years. POC Cr values were 127±122 µmol/l and Lab Cr values were 100 ±85 µmol/L, mean positive bias of 27.2±47.94 µmol/L. Overall, correlation between POC Cr and Lab Cr was very good, with Pearson correlation $r=0.956$ (Figure 1A). All 4 out of 96 values that were outside the limits of agreement (set at mean ±2 standard deviations) were for Lab Cr values >200 µmol/L. A Bland-Altman Plot is presented for paired samples with Lab Cr values <200 µmol/L (Figure 1B).

During the AKI workshop that took place in Port Harcourt Nigeria hosted by the Primary Health Care Board Rivers State 85 primary and secondary physicians participated. It was concluded that possible AKI should be considered if the adjusted for positive bias result of POC Cr was > 1.5 times the upper limit of normal range of the Lab assay. Guidance based on history and clinical observations to identify high risk patients that the POC Cr should be tested and an AKI management algorithm was developed (Figure 2).

The project started in the hospital emergency department and will roll out in 2 primary health care centres that will refer AKI cases to the renal team. Quality improvement methodology will be used and ethical approval has been obtained.

Conclusion: A project using POC Cr for improvement of community acquired AKI detection and management in Nigeria has commenced. Progress will be reviewed and appropriate adjustments in the algorithm will be performed by the multi-organisational quality improvement steering committee. Epidemiological data on AKI will be collected and analysed at the end of the project.