Electronic Alert Protocol Reduces In-Hospital AKI Mortality in Pilot Study

By Kurtis Pivert

A new streamlined approach for early detection and treatment of acute kidney injury (AKI) reduced mortality by 23 percent in a pilot study presented at ASN Kidney Week 2015 (1). AKI is frequently encountered in the hospital setting, complicating approximately 20 percent of cardiac surgeries worldwide. The STOP-AKI protocol—a combination of electronic alerts, a standardized intervention bundle, and staff and patient engagement—is a replicable model that could help to reduce the global burden of AKI.

AKI is common and costly, estimated to affect 21 percent of hospitalized adults and 33 percent of hospitalized children worldwide. Despite a high mortality rate—as high as 30 percent, deadlier than either heart attack or stroke—AKI deaths can often be prevented when detected early.

To reduce AKI’s toll and raise awareness of the importance of its prevention and early detection, researchers from the University Hospital Aintree in Liverpool, UK, developed a model to quickly identify and treat AKI in the hospital setting. The goal of the project, led by Thangavelu Chandrasekar, MRCP, and Hsu Pheen Chong, MBChB, was to decrease AKI mortality rates (26 percent in the period before the study) in their institution by 30 percent. STOP-AKI is one of several Avoidable Mortality Reduction projects underway at University Hospital Aintree, the others focused on reducing the incidence of deaths caused by sepsis and pneumonia.

Chandrasekar used a Plan-Do-Study-Act methodology to develop a multidisciplinary streamlined approach for AKI prevention, detection, and treatment (Figure 1). The final STOP-AKI model incorporates assessment and screening for patients at risk for AKI; early detection using automated electronic alerts triggered by serum creatinine changes using a standardized algorithm; and effective intervention using an evidence-based AKI treatment bundle (a modified version of the ABCDE checklist for AKI management) (2). Staff engagement, including training to raise clinical suspicion of AKI in at-risk individuals, as well as patient educational materials were other key components of the program.

In STOP-AKI, alerts are distributed by phone to the ward staff and electronically on the dashboard of the Outreach Team, who are highly trained nursing staff with critical care background. The Outreach Team visits the ward to review the patient and implement the AKI treatment bundle, which is simple, retainable, and has clear instructions to the medical staff based on evidence-based AKI management guidelines, said Chandrasekar (Figure 2). The Outreach Team facilitates discussions with the renal or critical care team where appropriate, and supports education of patients and staff.

After implementation of STOP-AKI, AKI-associated mortality fell by 27 percent (to 19 percent) and length of hospital stay decreased by 13 percent, equivalent to a 2.7-day reduction. “Improving staff and patient awareness through education, effective monitoring, and handover to primary care on discharge has ensured continuity of care that will hopefully reduce readmissions with AKI,” said Chandrasekar. He added this required multiple changes to the system at different levels to achieve the reductions in mortality and length of stay.

Chandrasekar noted that the simple, straightforward STOP-AKI protocol model is reproducible in other environments that utilize electronic health records. “The key components are identifying patients at risk and real-time automated electronic alerts which then trigger implementation of an effective treatment regimen,” he added.

Because AKI affects patients across all specialties, an emphasis on teamwork is important in successfully identifying and treating AKI in the hospital setting. “This needs a whole system approach with multiple interventions at different levels that dovetail with each other,” Chandrasekar emphasized. “Health care workers across all levels play an important role in improving care provision and hence positive outcomes.”

Because of STOP-AKI’s success, the system is being rolled out throughout the hospital and in primary care, with Chandrasekar anticipating further reductions in mortality.

In addition to an institution-wide implementation of STOP-AKI, the next phase of their research is development of assessment tools. “We are in the process of developing metrics to assess AKI progression and its predictors, and have rolled out our AKI alerts and management guidelines to the community, enabling much earlier intervention,” Chandrasekar added.

References

Figure 1
Flowchart of the STOP-AKI protocol development

Figure 2
The ABCDE-IT AKI treatment protocol

AKI Management: ABCDE-IT

Stage: 1  , 2  , 3  

- Acute complications (high K, acidosis, fluid overload)
- BP:check (systolic blood pressure <110 mmHg)
- Catheterization/fluid balance
- Drugs-step/avoid nephrotoxins
- Exclude obstruction (USG, KUB)
- Investigations: urine dip, Renal screen* (stage 2/3 AKI)
- First cause
  *Renal referral (stage 1/2 not resolving, All stage 3, high K- contact the renal oncall)
  *Renal screen: ANCA, GMB Abs, OSMNA, ANA, Immuno globulin, electrophoresis, Urine BIP

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