Optimal and early detection of acute kidney injury requires effective clinical decision support systems

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Keywords: acute kidney injury, decision support systems, electronic medical record

We would like to commend Porter et al. for their development of a fully automated real-time clinical decision support system using internationally recognized criteria for acute kidney injury (AKI) [1]. They reported the incidence of AKI Stages 1–3, in-hospital mortality, length of stay and distribution of alerts by specialty. During the 2-year study, their system generated 59,921 alerts that was associated with 15,550 unique patients, and detected an overall incidence of AKI of 10.7%. The major findings of this study include a distribution of highest AKI stage reached 7.2, 2.2 and 1.3% for Stage 1, 2 and 3, respectively. Older adults experienced a majority of the AKI episodes, with the median age being 74 years old, which was the same across all stages of AKI. Overall mortality for all stages of AKI was 18.5% (2873 patients) compared with general in-hospital mortality for non-AKI patients of 2.2%. The median length of stay was 9 days for all stages of AKI. Finally, there was substantial variability in the distribution of AKI by clinical service-line.

In the article, the authors decided that a high degree of sensitivity was desirable for their clinical decision support system, given the size of their hospital and the fact that many of the acute specialties did not have access to a renal consult service. Moreover, they preferred a low threshold for alerting AKI, giving the clinician the choice of whether to follow up on the alert, rather than risk an episode being missed. Finally, they chose the lowest serum creatinine in the previous 7–365 days prior to admission, which also increased sensitivity. Although the authors selected this as design priority, that is to increase sensitivity over specificity, this could lead to a significant amount of false-positive alerts. A high false-positive alert rate can result in alert burden or fatigue, which manifests itself in physicians not responding to important alerts because they receive too many [2]. Future work intent on reducing alert fatigue should focus on assessing the clinical performance of the alerts as measured by sensitivity, specificity, likelihood ratios and positive predictive values [3, 4]. The performance of these alerts can likely be improved by the inclusion of patient-specific risk factors, which may differ by AKI stage and age [5].

The alerts that were presented to the clinician in real-time as a statement accompanying the qualifying serum creatinine result. These non-interruptive alerts included the AKI stage and referred the clinician to hospital guidelines on the intranet. It is important to note that the authors did not assess the impact of the alerts on process or outcome measures as others have done previously [6–8] including an assessment of how the alerts (the majority of which were Stage 1) might affect progression of AKI to more advanced stages. However, for those who may wish to formally assess the impact of a clinical decision support system to detect and manage AKI, certain concepts should be followed. First, non-interruptive or passive alerts may be useful in some situations, but interruptive alerts have been shown to be more effective in having physicians respond to AKI-alerts [9]. Second, although counterintuitive, alerts should not be presented in electronic charting or order entry. Rather for maximum effectiveness, they should be delivered to clinicians outside of an electronic medical record or computerized provider order entry system such as to a pager, email or direct phone communication [10]. Third, effort should be made to enhance the presentation and personalization of the alerts, as well as what content should be included in them [11]. Lastly, in an effort to reduce alert fatigue, streamlining alerts to those that are actionable (i.e., require intervention) may be less sensitive but more specific with higher impact on patient care.

We applaud the efforts of Porter et al. to advance the use of a clinical decision support system to improve patient care by enhancing detection of AKI. Coupling an alert with existing
guidelines for management of AKI such as the Kidney Disease Improving Global Outcomes (KDIGO) clinical practice guideline [12] would be a logical next step.


REFERENCES


Peritoneal dialysis outcomes after temporary haemodialysis for peritonitis—influence on current practice

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Keywords: maximize PD treatment, peritonitis, Tenckhoff removal

Using peritoneal dialysis (PD) to obtain maximum clinical benefit for patients who require dialysis is a challenge. The cornerstones underpinning success in are:

(i) Maximizing the access to PD.
(ii) Efficiently integrating PD into the renal replacement therapy pathway.
(iii) Preserving effective safe time on PD.

Maximizing successful access to PD within dialysis programmes in the context of increasingly elderly and complex patients is dependent on providing good education and decision aids [1]. Notwithstanding the geographic and economic variables, most renal healthcare professionals worldwide advocate PD as the initial mode of choice [2]; however, uptake of PD is still often poor and extremely variable [3]. Despite the challenges that the changing dialysis demographic presents, some units are using available evidence to successfully support the use of PD in elderly and dependent patients [4]. Progress in providing assisted automated PD (APD) [5], and long distance support at home using telemedicine [6] have proven to be useful adjuncts to conventional or standard PD practice.