Editorials

Acute kidney injury in primary care:

where are we now and where are we going?

INTRODUCTION

Acute kidney injury (AKI) is defined as *'a clinical and biochemical diagnosis reflecting abrupt kidney dysfunction'*.[1] AKI is graded on a scale of 1–3 based on the size of the creatinine increase from baseline. Higher AKI scores are associated with higher mortality, longer length of stay, and less renal recovery.[2]

AKI complicates almost one in five hospital admissions and is associated with a 20–33% mortality rate, increased length of hospital stay, and an estimated annual cost to the NHS in England of £1.02 billion.[3] Two-thirds of AKI cases identified in hospital start in the community.[2] NHS England and the UK Renal Association Renal Registry's Think Kidneys programme have supported changes and improvement in AKI identification, measurement, risk assessment, and education across UK health care including the implementation of a national electronic system that alerts clinicians to potential cases of AKI.[1]

AKI IN THE COMMUNITY

Around 60% of all patients with AKI identified in hospital have it when they reach hospital.[2] The mortality of these patients with community-acquired AKI detected in hospital (CAH-AKI) is 19.6% during hospitalisation, which increases to an alarming 45% 14 months post-discharge.[4] Although CAH-AKI has a lower mortality rate than hospital-acquired AKI, CAH-AKI represents a noteworthy risk factor for death.

The incidence of community-acquired AKI detected in primary care (CAP-AKI) varies according to the use of different AKI definitions and different methodologies for acquiring a baseline creatinine. Sawhney *et al*[5] used the official NHS AKI algorithm and reported that 1.4% of 50 835 patients in a Scottish registry who also had a known creatinine within 12 months suffered CAP-AKI. They defined CAP-AKI as AKI detected in primary care but not admitted to hospital within the next 7 days. This study showed that patients with CAP-AKI were of similar age but suffered fewer comorbidities than patients with CAH-AKI. Reported mortality rates were 2.6% for CAP-AKI vs. 20.2% for CAH-AKI at 30 days that increased to 17% and 42.3% respectively at 1 year. Interestingly, in 30-day survivors adjusted 5-year mortality for CAP-AKI was not significantly different from CAH-AKI or hospital-acquired AKI. Patients with CAP-AKI were also less likely to make a full recovery of renal function (34.4% vs. 49.2%) when compared with those with CAH-AKI.[5] In summary, community-acquired AKI alerting in hospital or in the community (and not subsequently admitted to hospital) is associated with increased morbidity and mortality. Alongside national efforts in secondary care to tackle AKI there is a recognised need to optimise the AKI management pathway in primary care to improve outcomes.

COMMUNITY-BASED AKI INTERVENTIONS

AKI e–alerts

NHS England produced a patient safety notice that mandated all UK NHS trusts to implement the NHS AKI scoring algorithm into their laboratories.[6] This was initially deployed in secondary care but as of April 2016 roll-out into primary care began. The alert accompanies the blood test report. The NHS AKI algorithm is based on the Kidney Disease: Improving Global Outcomes (KDIGO) AKI criteria, which is universally accepted as a biochemical definition for AKI.[7]

The efficacy of AKI e-alerts in primary care has not been tested yet, although this work is ongoing. If the last measured creatinine is more than 7 days ago, the algorithm uses the median of the last year of creatinine results as a baseline reference value. An AKI score is provided if there has been a significant rise in creatinine from baseline. Due to more infrequent phlebotomy in primary care this algorithm uses the median value in the majority of cases[5] and may misclassify some results.

AKI is a complex syndrome, so the e-alert is not akin to a diagnostic label but should likely prompt a clinical review and appropriate response. Advice on appropriate responses to AKI alerts are available on the Think Kidneys website.[1] Minor adjustments in working practices may be required to respond to an e-alert in a timely manner such as setting up agreements with laboratories to phone severe cases of AKI to the out-of-hours on-call team and integrating clinically suspected AKI cases into GP handovers.

Post-AKI care and transition

Commissioning for Quality and Innovation (CQUIN) targets provide payment targets to improve health care provided by care providers in England. A CQUIN target now necessitates secondary care to include the diagnosis and severity of AKI on a patient's discharge summary. This highlights the importance of communication of AKI at the point of transition. AKI and chronic kidney disease (CKD) are intertwined bidirectional clinical syndromes. Sawhney *et al*[5] showed that 30% of patients alive at 90 days from a CAH-AKI episode have developed CKD. CKD is a recognised risk factor for AKI and AKI is a risk factor for subsequent episodes of AKI.[8] The CQUIN target will help with recognition of new cases of CKD and highlight patients at risk of further AKI events. This knowledge, if correctly coded for, can then better inform primary care clinicians' future clinical decisions and risk stratification. Given the time pressures already placed upon primary care, the use of integrated clinical information systems is as important as ever.

Medications

The co-prescribing of renin angiotensin system (RAS) inhibitors, diuretics, and non-steroidal anti-inflammatory drugs (NSAIDs) causes unnecessary mortality, AKI, and healthcare costs.[9,10] In Dreischulte *et al*'s paper the adjusted relative risk for AKI when patients are prescribed NSAIDs in combination with RAS blocker and diuretic was 1.64 (95% confidence interval = 1.25 to 2.14).[9] This combination has detrimental effects on regulatory systems that control blood pressure and maintain glomerular filtration rate. While recognising the difficulty of prescribing analgesia in patients with multimorbidities, care should be taken not to prescribe medicines that cause harm. Enhanced roles for community pharmacists and computerised hazard

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warnings will support improvements in medicines optimisation. They can also stimulate discussions with patients around the avoidance of NSAIDs when taking other potentially nephrotoxic medications.

The National Institute for Health and Care Excellence recommends that patients at risk of AKI are made aware that the risk of developing AKI increases when they become dehydrated and when they use medications that may affect the renal function.[8] An AKI 'sick day rule card' providing advice for temporary cessation of selected medications during acute illness was initially implemented in Scotland and subsequently in several other parts of the UK. However, an interim statement by Think Kidneys[11] raised concerns about the widespread provision of 'sick day rules' due to lack of existing evidence and the risk of reduced adherence to evidence-based treatments. Clinicians should exercise extreme caution in relation to patients with heart failure. They are at high risk of developing AKI,[8] yet RAS inhibitors decrease mortality and hospitalisation.[12] Any adjustment in these medications must be based on careful clinical evaluation.

FUTURE DEVELOPMENTS

In view of the already under-resourced and over-stretched primary care services, efforts should focus on developing an accurate risk stratification model that incorporates historical data from primary and secondary care, and includes real-time clinical data collected during the assessment of the unwell patient. This can highlight which patients are at high risk of AKI and those who would most benefit from urgent assessment of renal function or direct referral to hospital.

Think Kidneys and the whole medical community should be congratulated on the work that has already been undertaken tackling the 'AKI problem'. Further work across all healthcare domains is necessary. A GP may only see a patient with AKI around once every 2 months[1] but current work has increased awareness. E-alerts may support clinical decision making and provide a framework for future technological and educational developments.

All AKI alerts should be submitted to the Renal Registry by the laboratories. Combining this accumulating registry database with other outcome databases represents an opportunity to better characterise AKI epidemiology and associated morbidity and mortality, and to develop AKI risk prediction models. Further integration between primary and secondary care promises enhanced efficiency and better patient outcomes.

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