

Prevalence and prognosis of hyperkalemia in people hospitalised with and without AKI

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Background and Aims:

Hyperkalemia is a clinical emergency associated with kidney diseases and hospital mortality. It may be apparent on initial hospital presentation, or develop during the course of admission, and can occur in the context of AKI. The prevalence of hyperkalemia across these different presentations and contexts is not well described. No work has previously described whether the prognosis of hyperkalemia varies depending on timing of presentation, or on AKI status defined by KDIGO creatinine change biochemical criteria.

Methods:

We constructed a cohort of all adult residents in Grampian (North Scotland) admitted to hospital in 2012 (n=28462). We used a validated and replicated KDIGO based definition of AKI to identify AKI using serial serum creatinine values. We determined the presence of hyperkalemia (serum potassium ≥ 6 mEq/L) both on first blood test on presentation to hospital, and also during the course of hospital admission. We explored the outcome of 30 day mortality within subgroups of AKI status and timing of hyperkalemia. Covariates of interest included age, CKD, medications prescribed in the preceding 90 days and comorbidities (ICD-10 hospital episode codes). The relationship between hyperkalemia and 30 day mortality was determined using multivariable logistic regression.

Results:

Of 28462 hospital admissions, 247 (0.9%) presented with hyperkalemia, whereas 560 (2.0%) had hyperkalemia during the course of hospital admission. Hyperkalemia was common in the presence of AKI (4.2% at hospital presentation, 9.3% during hospital admission and rising to 24.5% during AKI stage 3). Hyperkalemia was uncommon in the absence of AKI (0.3% and 0.7% respectively) (OR AKI vs no AKI 13.9, 11.6-16.6). Other factors associated with hyperkalemia were male gender (OR 1.5, 1.3-1.8), age >70 years (OR 2.4, 2.0-2.9), CKD based on eGFR or proteinuria (5.5, 4.6-6.5), diabetes (OR 3.4, 2.8-4.0), heart failure (OR 3.0, 2.4-3.7), RAAS blockers (OR 2.4, 2.0-2.9), trimethoprim containing antibiotics (OR 2.2, 1.7-2.8), non-RAAS antihypertensives (OR 1.7, 1.4-2.0), but not NSAIDs (OR 0.9, 0.7-1.1). Hyperkalemia mortality (AKI vs no AKI) was 31% vs 29% when presenting at admission, or 34.3% vs 27.8% when occurring during hospital admission. Although absolute risks were similar irrespective of AKI, the excess relative mortality risk associated with hyperkalemia was lower for those with AKI (OR 2.7, 2.1-3.4) than those without AKI (OR 9.5, 6.8-13.2), which may be explained by a higher mortality for those with AKI even without hyperkalemia.

Conclusion:

Hyperkalemia is associated with a high mortality even in the absence of AKI and irrespective of the timing of presentation. Management protocols should draw attention to this poor prognosis across all clinical contexts. As hyperkalemia usually occurs within the context of AKI, it should prompt clinicians to consider ongoing close observation for emerging AKI even when AKI is not yet evident on blood tests.