311

Seasonality of Acute Kidney Injury for hospitalised patients in England

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Background and Aims:
Incidence of Acute Kidney Injury (AKI) is known to be seasonal, peaking in winter months among hospitalised patients. Previous studies have suggested that the seasonality of AKI is likely to be influenced by the seasonality of the underlying acute illnesses that are associated with AKI. Mortality of patients with AKI has also been reported as being higher in winter, reflecting well-described excess winter mortality associations.
Here we describe the seasonal variations of AKI alerts in England and the associated mortality rate using linked national databases.

Method:
Serum creatinine changes compatible with Kidney Disease Improving Global Outcomes (KDIGO) guidelines AKI stage 1, 2 and 3 are sent by laboratories in England as AKI alerts to the treating clinicians and the UK Renal Registry (UKRR). The UKRR linked the electronic AKI alerts to the Hospital Episode Statistics (HES) data, and identified AKI patients who were hospitalised. Descriptive statistics and investigation of the seasonal effect of 30-day patient mortality from the date of the AKI alert were carried out, using multivariable Cox regression and sequential adjusting for age, sex, index of multiple deprivation (IMD) and peak AKI stage.

Results:
The highest number of AKI episodes (N=81,276) was in winter, which is 6% higher than in summer (N=76,329) (Table 1). For patients who had an AKI episode and were admitted to hospitals, the crude 30-day mortality is 28% higher in the winter season when compared to the summer [HR 1.28 (1.25-1.31), p<0.01] (Figure 1). After adjusting season by age, peak AKI stage, IMD and sex, the 30-day mortality is still significantly higher (24%) in winter than in summer [HR 1.24 (1.21-1.27), p<0.01]. Winter mortality peak is confounded by age and AKI severity, which explained the drop in the hazard ratio at winter peaks; whereas season is not confounded by deprivation and sex. The pattern of seasonality varies with age: in age group 18-39, there were 26.1% of AKI episodes in summer and 23.3% in winter, whereas in age group >75, there were 23.7% in summer and 27.1% in winter.

Conclusion:
Analysis of England data confirms a seasonal pattern and a peak in AKI during winter months. Additionally it shows increased risk of mortality for patients with AKI in winter months. Future work will investigate the impact of comorbidities and case-mix on outcomes. Understanding the seasonal variation of AKI, can lead to an improvement in preventive care and clinical practice.