P149 -Acute Treatment of Hyperkalaemia with Intravenous Insulin – Comparative Evaluation of Patient Characteristics

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Introduction:
Hyperkalaemia is a common and serious medical emergency present in up to 10% of medical admissions. Current standard of care consists of an insulin infusion, but this treatment has important theoretical limitations including onset and duration of action, risk of hypoglycaemia, and requirement for hospitalisation. However, there are limited data on the real-world emergency management of hyperkalaemia. Here, we report characteristics of hyperkalaemic patients treated with insulin in a tertiary healthcare setting in the UK, compared with hyperkalaemic patients not treated with insulin.

Methods:
Hyperkalaemic patients (defined as having at least 1 potassium measurement ≥ 6 mmol/L) were identified from electronic health records (EHRs) of all patients admitted to the emergency department at Addenbrooke's Hospital, Cambridge between April 2015 and August 2018. All hyperkalaemic patients treated with insulin (K-I) were identified. Characteristics of the K-I cohort were compared with hyperkalaemic patients not treated with insulin (K-noI). Data were summarised as frequency (%), mean standard deviation (SD) or median (interquartile range (IQR)) as appropriate. Categorical variables were compared by Chi-squared test and continuous variables by Student's t-test or Mann–Whitney U-test based on their distribution. Factors associated with insulin treatment were explored using a mixed effects logistic regression model with insulin exposure as the dependent variable, odds ratios (ORs) are reported with associated 95% confidence intervals.

Results:
Hyperkalaemia ≥ 6 mmol/L was identified in 5,272 of 211,993 patients (1.9%) attending the emergency department. Of these, 1,284 (24%) received 2,541 insulin treatments for hyperkalaemia (K-I). Compared to K-noI patients, K-I patients were older (72 (59.5-84.5) vs 71 (53-83), p<0.001), more likely to be diabetic (35% vs 25.2%, p<0.001), have chronic kidney disease (CKD) (39.9% vs 18.6%, p <0.001), and have a greater number of other comorbid conditions. Potassium was higher in K-I (4.8⬚0.5 vs 4.6⬚0.6 mmol/L, p<0.001) compared to K-noI patients. Median length of hospital stay was significantly longer in K-I patients (11.7 days (4.9-24.7) vs. 6.0 (1.2-17.3) p<0.001). A higher proportion of K-I patients were treated with ACE Inhibitors (30.1% vs 23.1%, p<0.001), Angiotensin-2-receptor blockers (12.3% vs 9.2%m p=0.001) or potassium-sparing diuretics (17.1% vs 9.6%, p<0.001).
In a mixed-effects logistic regression model, the need for insulin treatment was associated with CKD (OR 2.4, 2.1-2.8, P <0.001), male sex (OR 1.6, 1.4-1.8, P <0.001), potassium-sparing diuretics (OR 1.6, 1.3-2.0, P <0.001) and hypertension (OR 1.3, 1.1-1.5, P=0.005).
At the end of follow up, 575/1,284 patients (44.8%) in K-I vs 1,089/3,988 patients (27.3%) had died (p<0.001). In a logistic regression model adjusting for age, gender and co-morbidity, the risk of death remained higher in the K-I group (OR 1.9, 1.6-2.2, p<0.001). Exact cause of death was not assessed.

Conclusion:
Patients that receive insulin for the treatment of hyperkalaemia are older, more likely to be male and have hypertension, CKD, diabetes and exposure to medications that increase potassium than those who do not

receive treatment. Receiving insulin for hyperkalaemia is associated with longer hospital stay and a higher risk of death.