**Clinical characteristics and in-hospital mortality among insulin pump users with acute coronary syndrome: A UK-wide Analysis from the MINAP Registry**

**Background:**
This study aimed to compare the clinical characteristics and outcomes of people with diabetes using insulin pump therapy versus multiple daily insulin injections (MDI) during hospitalization for acute coronary syndrome (ACS), and to identify factors associated with in-hospital mortality.

**Methods:**
We conducted a retrospective cohort study using data from the Myocardial Ischaemia National Audit Project (MINAP), a national registry of ACS admissions in England and Wales. Adult patients (aged ≥18 years) with confirmed ACS and a diagnosis of diabetes treated with insulin were included. Patients were stratified by insulin therapy: continuous subcutaneous insulin infusion (CSII) or MDI. Data included demographics, comorbidities, clinical markers, and treatments. The primary outcome was in-hospital mortality. We used logistic regression and a gradient boosting machine (GBM) model to identify predictors of mortality in CSII users.

**Results:**
The study included 3,321 CSII users and 36,158 MDI users. In-hospital mortality was higher in CSII users (11% vs. 8%, p<0.001). CSII users had higher rates of cardiogenic shock, pulmonary oedema, poor left ventricular function, and STEMI. The GBM model (AUC 0.837) identified Killip class, systolic blood pressure, and age as key predictors. Multivariable analysis showed cardiogenic shock (OR 9.93), pulmonary oedema (OR 1.23), and poor left ventricular function (OR 1.64) were significantly associated with mortality. Higher age (OR 1.05), heart rate (OR 1.01), and HbA1c (OR 1.01) increased mortality risk, while higher systolic BP (OR 0.98), no heart failure (OR 0.56), and haemoglobin (OR 0.99) were protective.

**Conclusion:**
CSII users admitted with ACS represent a more complex cohort, potentially explaining the higher observed mortality. Further research is needed to assess the impact of insulin pump therapy on ACS outcomes and ensure equitable access to diabetes technology.