Supplementary Materials:

Early diagnosis of acute kidney injury in aged patients undergoing percutaneous coronary intervention

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Data S1 Materials, methods, and declarations

Patients

All patients had acute coronary syndrome and underwent coronary angiography with angioplasty and/or stenting (132 patients). The exclusion criteria were: age below 60 years, pre-existing estimated glomerular filtration rate (eGFR) < 30 ml/min·1.73 m^2, tumor, liver disease, cardiogenic and septic shock, emergency coronary angiography because of acute myocardial infarction or unstable angina pectoris, exposure to contrast medium 1week prior to study, and patients given aminoglycoside, dopamine, N-acetylcysteine, metformin, sodium bicarbonate or mannitol at least one week before or during the study period.

All patients were infused with isotonic saline at a rate of 1 ml/kg per hour from 12 h before until 12 h after administration of the contrast medium (Stacul *et al*., 2011). The contrast medium for all patients enrolled in the study was the nonionic, isotonic contrast medium, iodixanol (320 mg iodine/ml, Visipaque®, GE Healthcare Ireland, Co.Cork, Ireland). The volume of contrast media was highly variable, as needed. For the present study, the eGFR was calculated via the CKD-EPI equation (Levey *et al*., 2009).

The SCr value measured the day before the intervention was established as the baseline SCr level. We monitored SCr levels at 24 and 48 h after the procedure. Urine samples were collected before, and 6, 24, and 48 h after contrast administration for determination of biomarkers.

Processing of urine samples

Urine samples were centrifuged for 15 minutes at 3500 r/min and the supernatant was stored in aliquots at -80 ℃ for subsequent biochemical measurements.

Measurements of biomarkers

L-FABP, NGAL and KIM-1 were measured in urine samples using ELISA kits (Human FABP1/L-FABP ELISA kit and Human TIM-1/KIM-1/HAVCR quantikine ELISA kit from R&D Systems China Ltd. China; Human NGAL ELISA kit from Bioporto. Denmark). All measurements were performed according to manufacturers' instructions by the same person who was blinded to

samples. To correct for urine dilution, values of biomarkers were adjusted for urinary creatinine. Serum and urinary creatinine levels were measured using standard techniques by the hospital clinical laboratory.

Statistical analysis

The results were analysed using MedCalc (version16.8.4) and SPSS (version 21.0). The Shapiro-Wilk tests were used for verifying that the variables had a normal distribution. Continuous variables are expressed as mean ± SD or as medians with interquartile ranges (25-75%). Student's t tests were used for comparing two means as well as Mann-Whitney U tests in the case of nonnormal distributions. A one-way ANOVA test with post hoc Bonferroni analysis was used when comparing the means of more than two variables. A $\chi 2$-test or Fisher's exact-test was used for analysis of categorical variables. We evaluated the sensitivity and specificity of each marker, using receiver operating characteristic (ROC) curve analysis. ROC curves for combined biomarkers were established applying the combined predictors or probabilities, based on the logistic regression model. Differences between the areas under the ROC curve (AUCs) were investigated with the non-parametric approach of DeLong. The significance level was set at $p < 0.05$ (two-sided).

Abbreviations

AKI: Acute kidney injury; PCI: Percutaneous coronary intervention; SCr: Serum creatinine; uL-FABP: Urinary liver-type fatty acid-binding protein; uNGAL: Urinary neutrophil gelatinase-associated lipocalin; uKIM-1: Urinary kidney injury molecule-1; eGFR: Estimated glomerular filtration rate; ROC: Receiver operating characteristic; AUC: Area under the ROC curves; NT-proBNP: N-terminal pro brain natriuretic peptide

Declarations

Data availability statements

The datasets supporting our findings are available from the corresponding author on reasonable request.

Authors' contributions

HY conceived the study, participated in the design of the study, analysed and interpreted the data, drafted the manuscript, and participated in critical review of the final manuscript. QL participated in the design of the study, revised the manuscript critically for important intellectual content. GS collected the data, participated in coordination of the study, made the figures and table. FZ, XX participated in the design of the study, collected the data, participated in coordination of the study. CW, LH collected the data, participated in coordination of the study. All authors have given final approval of the version to be published.

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References

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