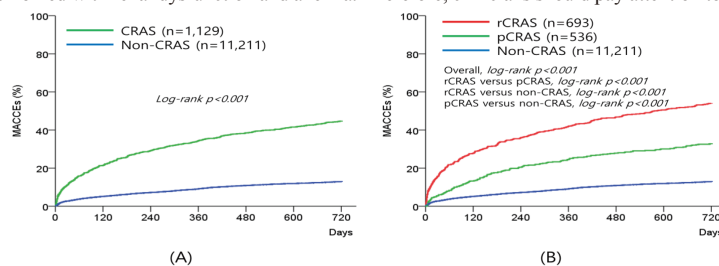


Impact of cardiorenal anemia syndrome on outcome in patients with acute myocardial infarction

경북대학교병원 내과

*이정원, 이장훈, 양동현, 조용근, 박현식, 배명환, 채성철, 장세용, 김홍년, 박윤정, 박보은, 김현정

Background/Aims: Cardio-renal anemia syndrome (CRAS) has prognostic significance in patients with heart failure. However, impact of CRAS on major adverse cardiocerebrovascular events (MACCEs) in patients with acute myocardial infarction (AMI) has not been investigated yet. **Methods:** Serum hemoglobin (Hb), estimated glomerular filtration rate (eGFR) calculated by the Modification of Diet in Renal Disease at admission, and echocardiographic left ventricular ejection fraction (LVEF) were obtained in 12,808 patients from the Korean AMI Registry (KAMIR) – National Institute of Health (NIH) database. CRAS was defined as preserved LV function ($EF \geq 50\%$; pCRAS) or reduced LV function ($EF < 50\%$; rCRAS) combined with (1) an eGFR < 60 ml/min/1.73 m² and (2) a Hb level of < 13 g/dl for males and < 12 g/dl for females. MACCEs were defined as death, non-fatal MI, repeat revascularization, rehospitalization due to heart failure, and cerebrovascular accident at 2 years. This research was supported by Research of Korea Centers for Disease Control and Prevention. **Results:** Overall, CRAS was presented in 1,229 (9.4%). In logistic regression model, diabetes mellitus (Odds ratio 3.44, 95% Confidence Interval [CI] 2.98 – 3.98; $p < 0.001$), followed by Killip class III-IV (Odds ratio 2.94, 95% CI 2.48 – 3.49; $p < 0.001$), was the most powerful independent predictors of CRAS. In Kaplan-Meier survival curve, patients with CRAS had higher MACCEs (43.0% versus 12.5%, log-rank $p < 0.001$; Figure A). In Cox-proportional hazards model, CRAS (hazards ratio [HR] 1.80, 95% CI 1.59 – 2.03; $p < 0.001$) was an independent predictor of MACCEs after adjusting confounding variables. When patients were divided into three groups (non-CRAS versus pCRAS versus rCRAS), there was graded relationships in terms of MACCEs among three groups (12.5% versus 31.7% versus 51.7%, log-rank $p < 0.001$; Figure B). In multivariate analysis, similar risk stratification for MACCE was observed: 1 (reference; non-CRAS group), HR 1.46 (pCRAS) and HR 2.04 (rCRAS). **Conclusions:** Clinical events were about twice higher when LV dysfunction is combined with renal dysfunction and anemia. Therefore, clinicians should pay attention to AMI patients with CRAS.



CRAS = cardiorenal anemia syndrome; rCRAS = CRAS with reduced left ventricular ejection fraction;
pCRAS = CRAS with preserved left ventricular ejection fraction