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Major adverse cardiovascular events and clinical outcomes in intensive care unit patients with acute renal replacement therapy

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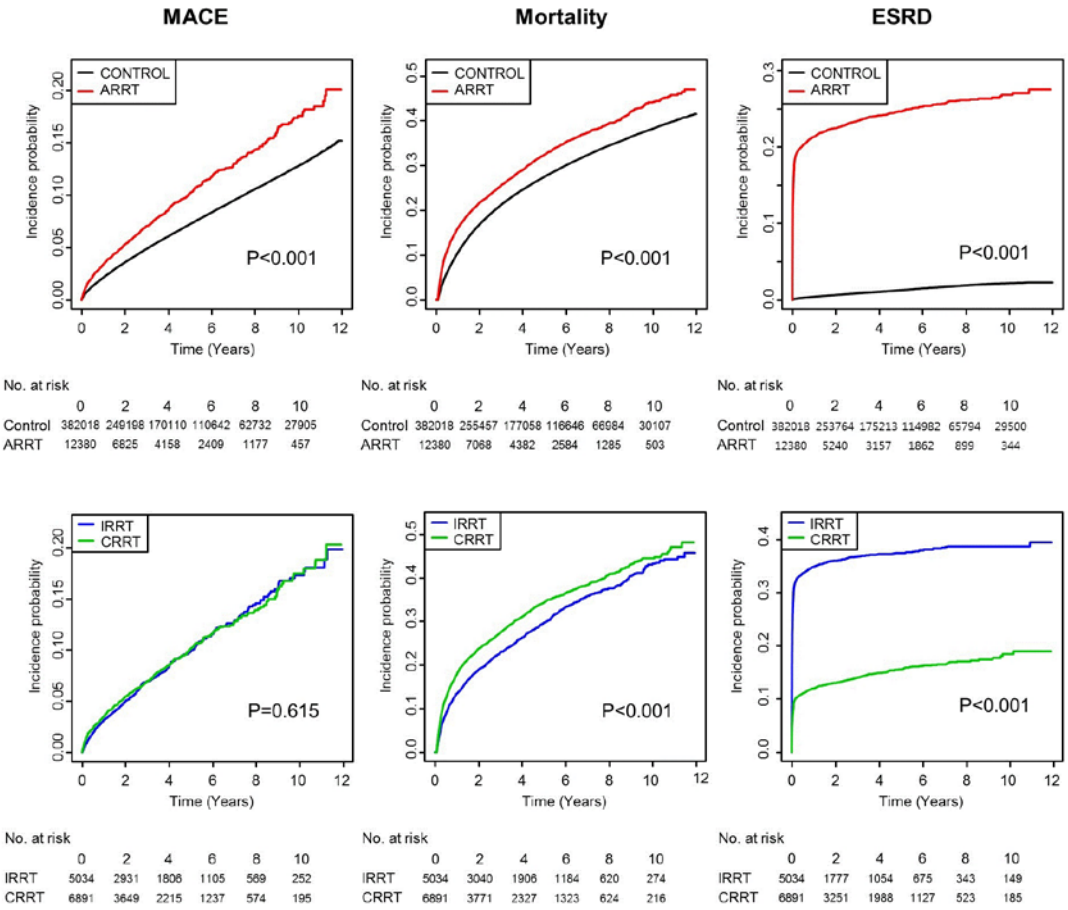
Objectives: Risk of the major adverse cardiovascular event (MACE) in intensive care unit (ICU) patients who required acute renal replacement therapy (ARRT) needs further investigation.

Methods: This study was a nationwide population-based study using the claim database of Korea. We reviewed the ICU patients in over forty government-designated tertiary hospitals in Korea from 2005 to 2016. The study group consisted of the patients who underwent ARRT, and the control group was ICU patients without ARRT. Patients who 1) had age under 20, 2) expired within 30 days after ICU care, 3) underwent ICU care less than 24 hours, 4) with a previous history of ICU admission, 5) MACE, or 6) known MACE related cardio- or cerebrovascular diseases were excluded. Within the study group, the outcome of CRRT patients was compared with the patients who received intermittent renal replacement therapy (IRRT) in the ICU. The primary outcome was the MACE, including acute myocardial infarction, revascularization, and acute ischemic stroke. Patient mortality and progression to end-stage renal disease were also evaluated.

Results: We included 12,380 ARRT patients and 382,018 patients in the control group. Among the study group, 6,891 patients were categorized as the CRRT group, and 5,034 as the IRRT group, respectively. The risks of MACE [adjusted hazard ratio (HR) 1.292 (1.205-1.386), P<0.001], all-cause mortality [adjusted HR 1.343 (1.296-1.391), P<0.001], and end-stage renal disease [adjusted HR 10.752 (10.119-11.424), P<0.001] were increased in the ARRT patients. When we compared the CRRT to the IRRT patients, the risk of MACE was comparable [adjusted HR 1.105 (0.947-1.288), P=0.204].

Conclusions: The risk of adverse cardiovascular outcome was increased in patients who underwent ARRT. Clinicians may consider appropriate risk factor management for dialysis-requiring ICU survivors. Receiving CRRT was not associated with an elevated cardiovascular risk when compared to IRRT in ICU.

Prognosis of patients according to dialysis modality


MACE
Mortality
ESRD
CONTROL
ARRT
IRRT
CRRT
Incidence probability
Time (Years)
P<0.001
P=0.615
No. at risk
Control 382018 249198 170110 110642 62732 27905
ARRT 12380 6825 4158 2409 1177 457
Control 382018 255457 177058 116646 66984 30107
ARRT 12380 7068 4382 2584 1285 503
Control 382018 253764 175213 114982 65794 29500
ARRT 12380 5240 3157 1862 899 344
IRRT 5034 2931 1806 1105 569 252
CRRT 6891 3649 2215 1237 574 195
IRRT 5034 3040 1906 1184 620 274
CRRT 6891 3771 2327 1323 624 216
IRRT 5034 1777 1054 675 343 149
CRRT 6891 3251 1988 1127 523 185