

# Effect size of remote ischaemic conditioning for patient outcomes of acute coronary syndrome, acute CNS injury and acute kidney injury

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**Background:** Acute-coronary-syndrome (ACS), acute-brain-injury (ABI) and acute-kidney-injury (AKI) are common emergent presentations. Despite reperfusion, reperfusion-injury (RI) accounts for 50% of organ-injury and is not managed. Remote-ischaemic-conditioning (RIC) reduced RI but is not routine-care. The aim of this study was to describe the effect-size of RIC on clinical outcomes of ACS, ABI and AKI. **Method:** Meta-analysis of systematically identified relevant prospective controlled trials retrieved via PubMed. Comparisons included biomarker levels, infarction volumes, major-adverse-cardiovascular-and-cerebrovascular-events (MACCE), discharge destination and mortality. **Results:** Six studies were identified for ACS- all STEMI patients (n=675), 3 for ABI - stroke, spinal cord decompression surgery, and traumatic brain injury patients (n=138) and 11 for preventing AKI during invasive cardiovascular interventions- angiogram, PCI, AAA repair, CABGS or valve surgery (n=1431). RIC was associated with a reduction of biomarkers for ACS (troponin, CK, CK-MB) weighted mean effect-size (wmes) 0.51 (95%CI 0.31-0.70, p<0.00001), ABI (CRP, neuron-specific-enolase) wmes 1.98 (95%CI 1.02-2.93, p<0.0001), and AKI (creatinine, urinary or serum NGAL, cystatin-C, L-FABP) wmes 0.56 (95%CI 0.06-1.07, p=0.03), reduced infarction volume in ACS, d=0.59 (95%CI 0.14-1.04) and reduced risk of infarction in ABI, d=0.61 (95%CI 0.28-0.94), increased myocardial salvage wmes 0.46 (95%CI 0.21-0.69, p<0.05), lower MACCE (OR=0.54, 95%CI 0.33-0.99, p=0.01) and mortality (OR=0.29, 95%CI 0.11-0.74, p=0.01) for ACS. **Conclusions:** The effect-size of RIC for ACS, ABI and prevention of AKI was 0.51 to 1.98 standard-deviation reduction in biomarker evidence of tissue injury. Numbers-needed-to-treat (NNT) for demonstrating a patient benefit in regards to biomarker levels was 1.2 and 3.6. NNT to prevent MACCE or mortality in STEMI was 10.3 and 19.9 respectively. RIC may represent an adjunct physical-therapy for preventing RI in ACS, ABI and those at risk of AKI in the Emergency Department.