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INFLUENCE OF ATMOSPHERIC TEMPERATURE ON NEUROLOGICAL MORTALITY AFTER OUT-OF-HOSPITAL CARDIAC ARREST

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Background: It has been already known that survival rates after out-of-hospital cardiac arrest (OHCA) are the lowest during night and winter. Although these variabilities are commonly explained by the effects of cold temperature, the effects of ambient temperature on variabilities in OHCA outcomes are unclear. The purpose of the present study was to test our hypothesis that cold exposure during cardiopulmonary resuscitation (CPR) would decrease the neurological survival rate one month after OHCA due to prolongation of the period from CPR to the ROSC.

Methods: We used the All-Japan Utstein Registry (2005–2010) combined with atmospheric temperature, and enrolled OHCA patients who were 18 years of age or older, who had suffered a witnessed cardiac arrest and who had been resuscitated. The primary outcome was a favorable neurological outcome at one month after OHCA, as defined by a Cerebral Performance Category scale of 1 or 2. The secondary outcome was the presence of ROSC before hospital admission. Logistic regression and cox regression analyses were performed to investigate the associations between the outcomes and ambient temperature, with adjustment for factors that are known to potentially affect OHCA patient outcomes.

Results: Among the 263,750 witnessed OHCA patients, neurological survival and ROSC rates were significantly increased with an adjusted odds ratio (OR) of 1.006 (95% CI 1.004-1.009) and a hazard ratio (HR) of 1.009 (95% CI 1.008-1.010) for each 1°C increase in temperature. There were more significant differences in the patients with VT/VF (OR 1.009, HR 1.012) than in those with the PEA (OR 1.002, HR 1.005) or asystole (OR 1.004, HR 1.007).

Conclusions: The findings of the present study indicate that cold exposure during CPR appears to worsen the neurological survival rate at one month after OHCA, probably due to the prolonged duration from CPR to ROSC in witnessed OHCA patients.