Association of out-of-hospital cardiac arrest occurrence time and the survival in all-Japan Utstein registry: difference between international resuscitation guidelines 2005 and 2010

K. Kato¹, T. Otsuka¹, Y. Seino², Y. Tahara³, N. Yonemoto⁴, H. Nonogi⁵, K. Nagao⁶, T. Ikeda⁷, N. Sato⁸, H. Tsutsui⁹
⁠¹Nippon Medical School, Department of Hygiene and Public Health, Tokyo, Japan; ²Nippon Medical School Chiba Hokusoh Hospital, Cardiovascular Center, Chiba, Japan; ³Nippon Cerebral and Cardiovascular Center, Department of Cardiovascular Medicine, Osaka, Japan; ⁴National Center of Neurology and Psychiatry, Tokyo, Japan; ⁵Shizuoka General Hospital, Intensive Care Center, Shizuoka, Japan; ⁶Nihon University Hospital, Cardiovascular Center, Tokyo, Japan; ⁷Toho University Faculty of Medicine, Department of Cardiovascular Medicine, Tokyo, Japan; ⁸Nippon Medical School Musashi-Kosugi Hospital, Cardiology, Kanagawa, Japan; ⁹Kyushu University Faculty of Medical Sciences, Department of Cardiovascular Medicine, Fukuoka, Japan
On behalf of JCS-ReSS study group

Background/Introduction: Previous studies have shown that out-of-hospital cardiac arrest (OHCA) occurring at night have poor outcomes compared with OHCA occurring during daytime. On the other hand, nationwide OHCA outcomes have gradually improved in Japan.

Purpose: We sought to examine whether one-month survival of OHCA differed between daytime and nighttime occurrences, and they differed between the periods of International Resuscitation Guidelines 2005 and 2010.

Methods: Using the All-Japan Utstein Registry between 2005 and 2015, adult OHCA patients whose collapse was witnessed by a bystander and the call-to-hospital admission interval was shorter than 120 min were included in this study. OHCA patients were divided by period of the International Resuscitation Guideline 2005 and 2010. Guideline 2005 included years from 2006 to 2010, while Guideline 2010 included years from 2011 to 2015. The primary outcome was one-month survival with favorable neurological outcome, defined as Cerebral Performance Category scale of 1 or 2. Daytime, evening, and night were defined as 0700 to 1459 h, 1500 to 2259 h, and 2300 to 0659 h, respectively.

Results: Among 479,046 cases, 20.3% revealed OHCA occurring at night. OHCA patients occurring at night had lower rate of bystander cardiopulmonary resuscitation (CPR) and automated external defibrillator use than those occurring at both daytime and evening. In addition, of those who received bystander CPR, higher rate of patients received CPR by family members. OHCA patients occurring at night in both guideline periods had significantly worse one-month survival than those occurring during daytime (reference) (adjusted odds ratio, 0.69, 0.64; 95% confidence interval 0.65–0.72, 0.61–0.67; P < 0.001, P < 0.001, Guideline 2005 and 2010 respectively). OHCA patients occurring during daytime in Guideline 2010 had better one-month survival than those in Guideline 2005 (adjusted odds ratio, 1.29; 95% confidence interval 1.24–1.34; P < 0.001).

Conclusions: One-month survival with favorable neurological outcome in OHCA patients occurring at night remains to be significantly worse than those occurring during daytime, even improved by the periods during daytime. CPR training for the family members should be more expanded and strengthened against the night time imperfection.