AP023.

Are qualities of bystander CPR associated with low chance of neurologically favourable one-year survival of EMS-unwitnessed OHCA during nighttime?

Yutaka Takei, PhD^{1,2}, Takahisa Kamikura, PhD^{1,2}, Yoshio Tanaka, MD, PhD¹, Tetsuo Maeda, MD, PhD¹, Hideo Inaba, MD, PhD¹

¹Kanazawa University Graduate School of Medicine, Department of Circulatory Emergency and Resuscitation Science, Japan.
²Niigata University of Health and Welfare, Department of Emergency Medical Sciences, Japan.

- Background
  - OHCA outcomes depend mainly on the initial bystander actions including implementation of good-quality bystander CPR.
  - Accumulating evidences suggest that OHCA outcomes are influenced by OHCA location and time of the day.
    - A large observational study revealed that bystander CPR was less frequently performed during the night time.
- Hypothesis
  - The quality of bystander-performed CCs might be a major factor associated with the long-term OHCA outcomes and their variations by location and time of the day.
- Objective
  - To clarify the major factors that were associated with the quality of bystander-performed CCs
  - To determine whether the good-quality bystander-performed CCs were associated with one-year survival with neurologically favourable survival.
- Methods
  - Baseline data
    - Data of the OHCA patients were prospectively collected in accordance to the Utstein recommendations by all fire departments in Ishikawa, Japan between October 2010 and March 2016.
  - Evaluation criteria
    - The quality of bystander-performed CCs was evaluated by EMTs on arrival at the scene.
    - The quality was determined to be good if the following criteria were satisfied:
      - appropriate hand or finger position for infants,
      - compression rates of at least 100/min,
      - compression depths of at least 2 inch (5 cm) or at least one-third of the anterior–posterior chest diameter,
      - proper decompression
    - The nighttime was defined as the time interval between 7:00 pm and 6:59 am.
  - Outcome measure
    - The primary endpoint was one-year survival with neurologically favourable outcomes
  - Analysis
    - Statistical analyses were performed using JMP® ver.13 for Windows (SAS Institute, Cary, NC).
    - Univariate analyses:
      - The chi-squared test and Fisher’s exact probability test.
      - The Kruskal–Wallis test for nonparametric comparisons.
    - Multiple logistic regression analysis
    - To identify the factors associated with the good-quality bystander-performed CCs and survival.
      - To build the model for one-year survival with neurologically favourable outcomes, factors that were significant by univariate analysis were added in a stepwise manner to obtain the best-fit model with the lowest Bayesian information criterion

Results

Fig. 1 Difference in quality of bystander-performed CCs

Fig.3 Difference in neurologically favorable one-year survival

Summary of results

- Time of the day and arrest location were significantly associated with CC quality, with considerable interaction.
- Following factors were significant factors associated with poor-quality CCs:
  - Non-central region
  - Lack of BLS training experience
  - Elderly-only rescuer
  - At-home OHCA
  - Nighttime (9:00 pm–7:00 am)
  - CC initiation following DA-CPR instructions
  - Female-only rescuer
- Following factors were significant factors associated with neurologically favourable one-year survival:
  - Shockable rhythm
  - Bystander-witnessed OHCA
  - Quality of bystander-performed CCs
  - Non-elderly patients

Fig.2 Major factors associated with good-quality bystander-performed CCs

Fig.4 Major factors associated with neurologically favourable 1-Y survival

Conclusions

- The quality of bystander-performed CCs was a major factor associated with one-year survival with neurologically favourable outcomes.
- Every effort should be made to improve the quality of CCs before EMS arrival at patients.

Acknowledgements:

We would like to thank all fire departments in Ishikawa Medical Control Council for aiding us with the data collection.