

Improvements of the Difficulty in Hospital Acceptance at the Scene by the Introduction of Smartphone Application for Emergency-Medical-Service System: A Population-Based Before-And-After Observation Study in Osaka City, Japan

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Abstract : Background: Recently, the number of ambulance dispatches has been increasing in Japan and it is, therefore, difficult to accept emergency patients to hospitals smoothly and appropriately because of the limited hospital capacity. To facilitate the request for patient transport by ambulances and hospital acceptance, the emergency information system using information technology has been built up and introduced in various communities. However, its effectiveness has not been insufficiently revealed in Japan. In 2013, we developed a smartphone application system that enables the emergency-medical-service (EMS) personnel to share information about on-scene ambulance and hospital situation. The aim of this study was to assess the introduction effect of this application for EMS system in Osaka City, Japan. Methods: This study was a retrospective study with population-based ambulance records of Osaka Municipal Fire Department. This study period was six years from January 1, 2010 to December 31, 2015. In this study, we enrolled emergency patients that on-scene EMS personnel conducted the hospital selection for them. The main endpoint was difficulty in hospital acceptance at the scene. The definition of difficulty in hospital acceptance at the scene was to make ≥ 5 phone calls by EMS personnel at the scene to each hospital until a decision to transport was determined. The definition of the smartphone application group was emergency patients transported in the period of 2013-2015 after the introduction of this application, and we assessed the introduction effect of smartphone application with multivariable logistic regression model. Results: A total of 600,526 emergency patients for whom EMS personnel selected hospitals were eligible for our analysis. There were 300,131 smartphone application group (50.0%) in 2010-2012 and 300,395 non-smartphone application group (50.0%) in 2013-2015. The proportion of the difficulty in hospital acceptance was 14.2% (42,585/300,131) in the smartphone application group and 10.9% (32,819/300,395) in the non-smartphone application group, and the difficulty in hospital acceptance significantly decreased by the introduction of the smartphone application (adjusted odds ratio; 0.730, 95% confidence interval; 0.718-0.741, $P < 0.001$). Conclusions: Sharing information between ambulance and hospital by introducing smartphone application at the scene was associated with decreasing the difficulty in hospital acceptance. Our findings may be considerable useful for developing emergency medical information system with using IT in other areas of the world.

Keywords : difficulty in hospital acceptance, emergency medical service, information technology, smartphone application

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