



Clinical Paper

Epidemiological characteristics of sudden cardiac arrest in schools[☆]

Tatsuya Nishiuchi^{a,*}, Yasuaki Hayashino^b, Taku Iwami^c, Tetsuhisa Kitamura^d,
Chika Nishiyama^e, Kentaro Kajino^f, Masahiko Nitta^g, Yasuyuki Hayashi^h,
Atsushi Hiraide^a, the Utstein Osaka Project Investigators

^a Department of Acute Medicine, Kinki University Faculty of Medicine, 377-2 Ohno-higashi, Osaka-Sayama, Osaka 589-8511, Japan

^b Department of Endocrinology, Tenri Hospital, 200 Mishimacho, Tenri, Nara 632-8552, Japan

^c Department of Preventive Services, Kyoto University School of Public Health, Yoshidahonmachi, Sakyo-ku, Kyoto 606-8317, Japan

^d Division of Environmental Medicine and Population Sciences, Department of Social and Environmental Medicine, Osaka University Graduate School of Medicine, 2-2 Yamadaoka, Suita, Osaka 565-0871, Japan

^e Department of Pharmacoevidence, Kyoto University Graduate School of Medicine and Public Health, Yoshida Konoe-cho, Sakyo-ku, Kyoto 606-8315, Japan

^f Health Policy Bureau, Guidance of Medical Service Division, Ministry of Health, Labour and Welfare Government of Japan, 1-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8916, Japan

^g Departments of Emergency Medicine and Pediatrics, Osaka Medical College, 2-7 Daigaku-machi, Takatsuki, Osaka 569-0801, Japan

^h Senri Critical Care Medical Center, Osaka Saiseikai Senri Hospital, 1-1-6 Tsukumodai, Suita, Osaka 565-0862, Japan

ARTICLE INFO

Article history:

Received 9 January 2014

Received in revised form 5 April 2014

Accepted 28 April 2014

Keywords:

Cardiac arrest

Schools

Prevention

Public access defibrillation

Epidemiology

ABSTRACT

Aims: The present study aimed to clarify the incidence and outcomes of sudden cardiac arrests in schools and the clinically relevant characteristics of individuals who experienced sudden cardiac arrests.

Methods and results: We obtained data on sudden cardiac arrests that occurred in schools between January 1, 2005 and December 31, 2009 from the database of the Utstein Osaka Project, a population-based observational study on out-of-hospital cardiac arrests in Osaka, Japan. The data were analyzed to show the epidemiological features of sudden cardiac arrests in schools in conjunction with prehospital documentation. In total, 44 cases were registered as sudden cardiac arrests in schools during the study period. Of these, 34 cases had nontraumatic cardiac arrests. Twenty-one cases (62%) had pre-existing cardiac diseases and/or collapsed during physical exercise. Twenty-three cases (68%) presented with ventricular fibrillation or pulseless ventricular tachycardia, with cases of survival 1 month after cardiac arrest and those having favourable neurological outcome (Cerebral Performance Category 1 or 2) being 12 (52%) and 10 (43%), respectively. The incidence of sudden cardiac arrests in students was 0.23 per 100,000 persons per year, ranging from 0.08 in junior high school to 0.64 in high school. The incidence of sudden cardiac arrests in school faculty and staff was 0.51 per 100,000 persons per year, a rate approximately 2 times of that observed in the students.

Conclusions: Although sudden cardiac arrests in schools is rare, they majorly occurred in individuals with cardiac diseases and/or during physical exercise and presented as ventricular fibrillation or pulseless ventricular tachycardia observed initially as cardiac arrhythmia.

© 2014 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Sudden cardiac arrest (SCA) in schools is a rare event. When a tragic event occurs in these places that are expected to be absolutely

safe, it can cause emotional distress to family members, students, faculty members, and community members. To prevent sudden cardiac death of students, faculty, staff, or visitors, deployment of automated external defibrillators (AED) in Japanese schools has been strongly advocated since the implementation of the nationwide public access defibrillation program in 2004. The Ministry of Education, Culture, Sports, Science and Technology of Japan reported that by 2012, AED have been placed in 98% public and private schools at all three levels, elementary, junior high, and high schools.¹ However, despite this wide spread use of AED in Japan,

[☆] A Spanish translated version of the summary of this article appears as Appendix in the final online version at <http://dx.doi.org/10.1016/j.resuscitation.2014.04.027>.

* Corresponding author.

E-mail address: paradisepa2@gmail.com (T. Nishiuchi).

epidemiological data on SCA in schools are limited. We therefore examined SCA epidemiological characteristics in schools using the Utstein-style registry database. The present study aimed to clarify SCA incidence and outcomes and the clinically relevant characteristics of individuals who experienced SCA in schools.

2. Methods

2.1. Study design, setting, and data sources

This was a population-based, observational study conducted in the Osaka Prefecture (area, 1898 km²; population, 8.8 million), Japan. This prefecture had approximately 19% individuals aged ≤19 years. The study protocol was approved by the institutional review board of Osaka City University.

In 1998, the Committee of the Utstein Osaka Project launched a population-based observational study of out-of-hospital cardiac arrest (OHCA) with the cooperation of medical institutions, fire departments, the Osaka Medical Association, and other relevant organizations in Osaka. The committee was authorized by the Osaka Prefectural Government in 2005, and the project has been conducted as a public service of the prefectural government since then.

The inclusion criteria for the Utstein Osaka Project Registry are OHCA cases resuscitated and transported by emergency medical services (EMS) personnel. OHCA data variables were determined by the committee according to the Utstein Recommendations.^{2,3} In cooperation with the physician in charge of the patients, EMS personnel completed the data form. More detailed information on patient characteristics and prehospital emergency care was gathered from prehospital documentation (EMS run sheet).

2.2. Subjects and variables measured

All SCA that occurred in school premises between January 1, 2005 and December 31, 2009 were included in the analysis.

The term “school” included the following public and private educational institutions defined by the School Education Act in Japan: elementary schools, junior high schools, high schools, special-needs schools, 2-year junior colleges, specialized training colleges, and universities. School premises are defined as school buildings, grounds, gymnasiums, swimming pools, and all other facilities belonging to the school organizations.

Compulsory education in Japan starts at the age of 6 and lasts for 9 years: 6 years of elementary school and 3 years of junior high school. In 2009, 97% of junior high graduates advanced to high school in Osaka. Special needs schools and schools for students with learning or physical disabilities accommodate children aged 6–18 years. We obtained information on the number of schools, students, and school staff from the website of the Osaka Prefectural Government.⁴ By May, 2009, there were 1974 schools in Osaka with 1,214,594 students and 123,138 educational or clerical staff (Table 1).

The following data were extracted from the Utstein Osaka Project database and relevant EMS run sheets: date, time, and

Table 1
Number of schools, students, and school staff in the Osaka Prefecture.

	No. of schools	No. of students	No. of faculty and staff
Elementary school	1042	498,933	33,617
Junior high school	532	247,972	19,784
High school	272	219,674	22,566
Special needs school	40	7,269	4,946
University	88	240,746	42,225
Total	1974	1,214,594	123,138

location of CA, age, gender, pre-existing cardiac disease, physical activity at CA onset, bystander witness status, cardiopulmonary resuscitation (CPR) by bystanders, first monitored rhythm confirmed by EMS personnel or AEDs used by bystanders if available, and CA cause (cardiac or noncardiac origin). Time factors were evaluated as the time intervals from the ambulance call to (1) arrival at patients side, (2) electrical shock if administered, and (3) hospital arrival.

2.3. Outcome measures

The average annual incidence of CA was calculated as the number of cases divided by the number of schools, with the population stratified by the educational institution category. Survival 1 month after CA was defined as survival more than 1 month after collapse or discharged alive within 1 month. Neurological status was evaluated by the Cerebral Performance Category (CPC) scale.³ A CPC score of 1 or 2 was defined as a good neurological outcome.

2.4. Data analysis

Statistical analysis was performed using STATA/SE 9.0 for Windows (STATA, College Station, TX, USA). Continuous data were expressed as the median and interquartile range. Categorical data were expressed as frequencies and percentages. We calculated the 95% confidence intervals for incidence using the Wilson method.

3. Results

3.1. SCA incidence and outcomes in schools

During the study period, 44 cases were registered as SCA in schools (Fig. 1). Of these, 34 were nontraumatic CA, with cases of survival 1 month after CA and those with good neurological outcome being 14 (41%) and 11 (32%), respectively. Twenty-three cases (68%) presented with ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT) (i.e., shockable rhythm). The outcomes of these 23 cases were more favourable than those presenting with nonshockable rhythm (i.e., pulseless electrical activity and asystole), with survival 1 month after SCA being 52% vs. 18% and good neurological outcome, 43% vs. 9%, respectively.

Traumatic SCA included one case of homicide (stabbing murder), three cases of suicide (two falls from height and one carbon

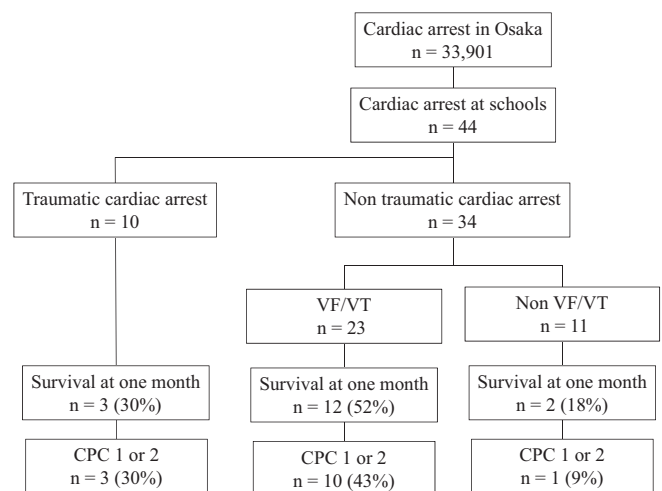


Fig. 1. Utstein reporting template for sudden cardiac arrest in schools in Osaka between January 2005 and December 2009. VF/VT: ventricular fibrillation or pulseless ventricular tachycardia. CPC: cerebral performance category.

Download English Version:

<https://daneshyari.com/en/article/5998094>

Download Persian Version:

<https://daneshyari.com/article/5998094>

[Daneshyari.com](https://daneshyari.com)