

Unexpected Sudden Cardiac Death Under School Supervision in Japan

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Objectives: Approximately half of sudden cardiac death (SCD) of children occurs unexpectedly. In Japan, cardiac screening has been continued for 40 years. To inform school caregivers of necessary knowledge about SCD, recent reports of death cases were analyzed. Methods: Ninety-eight percent of all primary, middle and high schools are affiliated with compensatory system for accidents managed by Japan National Agency for Sports and Health, and they have to report precisely when SCD occurred. SCD student whose life-threatening cardiac disorder was already diagnosed before fatal event is classified as 'expected' group, and SCD student whose risk was unknown before fatal event but was judged as cardiac disorder by autopsy or emergency examinations as 'unexpected' group. Causal disease, relation with exercise, and use of automated external defibrillator (AED) were analyzed with their medical reports and compared them. Results: Ninety-two SCD were reported from schools between 2006-2009. Forty-four were classified as expected group, and 48 as unexpected group. Causal diseases in expected group were 14 congenital heart diseases, 13 cardiomyopathies, 4 Wolff-White-Parkinson syndromes, 2 long QT syndromes, 2 aortic dissections, and 9 others. In unexpected group, causal diseases revealed by emergency examinations and/or autopsies were 5 acute myocarditis, 5 congenital coronary artery anomalies, 4 aortic dissections, 4 cardiomyopathies, 2 incomplete right bundle branch blocks, 1 commotio cordis, however, causes of 27 cases (56.3%) including 7 autopsies in unexpected group were unknown. In expected and unexpected group, 24 cases (54.5%) and 39 cases (81.3%) occurred during exercise, respectively, with significant difference ($p=0.04$). AED was used in 29 cases in every both groups with no significant difference. The incidence of SCD decreased to 23.0 per year during 2006 and 2009, comparing to 73.2 per year during 1989 and 1998. Conclusions: Though improvement of incidence is supposed to be multifactorial, cardiac screening and management has possibility to prevent SCD. Utilization of AED by schoolteachers or students as bystanders also has possibility to save a part of fatal cases. It may be worth discussing to induce echo screening of aorta width and origin of coronary arteries at least for students who will be competitive athletes.