A six-year prospective study of out-of-hospital cardiac arrest managed by a voluntary ambulance organisation

目的：擁有一個志願救護車服務於院前心搏停止及心肺復甦的流行病學資料庫，展望發展未來的策略及改善服務。

設計：使用厄特思泰恩形式樣本從一九九八年十二月至二零零四年十一月的六年期間作前瞻性之研究。設定背景：一個香港志願的救護車服務。研究對象及方法：救護員處理心搏停止個案後需完成及提交一份特別設計的資料表格，並連同救護員出動記錄及自動體外心臟去顫器的電腦打印輸出（如適用）。主要結果量度：經復甦後復習新鮮性血流循環及生存出院。結果：研究期間共有72名心搏停止個案，患者年齡介乎29至106歲（平均73.4歲）。大部分心搏停止在家中發生（46名/63.9%），58宗為目擊的心搏停止個案（80.5%），但只有9宗（15.5%）在救護員抵達前有旁觀者動手施行心肺復甦法，6名患者在救護車抵達時已出現屍僵或屍斑。61名患者有心電圖紙帶記錄，在自動體外心臟去顫器

Objective: To obtain a database on the epidemiology of prehospital cardiac arrest and its management by a voluntary ambulance service, with the view for developing future strategies and service improvement. Design: A 6-year prospective study from December 1998 to November 2004, using the Utstein-style template. Setting: A voluntary ambulance service in Hong Kong. Subjects and methods: Ambulance members had to complete and submit a specially designed data form after managing a cardiac arrest case, together with the ambulance run record and the automated external defibrillator (AED) computer printout, if appropriate. Main outcome measures: Survival to hospital discharge and return of spontaneous circulation after resuscitation. Results: A total of 72 cardiac arrests occurred during the period, with patients' age ranging from 29 to 106 years (mean 73.4). Most cardiac arrests occurred at home (46 or 63.9%). There were 58 witnessed cardiac arrests (80.5%), but bystander cardiopulmonary resuscitation (CPR) was started in only nine cases (15.5%) before the arrival of the ambulance crew. Six patients had evidence of rigor mortis or dependent lividity on ambulance arrival. For the 61 patients with electrocardiogram strips, the initial presenting rhythm on the AED was asystole in 45 (73.8%), pulseless electrical activity in 5 (8.2%), and ventricular fibrillation (VF) in 11 (18.0%). The median call-to-arrival time for VF cases (4.0 minutes) was significantly shorter than that of non-VF rhythms (8.5 minutes) [Mann-Whitney U test p=0.008]. Five patients had return of spontaneous circulation after resuscitation, but only one survived to hospital discharge. Conclusions: Bystander CPR and ambulance response time are two areas requiring urgent improvement in our locality. As the majority of cardiac arrests occurred at home, the cost-effectiveness of public access defibrillation for Hong Kong is unclear. However, strategic placement of AED at 'high incidence' locations should be seriously considered. (Hong Kong j.emerg.med. 2005;12:140-147)
Introduction

St John is the oldest order of chivalry in the world, having had its beginning in Jerusalem in 1023. In Hong Kong, St John was established in 1884. It is a non-profit non-political organisation committed to promoting and encouraging all work of humanity and charity for the relief of sickness, distress, suffering or danger irrespective of race, colour, creed and circumstances. It is better known for its first aid and ambulance services in Hong Kong. There are ten ambulances stationed at three depots in Hong Kong Island, Kowloon and the New Territories respectively, providing free on-call emergency ambulance service to the public 24 hours daily throughout the year. In line with the concept of the "chain of survival", the skill of automated external defibrillation (AED) was first introduced to St John ambulance members in 1993. Ambulances were equipped with automated external defibrillators in 1995. Formal structured training and monitoring programs were started in 1998. The objective of this study was to obtain a database on the epidemiology of cardiac arrest and its management by St John members, with a view for developing future strategies on voluntary ambulance service and public access defibrillation.

Subjects and methods

This was a six-year prospective study from December 1998 to November 2004. St John ambulance members had to complete and submit a specially designed data form after managing a cardiac arrest case, together with the ambulance run record and the AED computer printout, if appropriate. The following data were collected following the Utstein-style template: date, district, site, sex, age, time when call received, time of arrival at scene, time of departure from scene, time of arrival at hospital, chief complaint, history of cardiac disease, witness, time of collapse, bystander cardiopulmonary resuscitation (CPR), time when CPR was initiated, time when CPR ended, initial electrocardiographic rhythm, time of 1st shock, total number of shocks, return of spontaneous circulation (ROSC), AED model used, patient outcome, and additional remarks. As all ambulance cases would be sent to Hospital Authority hospitals, the latter's territory-wide patient database was accessed to check for hospital admission and survival.

Before March 2001, the AED model used was Laerdal Heartstart 3000, which could generate a monophasic truncated exponential waveform and escalating energy levels. This was replaced in the second quarter of 2001 by the Laerdal Heartstart FR/FR2 models, which used a biphasic truncated exponential waveform and a fixed energy level considered to be safer and more efficacious.

The data were entered into the computer software SPSS 10.0 for Windows (SPSS Inc., Chicago, USA), and subjected to statistical analysis. Mann-Whitney U test was used for analysis of continuous variables, with p<0.05 taken as statistically significant.

Keywords: Ambulances, cardiopulmonary resuscitation, emergency medical services, heart arrest, ventricular fibrillation

關鍵詞：救護車、心肺復甦法、緊急醫療服務、心搏停止、心室纖維性顫動