Preliminary Pre-Hospital Use of Personal Digital Assistance-Based EMT Pre-Hospital Patient Care Records (PCR)

Tzong-Luen Wang, MD, PhD and Hang Chang, MD, PhD

Abstract

To investigate if the use of personal digital assistance (PDA) with wireless transmission could provide more pre-hospital information before arrival to the emergency departments, we implemented the PDA system with wireless transmission and web-based recording system in the EMS of Taipei City since August 1st 2002. All pre-hospital records were posted in PDA software. The PDA was hanged on the legs of the EMTs. The time elapse from information received to the arrival to the ER was recorded. The completeness of pre-hospital recording was evaluated by two independent physicians. In addition, a questionnaire for EMTs was used to evaluate the possible difficulties in PDA use. There were 145 pre-hospital records enrolled in the study. Sixty eight records were posted in PDA files whereas the other 77 records were listed as traditional method. Among the cases used with PDA recordings, the mean time interval between the information received in our institute and arrival to hospital was 1.6±0.3 min. Eight of the 68 files (12%) were incomplete, especially the recording of vital signs (6/8, 75%). On the other hand, 9 of the 77 traditional records were incomplete (12%, *P*=NS vs. PDA files). According to the questionnaire, lack of personnel operating the PDA (28/35, 80%) and unfamiliarity with PDA processing (22/35, 63%) were the main factors affecting the completeness of PDA files. PDA-based EMT pre-hospital recording may have the benefit of early information received before arrival to the hospital. More humanistic design may be needed to promote the use of the system and its efficiencies. *(Ann Disaster Med. 2003;1:97-103)*

Key words: Emergency Medical Technician; Personal Digital Assistance; Prehospital care

Introduction

To establish well-defined prehospital medical records, prehospital personnel such as paramedics, emergency medical

From: Department of Emergency Medicine, Shin-Kong Wu Ho-Su Memorial Hospital, Taipei, Taiwan
Address for reprints: Dr. Tzong-Luen Wang, Department of Emergency Medicine, Shin-Kong Wu Ho-Su Memorial Hospital, 95 Wen Chang Road, Taipei, Taiwan
Received: Sep 8 2002. Revised: Oct 20 2002. Accepted: Nov 20 2002.
TEL: 886-2-28332211 ext 2087 FAX: 886-2-28353547 E-mail: M002183@ms.skh.org.tw

technician (EMT) and first responders shall manage the medical care of the patient within their scope of practice and in coordination with all other responding personnel. They should provide patient care according to the EMS Section treatment protocols appropriate for the level of care of the responder. In the United States, an approved prehospital patient care record (PCR) would be completed by each prehospital provider agency for each response.[1] The individual evaluating the patient's condition and providing emergency care shall complete the PCR.[1] The report is to be distributed as follows: medical record as an original top copy (legal document) to be retained by the provider agency; provider copy to be retained by provider agency for billing and/or quality assurance purposes; and hospital copy that forward with the patient to hospital for inclusion in the patient's chart. If the PCR is incomplete at the time of transport and/or arrival at the hospital, the provider must complete the PCR and take to the receiving hospital before the end of their shift.

With the advancement of electronic medical records, a well-informed clinician or a emergency medical technician (EMT) can respond to specific patient needs in a knowledge fashion and may therefore avoid possible errors such as those in recording.[1] Portable devices such as personal digital assistance (PDA) may further assist the receiving hospitals and physicians to access all available information including patients' data and drug database before arrival. We therein evaluated the adequacies of PDA software in pre-hospital EMT recordings in Taipei city.

Materials and Methods

We implemented the PDA system with wireless transmission and web-based recording system in the EMS of Taipei City since August 1st 2002. All pre-hospital records that had been presented in the traditional form were posted in PDA software. In detail, the record forms were displayed in 4 different pages and included the items such as call date and time, identification of the EMS agency/vehicle, patient identification, pertinent history of present illness/injury, relevant past medical history, chief and associated complaints, patient assessment findings, care rendered before arrival, clinical observations including responses to interventions, rescue/extrication information for trauma patients, facts supporting the intensity of the patient evaluation and treatment, including thought processes and the complexity of medical decision making, legible signatures and names of medical control personnel, communication method, notation of other agencies on scene.

The PDA was hanged on the legs or around the waists of the EMTs. The time elapse from information received

to the arrival to the ER was recorded. Two independent physicians evaluated the completeness of pre-hospital recording. In addition, a questionnaire for EMTs was used to evaluate the possible difficulties in PDA use.

Results

There were 145 pre-hospital records enrolled in the study. Sixty eight records were posted in PDA files whereas the other 77 records were listed as traditional method. Among the cases used with PDA recordings, the mean time interval between the information received in our institute and arrival to hospital was 1.6±0.3 min. Eight of the 68 files (12%) were incomplete, especially the recording of vital signs (6/8, 75%). On the other hand, 9 of the 77 traditional records were incomplete (12%, *P*=NS vs. PDA files). According to the questionnaire, lack of personnel operating the PDA (28/35, 80%) and unfamiliarity with PDA processing (22/35, 63%) were the main factors affecting the completeness of PDA files. PDA-based EMT pre-hospital recording may have the benefit of early information received before arrival to the hospital. More humanistic design may be needed to promote the use of the system and its efficiencies.

Discussion

Emergency department (ED)-based surveillance offers a way to collect data on those consulting the ED. The completeness of data collection should include pre-hospital medical records. Establishing a hospital ED surveillance system has several advantages for corresponding research.[1] First, because the incidence of ED-treated events is substantially greater than the incidence of fatal episodes, ED surveillance systems are extremely useful in monitoring pre-hospital management, detecting event clusters, and serving as endpoints of evaluation studies where the occurrence of more severe injuries would be too rare.[2] Second, the ED is usually the first place a patient visits after an acute event. Therefore recall of the external cause of the event is likely to be more accurate at the ED than it is later in the treatment process. On the other hand, the minimum data required for out-of-hospital documentation should accordingly include the following: call date and time, identification of the EMS agency/vehicle, patient identification, pertinent history of present illness/injury, relevant past medical history, chief and associated complaints, patient assessment findings, results of diagnostic tests such as capillary glucose readings and EKG rhythm if possible, care rendered before arrival, any hospital-generated orders, clinical observations including responses to interventions, which are as important as the intervention itself, final disposition and estimated time of arrival, mechanisms of injury, Glasgow Coma

Scale score, and trauma scores; rescue/extrication information for trauma patients, facts supporting the intensity of the patient evaluation and treatment, including thought processes and the complexity of medical decision making, legible signatures and names of medical control personnel, communication method, notation of other agencies on scene (i.e., police).[3]

PDA-based PCR provides at least two benefits to hospitals. First, it requires personnel at EDs to collect and maintain certain data elements on all patients, including patient identification, time and means of arrival, relevant history, prehospital care, diagnosis, tests ordered, and disposition.[4] The PDA is designed to meet the requirement, and all essential pre-hospital data are included. Second, hospitals can use the system for quality-improvement activities.[5-9] For example, case load may be determined by provider, diagnosis, outcome, and demographic characteristics of patients. A well-documented Ustein style survey may also be established.[10]

However, the PCR should be met with the following criteria:[11,12] 1) Factual: The log should chronicle objective information reported by emergency medical technicians (EMTs)--what they observe about the scene, glean from their assessment, or treatments rendered to the patient. Resist the impulse to speculate, judge character, or to label behaviors by using slang or demeaning statements abbreviated as code initials (such as TNT or PRH). On the other hand, using appropriate medical abbreviations increases the amount of information that can be noted in a limited space and in the short time span taken by most telemetry calls. Charting generally should maintain a sense of profession detachment. 2) Accurate: Even factual records will be subject to scrutiny if they look inaccurate or unreliable. During the discovery period, attorneys from both sides will examine all charts or logs and compare the actual notations to written standards. Every word and time frame may be meaningful. Inaccurate or incomplete entries, without just cause, diminish the reliability of the record. 3) Complete: The communications log should stand alone as a chronologic recording of all out-of-hospital events. It is helpful if boxes are present that allow quick checkmarks noting either "within normal limits" or other locally customized notations suggesting a pathologic condition (nausea, vomiting, cough, etc.) Equally helpful are check boxes for routine assessments, such as quantification of pain, pupil size and reactivity, breath sounds, skin color, temperature, moisture, level of consciousness, Glasgow Coma Scale scores and trauma scores. Forms constructed to facilitate quick notations of care rendered in the field, destination, and estimated time of arrival are also

beneficial provided local protocols define the applicable standards of practice. 4) Timely: The EMT should document as much as possible during the run.[7] If this cannot be done contemporaneously, jot down shorthand notes so that details remain fresh until you can finish the record. All vital signs, rhythm interpretations, assessments, and out-of-hospital interventions should be timed unless local protocols indicate otherwise.

In this study, lack of personnel operating the PDA (28/35, 80%) and unfamiliarity with PDA processing (22/35, 63%) were the main factors of incompleteness of PDA files. Besides personal training in exercising the PDA, adequate arrangement of personnel in ambulances and improvement in imputing mode of PDA may another measures in resolving the problem.

In our study, the limitations of PDA-based PCR include the following three. First, data were not entered while the patient was in the ED as the PCR was originally designed. This means that the additional information not contained in the logbook was written down and subsequently entered into the computer. Second, the PCR is used without any communication to other hospital information systems and still cannot be merged into a part of the hospital medical chartings. Finally, these were just preliminary results and more large-scale data would be needed to ascertain the role of PDA in pre-hospital EMT medical recordings.

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初步到院前使用個人掌上型電腦為根基的 EMT 到院前病患照護記錄

王宗倫　張　珩

摘要

為了調查具有無線傳輸功能的個人掌上型電腦可以在到達急診室之前提供更多的到院前資訊，我們從 2002 年 8 月 1 日安裝了無線傳輸的 PDA 及網路記錄系統於台北市的 EMS。所有到院前的記錄都被放置於 PDA 的軟體內。此 PDA 則懸掛於 EMT 的大腿外側。從資料取得至到達急診室所需的時間都被詳細記錄。再由兩位獨立的醫師評估其記錄之完整性。同時，對 EMT 進行另一份問卷調查，以評估他們使用 PDA 的困難性。共有 145 份到院前記錄被納入這項研究。68 份記錄被放置在 PDA 的文件內，其他 77 份記錄則用傳統的方式列出。在使用 PDA 記錄的案件中，從我們單位取得資料至到達醫院的平均間隔是 1.6±0.3 min。68 份中的 8 份(12%)是不完整的，特別是生命跡象的記錄(6/8,75%)。此外 77 份傳統記錄中有 9 份是不完整的(12%, *P*=NS vs. PDA files). 根據問卷調查，缺少人力來操作 PDA 及不熟悉 PDA 的使用是影響 PDA 資料完整性的主因。以 PDA 為基礎的 EMT 到院前記錄，其好處是能在到達醫院前更早取得資訊。需要更人性化的設計來推廣這系統的使用及提高其效率。 *(Ann Disaster Med. 2003;1:97-103)*

關鍵詞：緊急醫療人員，個人掌上型電腦，到院前照護

財團法人新光吳火獅紀念醫院急診科
抽印本索取：王宗倫　台北市士林區文昌路 95 號　新光吳火獅紀念醫院急診科
收件：91 年 9 月 8 日　修正：91 年 10 月 20 日　接受刊載：91 年 11 月 20 日
電話：(02)28332211 分機 2087　傳真：(02)28353547　E-mail：M002183@ms.skh.org.tw