TraumaHawk Photographic Trauma Site Documentation: Interdisciplinary Team Collaboration and Process Evaluation

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Introduction

TraumaHawk is a smartphone application used for the acquisition of motor vehicle crash (MVC) photographs that are sent to the University of Iowa Emergency Department to be assessed in order to improve patient outcomes. For the TraumaHawk program to be successful it requires a collaborative effort between various disciplines in the MVC victim care process; Iowa State Patrol, Johnson County Ambulance, local fire/police, the University of Iowa Emergency Department healthcare workers, and the University of Iowa trauma team. This project looks to facilitate collaboration in interdisciplinary teams through education and training.

Literature Review

There is a need for greater communication between Emergency Medical Services (EMS) and emergency care providers in the hospital. Only 51% of emergency physicians are satisfied with the information they receive from emergency responders.

In the early 1990s the University of Washington and Harborview trauma center employed a program in which they utilized hand held cameras that took Polaroid photos at the crash scene. Those were then attached to the patient and were viewed by trauma personnel at the hospital for evaluation. That process eventually progressed to the use of cameras with floppy disc capabilities. After photographing the crash site the floppy discs were sent with the patient to the trauma center where they were evaluated by the trauma team and used to assess patient injury. The program at Harborview did not keep up with technology and has slowly dissipated over the last decade.

Researchers have found the process of photographing the crash scene to be underutilized and under-researched. They also found, even with older technologies, that it is possible to take multiple photographs of vehicle intrusion and damage in an effective amount of time in multiple types of conditions and environments.

The advantages of photographically documented crash scenes are that they allow the trained trauma professional to assess patterns of injury based on crush and intrusion and patterns of the damaged vehicle. With the advantage of pre-hospital trauma scene photos, healthcare providers will have a better ability to prepare for the patient with information that will help dictate diagnostic and treatment procedures. Looking for type of crash, intrusion, force, and damage location assist the trauma provider in assessing for injury.

Methodology

The purpose of this project is to improve communication between emergency responders at a crash scene and the receiving trauma care providers at the University of Iowa. The objectives used to ensure the success are to design and create the TraumaHawk smartphone trauma scene documentation application.

After designing the smartphone application, the next step was to educate and train Iowa State Patrol, Johnson County Ambulance Service, and UIHC trauma care workers on crash scene documentation, the TraumaHawk app, and how to use photographs to assist the trauma patient. This will continue with cooperation from the University of Iowa Emergency Department.

In order to evaluate the implementation of the project three brief questionnaires were designed for users of the TraumaHawk smartphone application after using it in the field and hospital setting to measure the quality of interdisciplinary communication.
Evaluation

TraumaHawk, the smartphone application, has been created through collaboration with members of the computer science program at the University of Iowa. It is a functioning tool that can be used to transmit photographs from a crash scene to the University of Iowa emergency department. Photographs have been sent from smartphones during demonstrations of photographic trauma site documentation and also as part of the pilot program of this project. Results of the questionnaires show that more education is necessary to improve the communication between emergency responders and hospital personnel concerning the transmission of the photographs.

Both groups in the project, emergency responders and hospital personnel, are very receptive to improving communication between the two groups and are open to using new technology to improve that communication. Educational seminars and grand rounds were used to educate stakeholders regarding photographic trauma site documentation and the TraumaHawk tool.

In addition to these seminars there were seven demonstrations completed in collaboration with the Iowa Department of Public Safety in which TraumaHawk was shown to Iowa legislatures, media, and state emergency/disaster planning personnel.

As the pilot program for this project continues, gathering sufficient data for this program will take place over an extended period of time. More data will become available as more emergency responders are educated and trained to use the TraumaHawk smartphone application.

Once more questionnaires have been obtained, inferential statistics will be used to calculate the probability of “YES” answers using $p \pm 2\sqrt{\frac{p(1-p)}{n}}$ as more questionnaires are gathered. Associations between pairs of variables will be assessed by 2x2 tables and chi-square statistics.

Impact on Practice

The TraumaHawk program looks to build on the foundations of past research and implement a sustainable program that can provide photographs to trauma care providers in eastern Iowa. In correlation with past research, crash scene photographs can be taken at the trauma scene in a fast and efficient manner that doesn’t interfere with care of the crash victim. The TraumaHawk pilot program will continue at the University of Iowa.

Conclusions

TraumaHawk crash scene photographs can be obtained and sent to the emergency department in a fast and efficient time frame. This project can help to improve the communication process between emergency responders and hospital staff. It will be necessary to create a system in which the arrival of photographs is communicated to the emergency department automatically after they are sent via TraumaHawk.

The future of crash scene recreation will continue to grow as technology progresses. With the rapid advancement of technology the opportunities for a photographic trauma site documentation program will be broad. It is important to establish a strong foundation for a program that can evolve with technology. TraumaHawk can be a step in that process. More research is necessary to evaluate the ability of crash scene photographs to change or improve the decision making process of patient care in the hospital.

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References


