Chapter 50

Medco:
An Emergency Tele-Medicine System for Ambulance

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ABSTRACT

In emergency cases the delay in receiving the necessary pre-hospital care results in a large number of deaths every year. Providing appropriate preliminary care, along with proper time management and pre-hospital management can contribute to a better survival rate. Here the authors propose a portable system which transmits the vital parameters to the health care center along with the images of the patient, also availing the patient's Personal Health Record to the doctor, thus bridging the gap between the hospital and the ambulance and "virtually" bringing the doctor to the ambulance, thereby allowing him to diagnose the patient remotely and as accurately as possible. The paper puts a glance on rapidly developing field of Tele-medicine while proposing a system to overcome infrastructure inadequacies, which hamper the efficient use of Tele medicine systems (more specifically emergency tele-medicine) and provide better health care facilities in various medical situations, specifically those pertaining cases of burns, fatal wounds, head injuries, pregnancy and other such emergencies.

INTRODUCTION

According to studies/reports by National Crime Record Bureau road accidents alone claim 1,41,256 lives every year in India (Traffic Accidents, NCRB report), WHO takes into account the deaths after being admitted into the hospital and reports an even higher number which is nearly 40% higher than reported by NCRB. Not accounting the death toll in all other emergency situations, this translates roughly into a death every 4 minutes. Another analysis of this study shows that, with prompt medical response nearly 50% of these victims could have been saved (Statistics, Save Life Foundation).

Many studies worldwide have shown that rapid response time in the pre-hospital setting results in increased mortality and dramatically improved patient outcomes (Weston, Penny, Julian, 1994; Pavlopoulos, Kyriacou, Berler et al., 1998). Proper aid and pre-hospital management can greatly reduce the death toll, while assuring higher survival rate and better health care services.

Currently the telemedicine systems fall under 2 major categories, 'real time' and 'store and forward mode' (Lin, 1999). In the store and forward mode, all relevant information (data, images, etc.) is transmitted to the specialist at health care center, wherein immediate response by specialist is not expected. On the other hand, in real time interactive mode a paramedic is present with the patient at the remote location and specialist at the medical center. According to the doctors/medical staff, during emergencies a real time interactive telemedicine system is more preferable over the former one.

Here the authors propose a real time interactive system that conduits the gap between doctor and the ambulance, allowing the doctor to receive patient's real-time vital constraints, along with images of patient (wounds/burns) if required, also including the Personal Health Record (PHR) of the patient (If available), enabling the doctor to diagnose the patient, remotely and accurately.

The system also facilitates concurrent audio and video calling so the doctor can issue instructions to the paramedics, who are the first point of contact for the patients, but lack the expertise to deal with the situation. This minimizes the response time, which in itself is a challenge and can be overcome by using the traveling time effectively.

Coupled with functionalities such as GPS, wireless connectivity, etc. (which are already available on the device) the proposed system enables the health care center or hospital to be prepared for dealing with any situations that arise by the time the patient reaches the hospital. This will prove imperative in cases where the time required to reach hospital is large.

The authors think that, in developing countries like India, where the patient to doctor ratio is pretty high (Challa, Geethakumari, & Prasad, 2011), this system will help doctors immensely and will overall have large positive impact on patient's survival rate.

This paper is primarily based on previously published papers, MedCare: Tele-admonishing system (Saikar, Badve, Parulekar et al., 2015), VMATap: Virtual medical assistance on tap and emergency telemedicine system for ambulance (Saikar, Badve, Parulekar, 2016) by the same authors. Here the authors propose enhancements over the constraints in the previous system, amongst various other aspects.

In this paper a solution has been proposed for providing better health care services in developing countries like India, keeping in mind and attempting to overcome the infrastructural (and other) issues. The proposed system specifically focuses on providing panacea during the emergency medical situations, while keeping the system as stable as possible.

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