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The use of multi-media messaging in the referral of musculoskeletal limb injuries to a tertiary trauma unit using: a 1-month evaluation

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Summary

Objectives: New developments in telecommunications will have a profound effect on the delivery of medical care throughout the world. In Northern Ireland three trauma centres provide fracture care for their own and surrounding Emergency Departments. All trauma referrals are currently taken by telephone. It is our experience that the verbal description of the radiographs of a musculoskeletal limb injury can be inaccurate, necessitating us to view the plain films of the patient. By utilising a recent advance in telecommunications technology, the launch of mobile handsets with multi-media messaging (MMS) service capability, it is now possible to digitally capture and instantly send an image of a plain film.
Purpose: To evaluate the use of multi-media messaging as a supplement to the telephone referral of musculoskeletal limb injures.
Method: Following a referral using, the emergency physician and the trauma surgeon evaluated the multi-media consult through a survey questionnaire.
Results: Between the 1st December 2003 and the 1st January 2004, 46 multi-media consultations were performed. Picture quality was acceptable in all but one of the referrals. In 35 of the 46 referrals the multi-media image of the plain films was felt to improve the management of the patient. In 8 of the 46 referrals the multi-media image of the plain films was felt to change the management of the patient.
Conclusion: A multi-media messaging store- and forward telemedicine system has potential to facilitate the rapid, cost-effective management of musculoskeletal limb injuries thereby enhancing clinical care.

Introduction

Fracture services in Northern Ireland are provided by three trauma centres that care for their own and

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for surrounding Emergency Departments, with a total population of 1,700,000 people. All trauma referrals are currently accepted by telephone. Management decisions are therefore based upon a clinical history and an anatomical description of the radiographs. Many referrals are made by junior doctors and it is our experience that the verbal description of the radiograph, of a musculoskeletal limb injury, can sometimes be inaccurate. In some cases it is of great benefit to view the plain films of the injury to help formulate an accurate management plan. If we are unsure about the verbal description of the injury we request that the radiographs be sent to us for review. This is time-consuming, inefficient and a waste of healthcare resources, costing £ 70 for taxi transfer of the radiographs: we therefore felt that a simple store and forward telemedicine system using MMS would help to make early, accurate management decisions. Presently the dominant format of successful electronic communication is the desktop computer networked through the internet.[1] However, as on-call trauma surgeons we often take referrals where we are unable to get internet access. By utilizing a recent advance in technology, the launch of mobile telephone handsets with multi-media messaging (MMS) capability, we hope to overcome this obstacle. The purpose of this project was to evaluate and describe our experience of the use of MMS as a supplement to the telephone referral of musculoskeletal limb injures.

Figure 1 The Sharp GX20 Multi-media mobile handset.

Methods

Materials

Data collection, transmission and display

The simplicity and user-friendliness of the mobile handset must be acceptable. The ideal handset should be both small and light enough to be carried by the trauma surgeon at all times and incorporate an integrated digital camera that has sufficient resolution to take photographs of radiographs upon which a diagnostic decision can be made. After the evaluation of a selection of advanced mobile handsets, taking into consideration handset size and picture quality, the Sharp GX20 phone was chosen as the mobile platform to transmit and receive the multi-media messages (Fig. 1). The Sharp GX20 weighs 105 g and is 95 mm$\times$ 49 $\times$ mm 25 mm in size allowing it can be carried on the trauma SHO at all times. Its display size is 80 mm$\times$ 60 mm and the resolution of the screen is 240 $\times$ 320 pixels. In this study plain films were photographed by the referring emergency physician, saved in JPEG format and then transmitted as an MMS image (Fig. 2) to the handset of the trauma surgeon. All referrals included AP and lateral radiographs of the injury as well as a photograph of the associated wound if required (Fig. 3).

Patients

During December 2003 we evaluated the use of MMS as an adjunct to telephone musculoskeletal limb injury referrals. This project has involved the tertiary trauma centre at the Altnagelvin Area Hospital, Londonderry, Northern Ireland, and three referring peripheral Emergency Departments at the Erne Hospital, Enniskillen, Tyrone County Hospital, Omagh and the Causeway Hospital, Coleraine. The Emergency Departments and trauma surgeon were each provided with a MMS handset. The musculoskeletal limb injury referrals evaluated in this project were from 46 consecutive multi media consultations to Altnagelvin Hospital, during November 2003. Consecutive recruitment was chosen to avoid selection bias in radiograph quality or fracture pattern. AP and lateral radiographs were obtained in all the referred patients. Following an appropriate telephone referral a multi-media consultation was initiated. From the MMS images and the clinical