

IS MOBILE TELEDERMATOLOGY BECOMING A REALITY?

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Abstract

Mobile telemedicine is becoming more and more important in the 21st century. As a visual profession dermatology provides perfect conditions for using telemedicine tools in general and mobile devices in particular. Teledermatology advances the reliability of diagnosis by expert consultations without expensive and time-consuming relocations. Consecutively the quality of patient's care will be raised and the costs of the health care system can be reduced.

1. Introduction

The term mobile telemedicine is widely used and encompasses a wide range of telemedicine applications. In our understanding mobile telemedicine is defined as medicine at distance with the patients using mobile devices like cellular phones and personal digital assistants. The implementation of modern wireless telecommunication means like Global Positioning Radio System (GPRS) or Wireless Local Area Network (WLAN) and satellite communication has become nearly an everyday reality and thus forms the IT basis for mobile telemedicine. These technologies can be used widespread in medicine: from telecardiology onwards via teleradiology to telepathology and telepsychiatry. As a visual profession dermatology provides perfect conditions for using telemedicine tools in general and mobile devices in particular.

2. Results

In 2005, colleagues from the Department of Dermatology in Graz, Austria, demonstrated the feasibility for teleconsultations using cellular phones [1]. 95 Patients from the outpatient service of the Department of Dermatology, Medical University of Graz (Austria) have been photographed with the built-in camera of a cellular phone. In addition, photos of the skin conditions of 87 patients were taken with the built-in camera of a PDA. Images of the cases have been sent to three teleconsultants with different experience in dermatology via a virtual private network (www.telederm.org) based on a store-and-forward system. The teleconsultants reviewed the cases independently. The three teleconsultants reviewing photographs taken with a cellular phone obtained a score of correct telediagnosis of 73%, 68% and 68%, respectively, with a global average of 70%. The degree of concordance between face-to-face diagnoses and teledermatology with images shot with a PDA was 90%, 83% and 66%, respectively, with an average of 80% [2].

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In another study conducted recently in Graz 58 patients from an outpatient setting were included and a maximum of 3 still images per patient was shot using the built-in camera (1,3 Megapixel, Resolution with 640x480 Pixels) of a mobile phone. The first image was an overview image of a representative skin lesion, the other two were images from the lesion in close-up view. Subsequently, these images were stored as a JPEG file, transmitted via data-cable to a PC and integrated into a web application. Then the patient was examined by the specialist in the outpatient service while the images were diagnosed independently by two teledermatologists. Finally, the face-to-face diagnoses were compared with the results of the teleconsultation. Elaboration of final results is still pending, but overall the results seems to be very promising (publication in progress).

Our latest feasibility study with special emphasis on pigmented skin tumors was conducted with a modern cellular phone including 2 Megapixel built-in camera providing images with a resolution of 1632x1224 Pixels. This camera has an Autofocus-Function and Macro-Mode. 18 patients were selected consecutively in the Pigmented Skin Lesions Clinic. The physicians took 4 images of each patient: The first and second images were an overview respectively a close-up image of the skin lesion. The third image was taken with a magnifying glass with 8 times enlargement. The fourth image was taken with a polarized light source providing a dermoscopic image. Two teleconsultants reviewed the images on a specific web application where images had been uploaded in JPEG format. The telediagnoses of the pigmented skin tumors were then compared to the face-to-face diagnoses. The 2 teleconsultants obtained a score of correct telediagnosis of 95%. In comparison with the “older” studies the quality of the images in the latest feasibility study is much better, probably because of the Autofocus-Function and the high resolution of the telephone camera representing the fast development of the telecommunication sector (PloS One; submitted).

3. Discussion

Currently, in many medical specialities research in telemedicine is focusing on developing and testing new ways to utilize cellular phones for home-based health data acquisition. Home monitoring using information and communication technologies is particularly suitable for managing chronic diseases and a number of clinical trials have indicated the value of this concept to optimize therapy in hypertension, diabetes, asthma as well as to reduce hospitalization for patients with heart failures [3]. The results of our preliminary studies summarized herein show for the first time the potentiality of mobile teledermatology as a useful tool for telemedical consultations of inflammatory skin diseases as well as a triage system for pigmented skin lesions. In accordance with the new formulated concept of “person-centred health system” this approach opens up new horizons for persons with numerous moles and suspicious pigmented skin lesions. In fact, one of the cardinal points of the eHealth program of the European Commission Information Society and Media is the prevention and management of diseases through research on “Personal Health Systems”. The hallmark of this concept is to empower citizens to adopt an active role in managing their own health status and, in addition, facilitating early diagnosis of diseases [4]. In this context mobile teledermatology has the potential to become an easy applicable tool for everyone and may open the door for a new flexible triage system for inflammatory skin diseases as well as for detection of skin cancer in general and melanoma in particular. A person concerned about a rapidly emerging inflammatory skin disease or a changing mole can capture an image of a given lesion with a cellular phone and send it to a specialized telemedicine centre for triage. Certainly, the legal aspects concerning mobile teleconsultations have to be reevaluated based on a new definition of doctor-patient-relationship. Moreover, prospective, randomized clinical studies are needed to test and standardize the proposed mobile approach.

4. Conclusion

We foresee that in the near future there will be an icon on the screen of cellular phones allowing to immediately seeking for a telemedical consultation including advice and follow-up for dermatological conditions and a triage system for new and suspicious moles. So, mobile teledermatology is paving the way for enhanced self examination in the spirit of the eHealth program of the European Commission for Information Society and Media [4].

5. References

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