



Teledermatology: A Study Comparing Diagnosis and Management of Dermatological Conditions in the Emergency Department

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INTRODUCTION

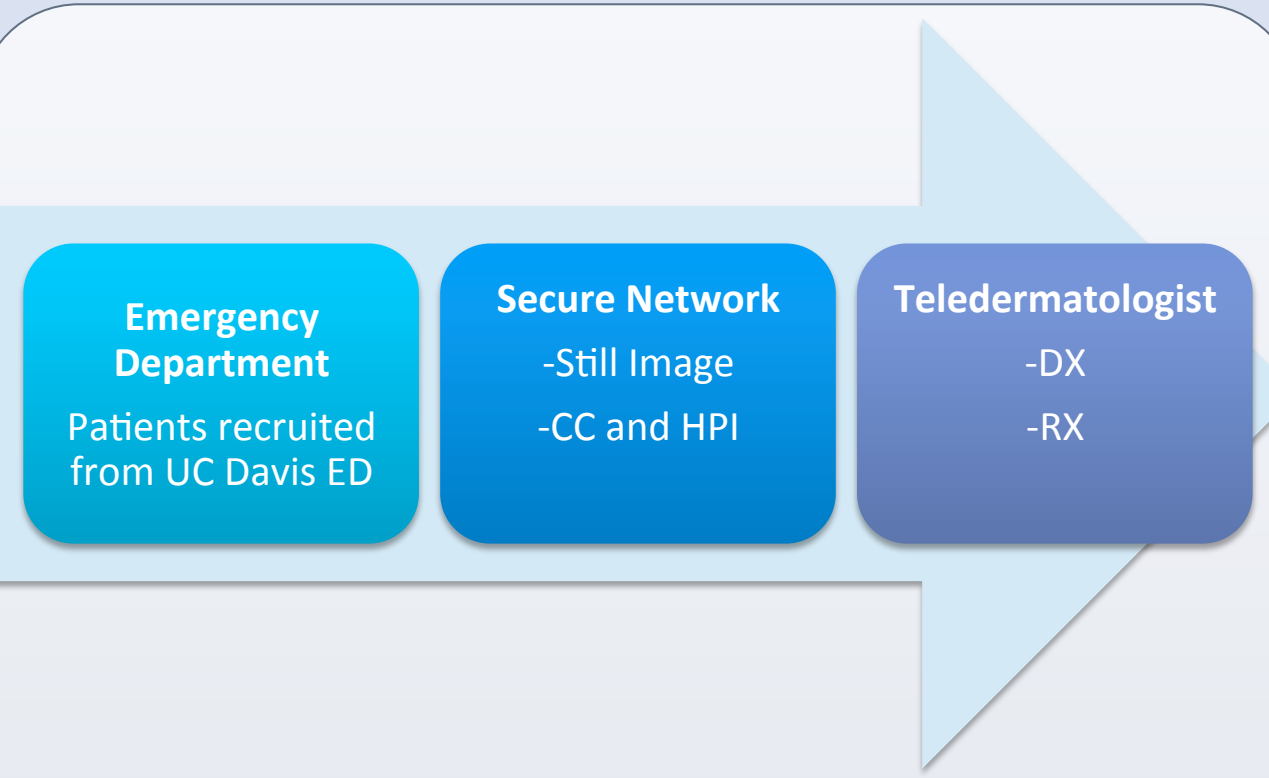
Teledermatology is use of communication technology to connect patients with dermatologists at a distance [1]. Dermatology is well suited for the use of telemedicine in the delivery of care because it is a specialty where visual inspection is important. Teledermatology can be applied in different ways. One way is using live interactive, real-time videoconferencing, while another is using a digital image that is stored and forwarded with a clinical history [2,3]. Advantage of store-and-forward method is that it avoids the logistical difficulty of setting up videoconferencing consultations. Technological advances also now allow high resolution images to be instantly uploaded. Skin lesions are a common reason for patients to go to the emergency department [9,10]. Teledermatology is a growing practice that can potentially revolutionize the delivery of dermatology services. But, before its widespread application as a health care service tool, it is important to assess its accuracy and reliability through multiple evaluations.

OBJECTIVES

1. To ascertain the diagnostic agreement between non-dermatological physicians and a board certified dermatologist in the assessment of dermatological diagnoses made through mobile phone photography when captured in the emergency department.
2. To test how often the use of mobile phone based teledermatology will alter the original management plan.

MATERIALS & METHODS

The Institutional Review Board of the University of California Davis approved this study. All Patients gave written informed consent to participate in this research. Subjects were recruited from the Emergency Department at UC Davis Medical Center after the treating physician identified them as having a dermatological condition. For each case of a skin condition, still images of the dermatological condition were taken and uploaded on a HIPAA secure cloud based online teledermatology platform (Klara). An emergency medicine physician assessed the subject directly and one board-certified dermatologist assessed the skin condition through examination of the still images and was blinded to the diagnosis rendered by the non-dermatologist physician until a diagnosis was finalized. The concordance of the non-dermatologist physician's diagnosis and treatment plan was compared to the diagnosis and treatment plan provided by the dermatologist viewing the still images. The images only had accompanying basic history of present illness (without diagnostic history) and a subject code. The board certified dermatologist participating in image grading did not have access to any information besides the image, subject code, and the history or present illness prior to his diagnosis.



RESULTS

50 subjects were evaluated using still digital images (55 subjects enrolled, 5 were excluded)

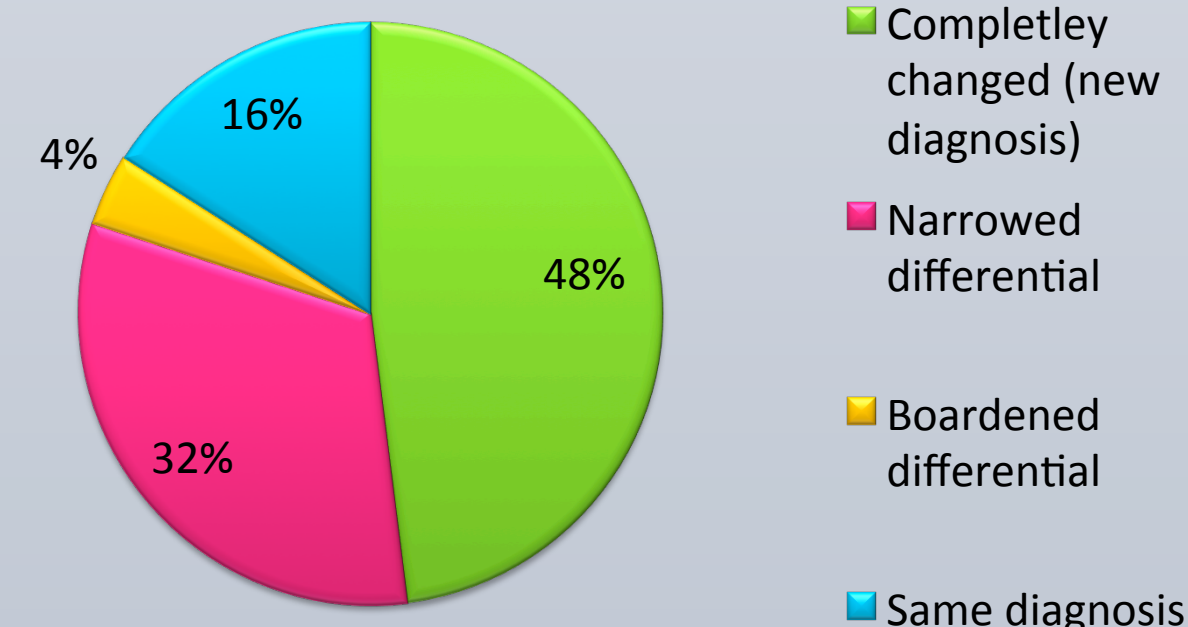
Demographics:

- 29 (58%) males and 21 (42%) females
- 33 (66%) subjects were in the pediatric age range (under 18 years of age)
- 30 (60%) subjects were non-Hispanic, 19 (38%) were Hispanic, 1 declined to answer

Table 1. Top Five Diagnoses

| |
|-------------------------|
| Atopic Dermatitis |
| Hand-Foot-Mouth Disease |
| Contact Dermatitis |
| Viral Exanthum |
| Molluscum Contagiosum |

Figure 1. Diagnostic Agreement Between ED Physician and Teledermatologist



RESULTS

Alterations in management plan:

- 68% of patients (n=34) had a change in management by teledermatologist

Table 2. Diagnoses that Emergency Department Physicians Requested an Official Dermatology Consult

| |
|---|
| Atopic Dermatitis |
| Morbiliform drug eruption |
| Acute Hemorrhagic edema of infancy |
| Hand-foot-mouth vs varicella |
| Acnieform eruption (folliculitis) vs miliaria rubra |
| Atopic dermatitis w/imetiginzation |
| Eczema herpeticum vs eczema coxsackium |

Correlation between live face-to-face dermatology consult and teledermatologist:

- 16% of patients (n=8) with official face-to-face (FTF) dermatology consult by ED
- Diagnosis (100%) and management (88%) was in agreement between FTF dermatologist and telederamntologist

A missed case of pemphigus vulgaris:

- Patient came back to the emergency department one week later



CONCLUSIONS

- From our teledermatology study looking at patients from the Emergency Department at UC Davis Medical Center we found that teledermatology is a reliable and valid mode of providing dermatological care.
- As the demand for dermatological services increases, teledermatology can serve as a medium to provide these services to rural or primary care physicians.
- It can also service as an aid in busy emergency departments, where waiting for a face-to-face dermatology consult can take hours.
- In our study, teledermatology had minimal start-up costs, and had complete agreement with diagnostic and management recommendations to a FTF dermatologist.
- It should not, however, be thought of as a gold standard for dermatology delivery.
- Limitation of our study is the sample size, thus, further research is needed to evaluate the application of teledermatology in the health care setting.

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