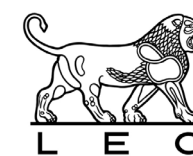


Teledermatology and teledermoscopy as tools to help general practitioners in effective e-triage of suspicious skin lesions prior to dermatology evaluation

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Introduction

The diagnosis of melanoma and other types of skin cancers by general practitioners (GPs) is not easy. With the shortage of dermatologists in Canada, there is an ever-growing need to streamline operations to connect patients with dermatologists and triage high priority patients. This emphasizes the need for a more efficient workflow through telehealth tools and management strategy between GPs and dermatologists.

Although the benefits of utilizing telehealth for improved telemedicine management have been extensively studied, the feasibility of using teledermoscopy to support skin cancer management when connecting general practitioners with dermatologists has not been investigated thoroughly.

Advantages of this process include but are not limited to: minimized time to access specialized services, reduced cost linked to travelling, earlier detection of skin cancers and a decreased number of healthcare visits.

This study aims to evaluate the use of teledermatology for remotely monitoring suspicious lesions and implementing a connected referral system for effective eTriage.

Methods

Study objectives

A controlled trial on the efficiency and accuracy of the diagnosis for eTriage purposes regarding the prioritization of dermatologist's consultations requests for skin cancer lesions.

This trial will compare both the eTriage process vs the usual paper referral process in terms of efficacy, accuracy, and time savings to prioritize patients regarding potential skin cancer lesions.

Study setting

Participants were recruited when attending visits to their GPs in the province of Québec, Canada. A group of 23 GPs were enrolled and trained to use their iPhone with a MoleScope device and DermEngine application for the evaluation of a suspicious skin lesion.

After obtaining the patient's informed consent, clinical and dermoscopic images of one suspicious skin lesion were taken by the physician, incorporated in the specialized DermEngine eTriage module and sent to the dermatologist.

The dermatologist was advised by the App on his iPhone/Apple Watch and by email for each case received. The group was followed up with throughout the process and the outcomes were recorded.

For suspicious lesions (clinical and/or dermoscopy), diagnoses were confirmed histologically by a dermatopathologist.

Inclusion and exclusion criteria

Eligibility for this trial included patients with moles, who were attending family doctor clinics and were aged 18 years or older. Those under specialist care as part of the high risk group for skin cancer were excluded.

Doctors Physicians who were not already in possession of or have not used a smart mobile phone and did not have internet connection were considered ineligible to participate.

Data Collection and Analysis

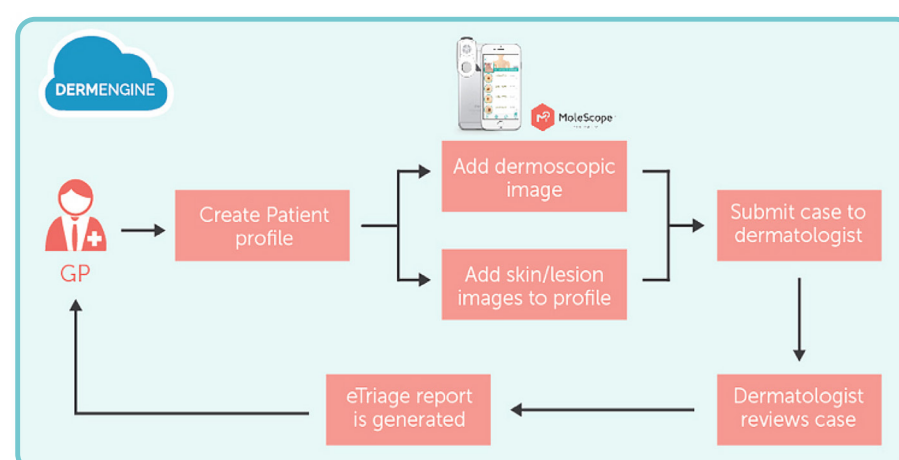
MoleScope™

The MoleScope is a smartphone attachment for dermoscopy that provides a high-resolution, detailed view of the skin through magnification and specialized lighting. It can be used by health professionals.

The device was used as the primary tool to collect dermoscopy images of pigmented and nonpigmented suspicious lesions.

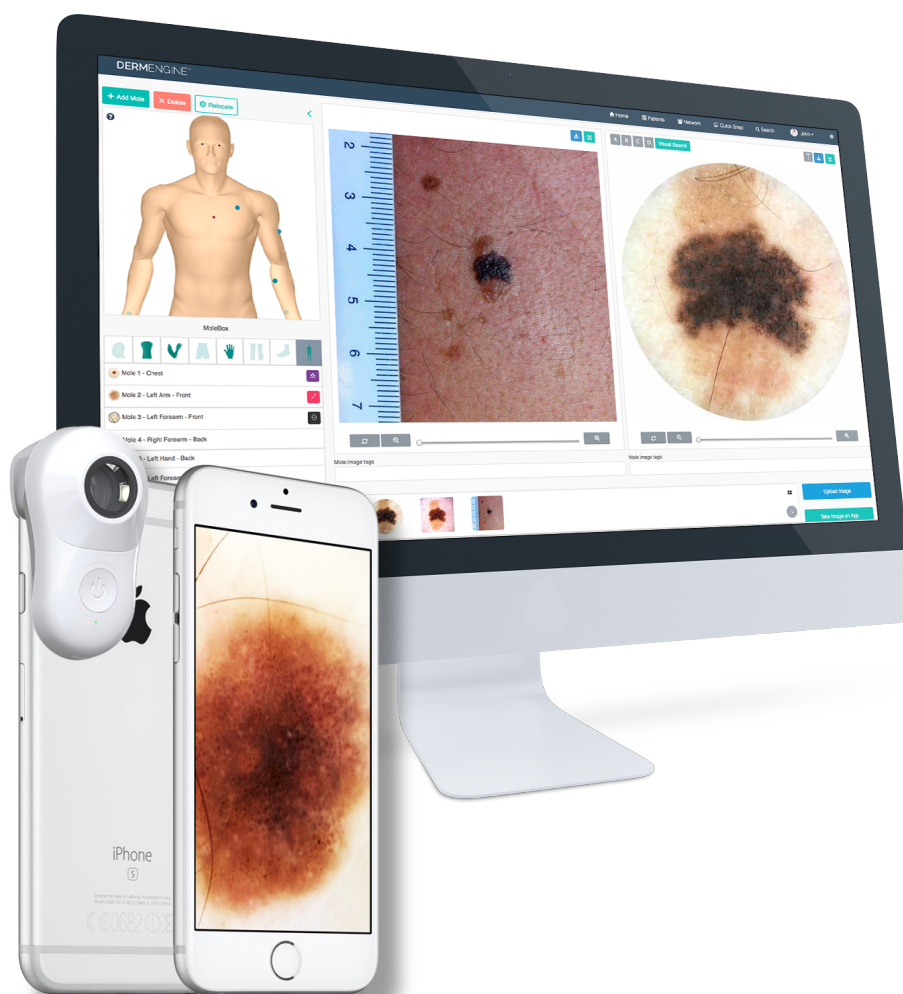
DermEngine™

DermEngine offers a seamless eTriage service that enables healthcare providers to extend their clinic presence to both current and new patients. It allows physicians to share their images and cases for a second opinion with their colleagues in their network and provide tele-dermatology consultations through a customized app. DermEngine was used by GPs to collect the patient's dermatologic images and share these images with dermatologist for eTriage reports.



Endpoints

Accuracy of the diagnosis by GPs and dermatologist, efficacy of the triage to prioritize the consultation with a dermatologist regarding possible skin cancer lesions, actual time for patient to see a dermatologist, compare tele-diagnosis to real life diagnosis, appreciation of the eTriage process overall.



Results

A total of 292 patients were enrolled and photographed (clinical and dermoscopy images) and sent to dermatologist for review and evaluation between September 2015 and June 2017. The quality of the images varies from moderate to excellent. The time delay to see the various patients was between 14 to 90 days according to the degree of suspicion. Before the use of this system, the usual time to be evaluated by a dermatologist varied from 1 to 12 months.

Confirmation of the telediagnosis was made clinically, dermoscopically or by dermatopathological evaluation for suspicious lesions. A total of 10 melanomas (8 invasive melanomas, mean Breslow thickness 0.75 mm and 2 in situ, lentigo maligna type), 12 basal cell carcinomas and 10 squamous cell carcinomas were diagnosed in the study. Other benign lesions diagnosed were acquired benign nevi, atypical nevi, seborrheic keratoses, solar lentiginos, angiomas and dermatofibromas.

Discussion

This is the first study in Canada to evaluate the efficacy of teledermatology and teledermoscopy being used to optimize eTriage consultations for suspicious skin lesions. This teledermatology program has great potential to improve the referral system between general practitioners and dermatologists.

Advantages of this method are: more accurate diagnostic, efficient triage prior to actual clinical visit, better planning of biopsies and surgeries, patient's confidence in the process.

Difficulties in the study were: time to train physicians to use device and App, some physicians were not confident to use MoleScope, iPhone and software, more time in evaluating patients, absence of remuneration for the physicians, need for the dermatologist to reconcile reception of the consultation by fax and software, time to review cases and communicate with the referring physician.

Conclusion

With the growing incidence of skin cancers including melanoma, we are expecting a very high work load in the future for dermatologists and general practitioners. We believe new and user-friendly technologies will be essential to allow earlier diagnosis of cutaneous malignancies, bring optimized patient management and encourage the development of efficient referral network.

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