The Diagnostic characteristics of SIAscopy versus dermoscopy for pigmented skin leasions presenting in primary care

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Introduction:

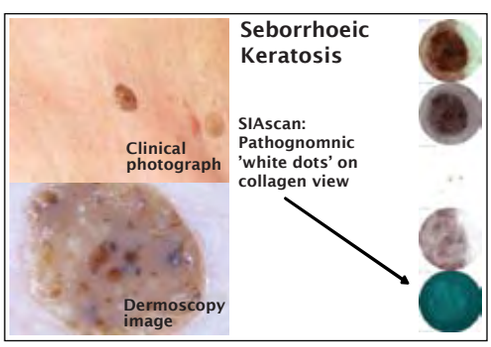
A wealth of data suggests that GPs have low specificity for diagnosing melanoma. Both SIAscopy and dermoscopy are potential tools to aid GPs in their diagnosis of pigmented skin lesions. Whilst the dermatoscope utilises oil immersion to visualise patterns through a translucent epidermis, the SIAscope is a non-invasive multispectral scanning technique which maps the concentration of dermal and epidermal melanin, blood and collagen thickness across the imaged skin lesion. Previous work in secondary care has demonstrated that both tools are effective in the early diagnosis of cutaneous malignant melanoma in expert hands. This is the first study to examine the diagnostic characteristics of SIAscopy for lesions presenting in primary care and, since the study protocol included the use of dermoscopy for the same lesions, a direct comparison between these techniques could be made.

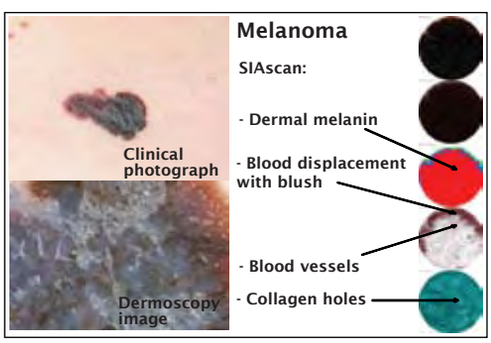
Method:

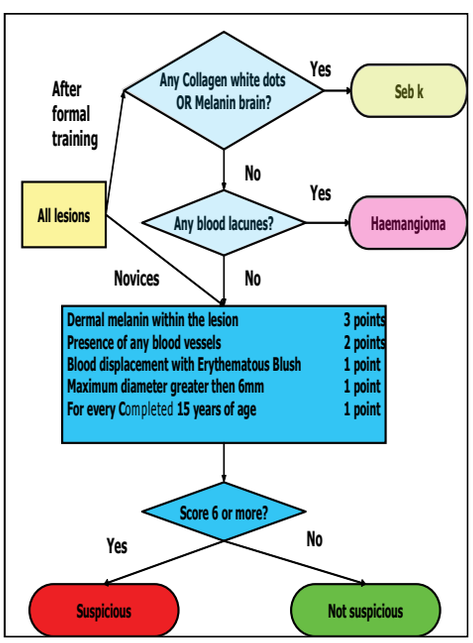
Patients attended their GP's practice and were assessed in the usual way with the GP stating their intended action. The patients were separately reviewed by our team by means of clinical examination, photography, dermoscopy and SIAgraphy. The GPs' action was compared to expert opinion of SIAscopy and dermoscopy, mimicking a telemedicine approach. Further analysis included GP scoring of lesions using SIAscans to test the reliability of the technique in 'non-expert' hands.

Results:

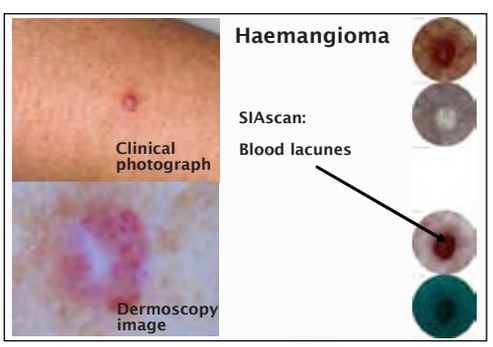
Over a twelve month period, 679 lesions were presented to GPs in six participating practices. Of the five melanomas included in the study, three would not have otherwise been seen by specialists. The mean Breslow thickness of these melanomas was 0.56mm. General Practitioners (GPs) had difficulty in distinguishing haemangiomas and seborrhoeic keratoses from melanoma, and over-estimated the number of suspicious lesions they saw. **For the clinical diagnosis of 'suspicious' made by specialists, GPs had a sensitivity of 63% and specificity of 76%, and for the diagnosis of 'melanoma' they had a sensitivity of 67% and specificity of 75%.** To update the secondary care SIAscopy algorithm for use in primary care, the data was divided into training and test sets; kappa statistics were used for reliability of SIA features, and ROC analysis to determine the precise scoring system. **Expert SIAscopists using this new algorithm on the test set could achieve 100% sensitivity and 83% specificity for the diagnosis of melanoma; corresponding figures for expert dermoscopy were 86% and 94% respectively.** To determine if the new scoring system was **generalisable to a larger population of melanomas,** it was tested on 40 melanomas from a databank of 65, which were randomly added to the test set over 10, 000 permutations. **Sensitivity and Specificity remained high at 92-96%, and 843% respectively. 'Novice' GPs achieved 94-100% sensitivity and 69% specificity using a simplified SIAscopy algorithm,** and with a little more training could be expected to achieve results similar to experts.

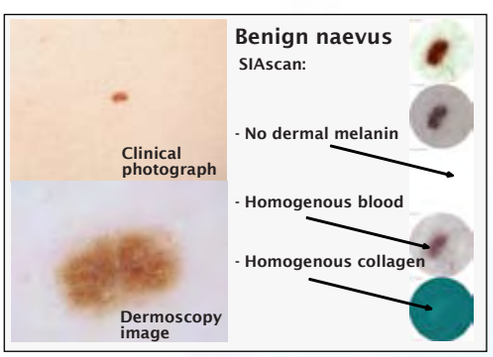






Primary Care SIAscopy algorithm





Conclusions:

These results demonstrate that tools to aid GPs in their assessment of pigmented lesions could radically increase their accuracy of referral to secondary care. The slightly more advanced user (possibly a GP with a special interest (GPSI)) could also potentially be trained to recognise 'expert' features suggestive of seborrhoeic keratoses and haemangiomas, thus increasing the specificity of SIAscopy in GPs' hands. Whilst the SIAscans are simple and easy to interpret with minimal training, dermoscopy is by its nature subjective and arguably best utilised by specialists.

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