ABSTRACT

A clinical trial comprising 266 pigmented lesions and 49 vascular lesions has been performed in three Riga clinics by means of multi-spectral imaging analysis. The imaging system Nuance 2.4 (CRI) and self-developed software for mapping of the main skin chromophores were used. The obtained results confirm clinical potential of this technology for non-contact quantitative assessment of skin pathologies.

RESULTS

The RGB images of two vascular skin malformations (melanoma, other pigmented and vascular) and normal skin. The RGB images of two pigmented skin malformations in comparison with the calculated relative concentration distribution maps of melanin, oxyhemoglobin and deoxyhemoglobin.

CONCLUSIONS

The obtained results confirm the clinical potential of the multispectral imaging technology for non-contact quantitative assessment of skin pathologies.

METHOD

Overall 225 patients (186 females and 39 males) with 334 cases were inspected in three clinics of Riga (Latvia). All lesions were classified in four main groups: malignant pigmented lesions (16 cutaneous melanomas, 6 dysplastic nevi and 1 lentigo maligna) - 23 cases, non-malignant pigmented lesions (different kind of nevi and superficial pigmentation) - 243 cases, non-malignant vascular lesions (port-wine stain, hemangioma, telangiectasia) - 49 cases and others - 19 cases.

Multispectral images of reference \( I_0(\lambda) \) and lesion \( I(\lambda) \) were taken during measurements and then Nuance program automatically calculate optical density (OD) values over the area (Fig.3):

\[
OD(\lambda) = -\log \left( \frac{I_0(\lambda)}{I(\lambda)} \right)
\]

The three chromophore absorption model was used to predict the optical density [1, 2] (Fig.5, 6):

\[
OD(\lambda) = \alpha_m(\lambda) + \alpha_h(\lambda) + \alpha_l(\lambda)
\]

RESULTS

The optical density difference \( \Delta OD(\lambda) \) between malformation and circumjacent normal skin (representing the difference of particular chromophore concentration) were calculated as (Fig.8):

\[
\Delta OD(\lambda) = OD(\lambda)_{\text{normal}} - OD(\lambda)_{\text{malformant}} = \delta \alpha_l(\lambda) + \delta \alpha_h(\lambda) + \delta \alpha_m(\lambda)
\]

REFERENCES


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