Improving recognition of vulvar HSIL and lichen sclerosus using dermatoscopy and optical coherence tomography: a prospective feasibility study

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INTRODUCTION

The diagnostic process of vulvar diseases, such as vulvar high-grade squamous intraepithelial lesions (vHSIL) and lichen sclerosus (LS), should be improved by objective and non-invasive, disease-specific biomarkers. Though stemming from distinct aetiologic pathways, both diseases can predispose to vulvar squamous cell carcinoma (VSCC). Dermatoscopy and dynamic optical coherence tomography (D-OCT) are candidate imaging tools that have not been researched for application to the vulvar clinic.

OBJECTIVES

- To explore feasibility of dermatoscopy and D-OCT as non-invasive imaging tools as potential biomarker.
- To examine characteristics of dermatoscopy and D-OCT on premalignant vulvar skin compared to healthy vulvar skin.

METHODS

- 10 healthy volunteers
- 5 patients with vHSIL
- 10 patients with LS
- Dermatoscopy (Fotofinder)
  - Characteristics scored by expert dermatologist
- Dynamic OCT (Vivosight)
  - Epidermal thickness
  - Blood flow
  - Vulvar biopsies

Part of a prospective, multi-modal, observational clinical trial

- Imaging
- Clinical (physician-reported)
- Patient-reported
- Molecular (sequencing)
- Cellular (histology)
- Microbiome composition

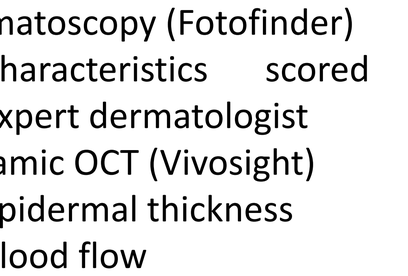

Figure 1: *Multi-modal disease profiling*

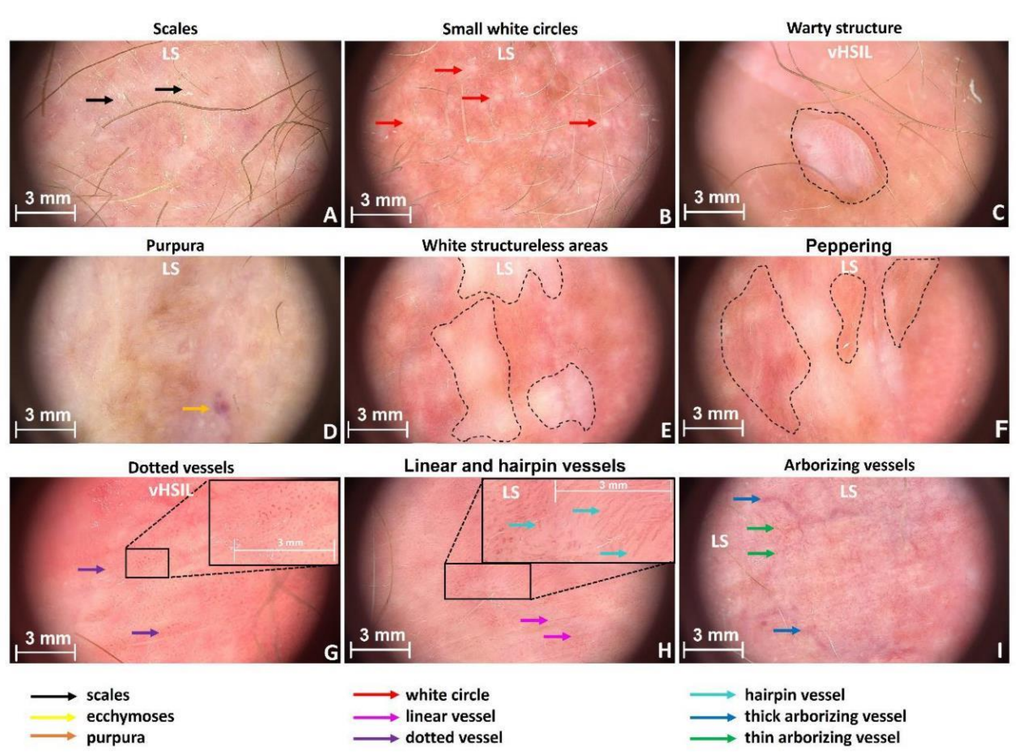

Figure 2: *Dermatoscopy characteristics*

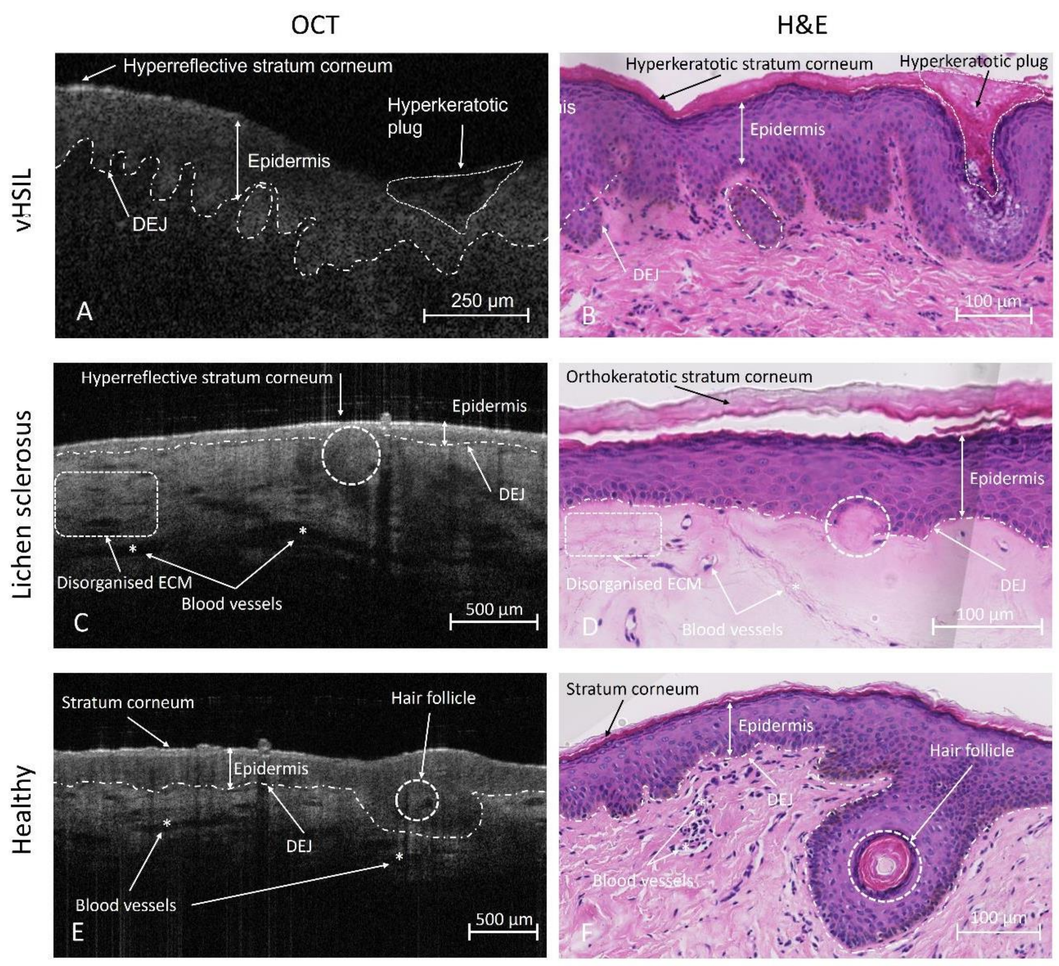

Figure 3: *Structural OCT alignment with H&E histology*

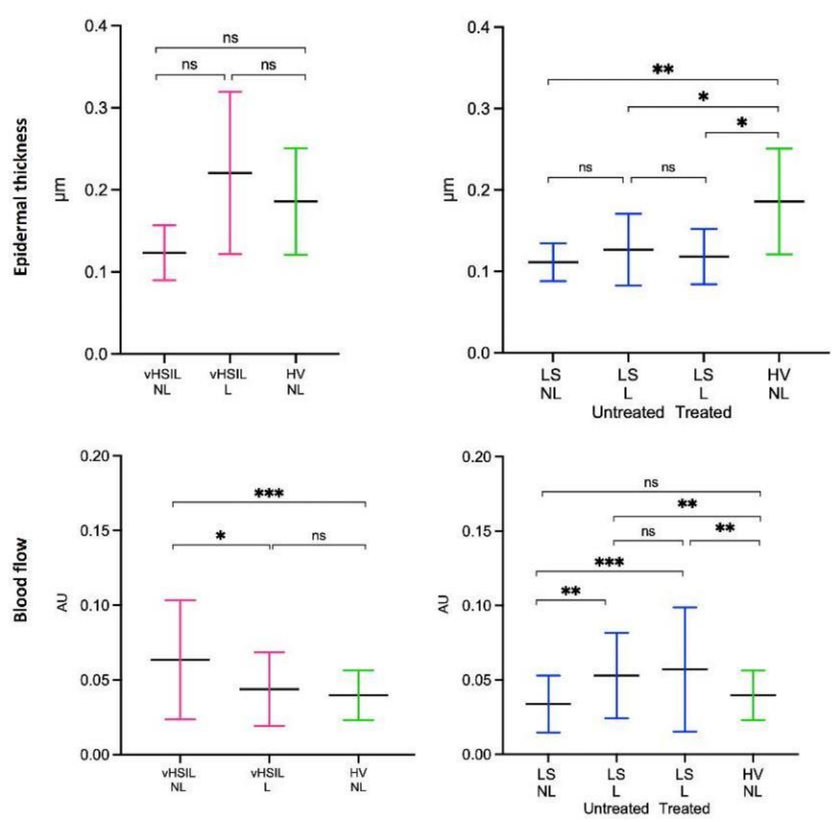

Figure 4: *Epidermal thickness and dermal blood flow, as measured by D-OCT, in vHSIL and LS compared to healthy vulva.*

RESULTS

Dermatoscopy

vHSIL shows a warty structure, while dermatoscopy of LS appears with white or structureless areas with arborizing vessel morphology.

Epidermal thickness

The incorporated D-OCT algorithm failed to calculate epidermal thickness. Manual measurements showed a thinner lesional and non-lesional epithelium in LS compared to healthy vulvar skin.

Blood flow

Lesional LS skin showed a higher blood flow than healthy controls or non-lesional skin. Lesional vHSIL did not differ from healthy controls.

CONCLUSION

Dermatoscopy is a promising tool that may facilitate clinical recognition and follow-up of vHSIL and LS after expansion of patient groups and clinical validation. Vulvar biopsies can be obtained on a limited basis, whilst non-invasive techniques can be used repeatedly, minimizing patient burden as demonstrated in this study. The step to clinical integration of D-OCT is considered inappropriate at this stage due to the suboptimal algorithms and remaining questions on the applicability of the biomarker for the clinical practice. Our findings need to be confirmed in larger, more diverse cohorts including suspicious lesions of the vulva over time before implementation in the vulvar clinic.

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