Methods: This Swiss multicentre, prospective, observational study analysed SSc patients with a history of active DU. Demographic characteristics and routine clinical data were recorded and patients underwent NVC at baseline and at the follow-up visit.

The centres' investigators were trained to perform NVC and, the nailfolds of 8 fingers (digit 2–5 on both hands) were examined if possible. All images were stored centrally and separately analysed by two extensively trained and experienced reviewers (OD & UAW) separately.

In each NVC image the total number of capillaries in the distal row, the number of megacapillaries and the maximum diameter of the megacapillaries were assessed. Based on these 3 characteristics, the CSURI was calculated according to Sebastiani et al. [1] for patients with at least 1 megacapillary present. Data were analysed descriptively.

Results: Between 2011 and 2015, 61 patients fulfilled the eligibility criteria and had at least one follow-up visit (median observation time 1.0 years, interquartile range [IQR] 1.0–1.1). Of these patients, more than a third (reviewer 1: n=24 patients, 39%; reviewer 2: n=26 patients, 43%) had no megacapillaries present on NVC on any assessed finger and hence the CSURI could not be calculated for those either at baseline or follow-up. Therefore, this analysis is based on the remaining 34 patients who had at least one megacapillary present on NVC at baseline and at follow-up by both reviewers (26% male; median age 57 years, IQR 48–65 years).

The median baseline CSURI scores according to reviewer 1 was 5.3 (IQR 2.6–16.3) increasing to a median of 5.9 (1.3–12.0) at follow-up. The CSURI as evaluated by reviewer 2 reduced from baseline (median 6.4, IQR 2.4–12.5) to follow-up (5.0, IQR 1.7–10.0).

None of the assessed demographic or disease characteristics (Box 1) were associated with the changes in the CSURI between baseline and follow-up for the scores obtained by reviewer 1 and reviewer 2 at the same time; although the limited sample size should be kept in mind interpreting this lack of association.

Box 1: Characteristics assessed for associations with the baseline capillaroscopic skin ulcer index (CSURI) as well as the change in CSURI between the baseline and the follow-up visit.

Demographic characteristics
Age
Sex
Smoking habit (Never/previous/current smoker)
Disease characteristics
Time since Raynaud's phenomenon onset
Time since first non-Raynaud's phenomenon manifestation
Time since first digital ulcers
Previous major digital vascular complication (None/soft tissue infection/ auto-amputation/gangrene)
Cutaneous involvement (Diffuse/limited)
Erectile dysfunction
Proteinuria (>300 mg/dl)
Renal crisis
Pulmonary arterial hypertension
Raynaud's phenomenon condition score at baseline
Modified Rodnan skin score at baseline
Number of digital ulcers at baseline
Laboratory parameters
Anti-nuclear antibodies positive
Anti-centromere antibodies positive
Anti-topoisomerase autoantibodies positive

Conclusions: In this study, around 40% of patients could not be evaluated with the CSURI due to the absence of megacapillaries on NVC. Clinical decisions based on the CSURI in routine practice should be made with caution, as it can vary greatly between assessors even if they are extensively trained.

References:

[1] Sebastiani M, et al. Predictive role of capillaroscopic skin ulcer risk index in systemic sclerosis: a multicentre validation study. ARD 2012;71:67–70.

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FRI0370 THREE-DIMENSIONAL NAILFOLD CAPILLARY IMAGING BY DYNAMIC OPTICAL COHERENCE TOMOGRAPHY IN SYSTEMIC SCLEROSIS: A VALIDATION STUDY USING NAILFOLD VIDEO-CAPILLAROSCOPY

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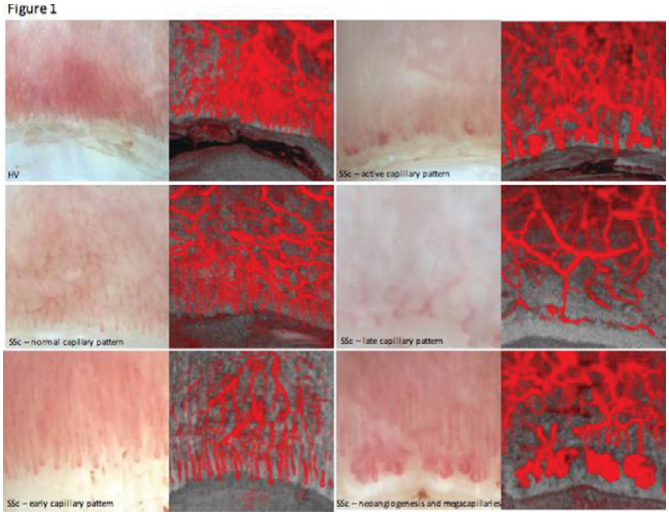
Background: Optical Coherence Tomography (OCT) of the skin has been proposed as imaging biomarker of fibrosis in Systemic Sclerosis (SSc) (1). However, over the past few years, growing efforts have been made to enable OCT to the study of human skin microcirculation including human nailfold (2). Dynamic OCT (D-OCT) is a newly developed OCT technology that allows detection of blood flow in vivo in addition to the images of traditional OCT scans (3).

Objectives: Aims of this study were: 1) to evaluate face/criterion validity and feasibility of nailfold capillary D-OCT imaging as compared with nailfold video-capillaroscopy (NVC) capillary patterns in SSc patients; 2) to investigate whether D-OCT could offer a complementary value to NVC through the 3-dimensional reconstruction and quantification of nailfold capillary abnormalities in SSc patients.

Methods: Fifty subjects including forty SSc patients all fulfilling 2013 EULAR/ACR classification criteria (10 with normal/non-specific, 10 with early, 10 with active, 10 with late capillary pattern respectively) and ten age/gender-matched healthy volunteers (HV) were enrolled in this study. All subjects had NVC done on 8 fingers and classified according to the capillary pattern. Nailfold of the finger with the worst capillary score in SSc patients and the 4th finger (the most affected in the SSc groups) of the dominant hand in subjects with normal capillary pattern was subsequently scanned using Vivosight D-OCT (Michelson Diagnostics Ltd., Kent, UK). D-OCT images were analyzed using the proprietary software tool to extract a quantitative measure of the speckle variance (SV)-signal. Results were expressed as mean±standard error. Statistical analysis was performed using GraphPad Prism software V.7.0.

Results: The finger with the worst capillary score was the 4th (83%) in the SSc patients. The typical nailfold capillary features seen at NVC were visualized at D-OCT images. Representative images are shown in figure 1. Each nailfold D-OCT scan lasted 60 seconds, was well tolerated and did not require use of gel or immersion oil. OCT mean SV-signal measurements were significantly different between HV and SSc patients with any specific capillary pattern (0.16±0.02 vs 0.10±0.01, p=0.0028) and between SSc patients without and with specific capillary pattern (0.14±0.01 vs 0.10±0.01, p=0.02). The mean SV-signal was higher in HV than in SSc patients without specific capillary pattern however the difference was not statistically significant. When analyzing the three specific capillary patterns, SV-signal measurements were not significantly different. Interestingly, within the late capillary pattern, mean SV-signal was significantly lower in patients displaying capillary loss as main feature compared with those with remarkable neoangiogenesis (p=0.03).

Figure 1



Conclusions: D-OCT is a feasible technique able to reproduce the capillary changes seen at NVC in SSc patients. More importantly D-OCT could offer a complementary value to quantify peripheral blood flow at capillary level. Future longitudinal studies are needed to evaluate the sensitivity to change over time and the potential of D-OCT as quantitative outcome measure of microvasculopathy in SSc.

References:

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