Longitudinal nailfold capillaroscopy tracking of microangiopathic changes in systemic sclerosis

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Word count (max 200): 198
A 51 year old female with a 20-year history of limited cutaneous systemic sclerosis (Raynaud’s phenomenon, sclerodactyly, digital pitting, anti-centromere autoantibody, abnormal nailfold capillaries) had no history of digital ulceration but developed calcinosis of several fingers. Raynaud’s phenomenon was relatively mild.

Regular high-magnification (300x) capillaroscopic assessment (for research purposes) was recorded from 2002; approximately 4 years post-diagnosis. The microscope system used throughout was a modified KK Technology system, with green LED illumination for maximum contrast and custom software allowing whole-nailfold mosaic images to be captured [1]. Seven images of the non-dominant ring finger were captured during the 9.9 year period ending August 2012.

The image sequence describes the progression of the nailfold microvasculature from an Early/Active scleroderma pattern [2] initially, with many enlarged and giant capillaries, through a period of relative avascularity, concluding with evidence of neoangiogenesis by the final image, and demonstrates the potential of capillaroscopy as a biomarker of microvascular disease. This tracking of change is possible via the image capture system which combines high magnification with a whole nailfold view. Capillaroscopy provides a unique non-invasive window into evolution of SSc pathogenesis over time: in this patient microvascular disease progression might be 'driving' development of calcinosis.

References


Funding: No specific funding was received to carry out the described work.

Disclosure statement: The authors declare no conflicts of interest.
Figure 1. High-magnification nailfold mosaic sequence covering a near 10 year period. Images are recorded at 300x magnification, giving a resolution of approximately 1µm/pixel. Mosaics are built up from individual camera frames and then “stitched” automatically in software to create the pan-nailfold images seen above. Vertical red lines are superimposed on the sequence as a visual aid, linking the same vessels in each image.