ARP Rheumatology 2022;2:188-189

EDITORIAL

Nailfold capillaroscopy: from the early ages to the early diagnosis of systemic sclerosis

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Nailfold capillaroscopy (NC) is the most frequently used imaging technique to assess patients with microcirculatory disturbances, namely Raynaud's phenomenon (RP). In this context, NC enables the distinction between primary and secondary RP through the qualitative and quantitative assessment of nailfold capillaries, with diagnostic and prognostic implications in some inflammatory connective tissue diseases[1]. The most accessible NC instruments are the stereomicroscope and the videocapillaroscope, the latter having numerous advantages over the first, including the use of validated scoring systems for diagnostic and follow-up purposes[2].

From an historical perspective, the early years of the 20th century witnessed a growing interest and application of primordial microscopy techniques to the study of microcirculation, but the landmark event for NC was probably the first description of the scleroderma pattern by Maricq in 1973[3]. Maricq *et al.* studied patients with inflammatory connective tissue diseases and described the scleroderma pattern as a combination of four capillary abnormalities including widening of all three segments of the capillary loop (arterial, venous and intermediate), loss of capillaries, disorganization of the capillary bed and presence of bushy capillaries (suggestive of neoangiogenesis)[4]. These abnormalities could be found in diseases of the so-called scleroderma spectrum: systemic sclerosis (SSc), mixed connective tissue disease, undifferentiated connective tissue disease and dermatomyositis. Since Maricq thought that a correlation between capillary abnormalities and disease activity/progression existed, she organized those abnormalities in two stages: active (significant capillary loss and neoangiogenesis, believed to correlate with fast disease progression) and slow (several giant capillaries and mild capillary loss, believed to correlate with slow disease progression)[5]. These stages were later reviewed by Cutolo *et al.* in yet another groundbreaking publication[6] establishing what is still accepted today as the three main progressive stages of microcirculatory damage in scleroderma spectrum diseases: early, active and late. The early phase is characterized by few giant capillaries and few microhemorrhages, with no significant capillary loss, neoangiogenesis or bed distortion; the active phase is characterized by several giant capillaries and microhemorrhages, capillary loss and neoangiogenesis; and, in the late phase, severe capillary bed derangement, avascular areas and neoangiogenesis predominate[6]. The three stages described by Cutolo provided the basis for almost all the NC investigation developed since the year 2000 in the field of SSc.

The recognition that more than 90%[1] of SSc patients have a scleroderma pattern in their NC, alongside the fact that these stages correlate with disease progression, prompted interest in the inclusion of NC as a diagnostic criteria. The first ones to do so were Leroy and Medsger in 2001[7]. Acknowledging that the 1980 American Rheumatism Association (ARA) preliminary criteria did not allow the early identification of patients with SSc, Leroy and Medsger developed the concept of "limited SSc" for patients with only RP and either a typical NC finding or a SSc-specific autoantibody. Patients fulfilling these early criteria had a 79.5% probability of developing clinically overt SSc after 9 years of follow-up[8]. Ten years later, the European Scleroderma Trials and Research (EUSTAR) Group proposed the Very Early Diagnosis of Systemic Sclerosis (VEDOSS) preliminary criteria[9] in which patients with RP, puffy fingers and positive antinuclear antibodies classify as VEDOSS if a typical NC scleroderma pattern was found and/or the patient tested positive for SSc-specific antibodies (anti-centromere or anti-topoisomerase I) (Figure 1).

However, the landmark achievement of NC was probably the inclusion in the 2013 American College of Rheumatology (ACR) – European Alliance of Associations for Rheumatology (EULAR) classification criteria for SSc[10]. By including not only clinical features (like RP, puffy fingers and telangiectasia) but also NC and autoantibody tests, sensitivity was improved by over 15% (91% vs 75%) compared to the 1980 ARA criteria[10,11]. Specificity also increased (92% vs 72%)[10]. The deserved emphasis to NC was given in these 2013 criteria. Making an analysis of each individual component, the capillaroscopic pattern and RP stand out for their higher diagnosis accuracy (81.1% and 99.1% respectively), the first being quite specific[12].

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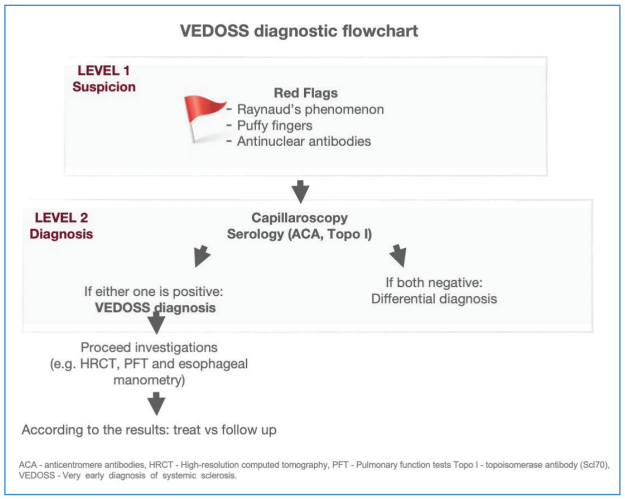

Figure 1. Flowchart of the VEDOSS preliminary criteria. Adapted from [9].

Although the utility of NC in the diagnosis of SSc is clearly demonstrated, strong unequivocal evidence supporting its use in the prediction of complications and assessment of treatment response is still lacking. A few prospective studies have correlated specific scoring systems with development of digital ulcers and lung involvement[13,14].

In conclusion, NC has earned its place as a reliable tool in the diagnosis of SSc. The majority of patients develop RP and microcirculatory changes years before full-blown disease onset, which provides a window of opportunity for early diagnosis and consequent close monitoring of complications and severe organ-damage. NC is a non-invasive, easily-accessible and inexpensive microcirculation technique, with a small-learning curve and good intra and inter-reliability[15]. It is our strong belief that NC performed by an experienced rheumatologist should be available for diagnostic purposes in all Rheumatology departments to assure the standard of care in patients with RP, puffy fingers or other symptoms suggestive of SSc.

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