Nailfold Capillaroscopy Patterns

Daniela Rossi MD, Savino Sciascia MD PhD and Dario Roccatello MD

Center of Research of Immunopathology and Rare Diseases (CMID) – Division of Nephrology and Dialysis (ERK-net member), St. Giovanni Bosco Hospital and University of Turin, Turin, Italy

KEY WORDS: microcirculation, nailfold capillaroscopy (NVC), Raynaud's phenomena, systemic sclerosis

IMAJ 2019; 21: 497–498

Nailfold capillaroscopy (NVC) consists of the combination of a microscope and a digital video camera. NVC is a non-invasive, inexpensive, and reproducible imaging method used for the evaluation of structural changes in peripheral microcirculation. It is mainly used in the evaluation of Raynaud's phenomena (RP) and for the diagnosis of systemic sclerosis (SSc) [1].

NVC acquires prognostic relevance in the global assessment of a single patient. It is useful in differentiating idiopathic RP from abnormal capillaroscopic changes, which may develop into a connective autoimmune disorder. The technique is the most valuable tool for the early diagnosis of SSc and related disorders. NVC is useful in monitoring the progression of the disease, and its predictive value of clinical complications make it a powerful tool for clinical evaluation. The inclusion of capillaroscopic abnormalities in the new classification criteria of the American College of Rheumatology/European League Against Rheumatisms (ACR/EULAR) for SSc gives a new impetus to the use and dissemination of capillaroscopy.

Three stages of capillaroscopy are associated with scleroderma pattern. They are referred to as recent, active, and late [2]. Figure 1A shows a normal capillaroscopy compared to Figure 1B, which shows neoangiogenetic features of vascular aspecific changes, micro-hemorrhages, and ectasia (including megacapillaries) as predominately seen in the recent pattern. The recent pattern has a relatively preserved capillary distribution without significant devascularization. These findings are crucial for early diagnosis of SSc. In the active pattern, an increase in the number of giant capillaries (megacapillaries) and micro-hemorrhages are observed, in association with a moderate loss of capillaries and mild distortion of capillary architecture [Figure 1C]. The late pattern is characterized by a severe loss of capillaries and by extensive avascular areas, and disorganization of capillary architecture [Figure 1D]. The late pattern changes correlate with the duration of RP and diagnosis of SSc.

Capillaroscopy could be affective not only in the diagnosis and evaluation of

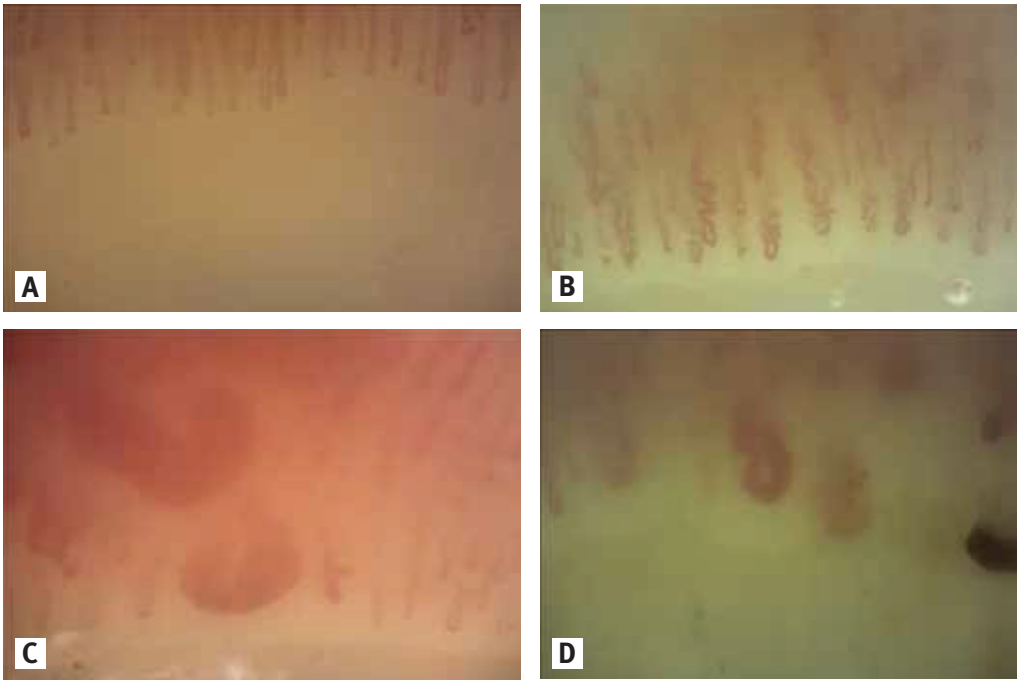

Figure 1. Stages of capillaroscopy are associated with scleroderma pattern

[A] Normal capillaroscopy pattern

[B] Recent pattern of neoangiogenetic features of vascular aspecific changes, micro-hemorrhages, and ectasia (including megacapillaries) with relatively preserved capillary distribution no significant devascularization

[C] Active pattern with an increase in the number of megacapillaries and micro-hemorrhages, in association with a moderate loss of capillaries and mild distortion of capillary architecture

[D] Late pattern with a severe loss of capillaries extensive avascular areas associated with a disorganization of capillary architecture

severity of SSc, but also in helping to identify patients at risk of visceral involvement. Indeed, an association between the risk of serious visceral injury and recent, active, and late patterns in the stages of capillaroscopy has been reported. A higher risk in patients presenting with the late pattern has been shown [3].

NVC should be performed in all cases of undifferentiated connective tissue disease with the aim of identifying patients at risk for progression to SSc or to its spectrum diseases [4]. RP is also an initial manifestations of mixed connective tissue disease occurring in approximately 85% of patients and is part of the classification criteria for this disease [5].

Scleroderma pattern is observed in about 20–60% of patients with dermatomyositis and polymyositis, with more frequent and pronounced findings in dermatomyositis than in polymyositis. This finding correlates with the presence of RP and interstitial pulmonary involvement [6]. When RP is present in Sjögren syndrome or rheumatoid arthritis patients, capillaroscopic findings are nonspecific (i.e., presence of elongated capillaries) [Figure 1B].

Finally, several video capillaroscopic abnormalities have also been described in patients with mixed cryoglobulinemia with some suggestive correlations with the most severe manifestations of vasculitis, especially renal involvement.

Correspondence
Dr. D. Roccatello
Center of Research of Immunopathology and Rare Diseases (CMID) – Division of Nephrology and Dialysis (ERK-net member), St. Giovanni Bosco Hospital and University of Turin, Turin ASL TO2, Italy
email: dario.roccatello@unito.it

References

1. Rossi, D, Russo A, Manna E, et al. The role of nail-videocapillaroscopy in early diagnosis of scleroderma. *Autoimmun Rev* 2013; 12 (8): 821-5.
2. Cutolo M, Sulli A, Pizzorni C, Accardo S. Nailfold videocapillaroscopy assessment of microvascular damage in systemic sclerosis. *J Rheumatol* 2000; 27 (1): 155-60.
3. Lim SS, Vos T, Flaxman AD, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380 (9859): 2224-60.
4. Nagy Z, Czirják L. Nailfold digital capillaroscopy in 447 patients with connective tissue disease and Raynaud's disease. *J Eur Acad Dermatol Venereol* 2004; 18 (1): 62-8.
5. Smolen JS, Steiner G. Mixed connective tissue disease: to be or not to be? *Arthritis Rheum 1998;* 41, 768-77.
6. Ganczarczyk ML, Lee P, Armstrong SK. Nailfold capillary microscopy in polymyositis and dermatomyositis. *Arthritis Rheum* 1988; 31: 116–9.

Capsule

Immunization expands B cells specific to HIV-1 V3-glycan in mice and macaques

Broadly neutralizing monoclonal antibodies protects against infection with HIV-1 in animal models, suggesting that a vaccine that elicits these antibodies would be protective in humans. However, it has not yet been possible to induce adequate serological responses by vaccination. To activate B cells that express precursors of broadly neutralizing antibodies within polyclonal repertoires, **Escolano** and co-authors developed an immunogen, RC1, that facilitates the recognition of the variable loop 3 (V3)-glycan patch on the envelope protein of HIV-1. RC1 conceals non-conserved immunodominant regions by the addition of glycans and/or multimerization on virus-like particles. Immunization of mice, rabbits, and rhesus macaques with RC1 elicited serological responses that targeted the V3-glycan patch. Antibody cloning and cryo-electron microscopy structures of antibody-envelope complexes confirmed that immunization with RC1 expands clones of B cells that carry the anti-V3-glycan patch antibodies, which resemble precursors of human broadly neutralizing antibodies. Thus, RC1 may be a suitable priming immunogen for sequential vaccination strategies in the context of polyclonal repertoires.

Nature 2019; 570: 468
Eitan Israeli

Capsule

Malnutrition and dietary repair

Childhood malnutrition is accompanied by growth stunting and immaturity of the gut microbiota. Even after therapeutic intervention with standard commercial complementary foods, children may fail to thrive. **Gehrig** et al. and **Raman** et al. monitored metabolic parameters in healthy Bangladeshi children and those recovering from severe acute malnutrition. The authors investigated the interactions between therapeutic diet, microbiota development, and growth recovery. Diets were then designed using pig and mouse models to nudge the microbiota into a mature post-weaning state that might be expected to support the growth of a child. These methods were first tested in mice inoculated with age-characteristic gut microbiota. The designed diets entrained maturation of the children's microbiota and put their metabolic and growth profiles on a healthier trajectory.

Science 2019; 365: eaau4732, eaau4735
Eitan Israeli