Supplements 4

Ultrasound protocol.

Machine pre-set

A specific pre-set was developed for optimising GS image resolution, and CD was standardised: 500 Hz for pulse repetition frequency, 2 for wall filter, 1 for persistence and colour gain 17. See supplements 2 for ultrasound protocol.

Joints

Dorsal and volar aspects of 2nd to 5th DIP-joint was semi-quantitatively scored 0-3 for Grey-scale synovial hypertrophy and 0-3 for Color Doppler according to the OMERACT standards [1].
The joint was assessed for erosions and new bone formation. Erosions were defined as a step-down contour defect visible in transversal and longitudinal planes (scored 0-3 with 0=no erosion, 1=erosion<2mm, 2=erosion>2mm, 3=large destruction of the joint). New bone formation was defined by a step-up contour semi-quantitatively scored from 0-3: 0=no osteophyte, 1= small osteophyte, 2= medium osteophyte and 3=large diffuse osteophytes. The term new bone formation was choosen to align the terminology between other imaging modalitites such as magnetic resonance imaging and X-ray.

Enthesis

Extensor and flexor tendons were scored at the level of DIP-joint and enthesopathy was evaluated according to OMERACT recommendations [2]: 0=absent, 1=at least one feature present.
Peritenonitis was defined as a hypoechoic swelling of the soft tissue surrounding the extensor digitorum tendon with or without peri-tendinous CD signal [3] was dichotomously scored: 0=absent, 1=at least one feature present.
The extensor tendon's insertion was measured (mm) in the longitudinal plane from the bone perpendicular to the tendon. The insertion of the flexor tendon was measured (mm) in the longitudinal plane.

Nail

Each fingernail from 2nd to 5th fingers was scanned in the grayscale mode. Nail matrix, nail fold and nail thickness were measured in mm.

Doppler quantification

Doppler quantification technique enabled blood flow visualisation of the nail fold by calculating the number of coloured pixels in relation to the total amount of pixels in the region of interest (ROI) expressed as the colour fraction (coloured pixels/total pixels). The ROI was drawn from the basis of the distal phalanges, along the bony surface to the level of the nail fold and the skin encompassing the nail matrix, nail fold and extensor tendon from the DIP – joint to the nail-basis. The blood flow was quantitatively read as MAXratio and MINratio.

Evaluation

Images and clips were stored and scored on a computer workstation by JG blinded to the patient's identity by the assignment of a participant number.

The ultrasound protocol was validated in 30 healthy participants as part of the explorative outcome.

Primary US variables

Features of the SEC include extensor tendon thickness (mm), nail matrix thickness (mm), nailbed thickness (mm).

Each US parameters: synovial hypertrophy (0-3), color Doppler (0-3), erosions (0-3) and osteophytes were analysed as independent variables.

Blood flow variables

Nail matrix US measure of flow was expressed as MAXratio and MINratio for each DIP-joint.

References

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2 Terslev L, Naredo E, Iagnocco A, *et al.* Defining enthesitis in spondyloarthritis by ultrasound: Results of a delphi process and of a reliability reading exercise. *Arthritis Care Res* 2014;**66**. doi:10.1002/acr.22191

3 Gutierrez M, Filippucci E, De Angelis R, *et al.* A sonographic spectrum of psoriatic arthritis: 'the five targets'. *Clin Rheumatol* 2010;**29**:133–42. doi:10.1007/s10067-009-1292-y