



Response to 'Ultrasound characterization of cutaneous ulcers in systemic sclerosis'

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Dear Sir,

I read with great interest the recent article published by Suliman et al. [1] in which the authors successfully used ultrasound (US) to characterise skin ulcers in patients with systemic sclerosis (SSc). In their study, which included 21 skin ulcers (8 lesions sonographically defined as ulcers) from 10 patients with SSc, the authors were able to objectively measure ulcer morphology (e.g. surface area and depth).

We have previously reported our experience using high-frequency US to measure digital ulcers (DUs) in patients with SSc [2]. In our pilot study, we were able to successfully assess a wide range of SSc-DUs ($n = 15$) including both fingertip and extensor DUs, as well as in relation to underlying calcinosis. In our study, the average width and depth was 5.74 and 0.99 mm, respectively, which highlights the potential challenge of assessing skin ulcers/DUs by visual inspection alone.

Unlike our study, the authors also assessed the skin lesions using power Doppler (PD). The highest pain and ulcer VAS was found in three ulcers (from two patients) that showed higher PD signals, which the authors presumed was due to concomitant infection. Treatment with antibiotic therapy was associated with a reduction in PD signal and both pain and ulcer VAS.

SSc-DUs (both fingertip and extensor) have been reported to have a relatively ischaemic centre compared to surrounding non-ulcerated skin as assessed by laser Doppler and speckle imaging [3, 4], and with a reduction in ischaemia with DU healing [3, 4]. Furthermore, there is often a relative hyperaemia of the skin immediately surrounding the ischaemic DU centre [4, 5]. The aetiology of this hyperaemia is currently unclear, however, it could potentially have an important role in DU healing (e.g. through increased tissue

perfusion). Furthermore, the role of inflammation in the pathogenesis of SSc-DUs has yet to be defined. Of interest, three (out of five) lesions which showed calcinosis had a positive power Doppler signal. Subcutaneous calcinosis is not uncommonly associated with a local inflammatory response (and with the discharge of calcinotic material) [6], and therefore, the role of inflammation in the pathogenesis of calcinosis-associated ulceration warrants further investigation.

Taken together, our two studies strongly support the potential emerging role of US to define skin ulcers in patients with SSc, including to objectively measure ulcer morphology and extent, and to provide novel insights into the pathogenesis of SSc-DUs.

Compliance with ethical standards

Disclosures None.

References

1. Suliman YA, Kafaja S, Fitzgerald J, Wortsman X, Grotts J, Matucci-Cerrinic M, Ranganath VK, Furst DE (2018) Ultrasound characterization of cutaneous ulcers in systemic sclerosis. *Clin Rheumatol* doi: <https://doi.org/10.1007/s10067-018-3986-5>. [Epub ahead of print]
2. Hughes M, Moore T, Manning J, Dinsdale G, Herrick AL, Murray A (2017) A pilot study using high-frequency ultrasound to measure digital ulcers: a possible outcome measure in systemic sclerosis clinical trials? *Clin Exp Rheumatol* 35 Suppl 1(4):218–219
3. Ruaro B, Sulli A, Smith V, Paolino S, Pizzomi C, Cutolo M (2015) Short-term follow-up of digital ulcers by laser speckle contrast analysis in systemic sclerosis patients. *Microvasc Res* 101:82–85
4. Murray A, Moore T, Wragg E, Ennis H, Vail A, Dinsdale G, Muir L, Griffiths CE, Herrick AL (2016) Pilot study assessing pathophysiology and healing of digital ulcers in patients with systemic sclerosis using laser Doppler imaging and thermography. *Clin Exp Rheumatol* 34 Suppl 100(5):100–105
5. Hughes M, Moore T, Manning J, Wilkinson J, Dinsdale G, Roberts C, Murray, Herrick AL (2017) Reduced perfusion in systemic sclerosis digital ulcers (both fingertip and extensor) can be increased by topical application of glyceryl trinitrate. *Microvasc Res* 111:32–36
6. Hughes M, Herrick AL (2017) Digital ulcers in systemic sclerosis. *Rheumatology (Oxford)* 56(1):14–25

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