Vascularity of nail bed by ultrasound to discriminate psoriasis, psoriatic arthritis and healthy controls

Sirs,

Ultrasonography (US) has been increasingly used in the field of psoriasis and psoriatic arthritis (PsA) to better understand the mechanisms of both of these conditions (1-3). US has been demonstrated to visualise all the target tissues in PsA (4-5). For the nail, the main grey-scale changes, loss of trilaminar appearance and pitting, agree with clinical assessment in 76.3% of nails (6). Although PD changes of the nail have also been described (7), the nail bed is an extremely vascular site, which raises the question whether PD changes may necessarily reflect pathology. We aimed to find the frequency and severity of PD signals in psoriatic nail disease compared to healthy controls (HC) to understand whether PD signals are associated with disease.

This study was approved by the Leeds (East) Research Ethics Committee. Informed consent was obtained from all participants. A total of 86 psoriasis patients (169 nails) and 19 HC (38 nails) had an US scan using a Logiq E9 machine (General Electric, Wauwatosa, Wisconsin USA) and a linear probe at 10–18 MHz. The most severely involved and the corresponding nail on the other hand was scanned. The decision was made by the clinician without giving the information to the sonographer. PD settings were standardised with a pulse repetition frequency of 800 Hz, a Doppler frequency of 9.1 and low wall filters. PD signals were scored as grade 0: no PD; grade 1: one/ two vessels; grade 2: PD signal ≤50% of the nail bed; grade 3: PD signal covering >50% of the nail bed. The grey scale findings of the nails of the same group had been published before (4). This study focused on analysis of the PD changes on the nail bed.

Forty-two (48.8%) psoriasis patients had PsA and 52 (60.5%) had clinical nail disease. In psoriasis 26/169 (15.4%) had no PD signals, similar to 7/38 (18.4%) of HC. The PD grade 3 signals were more frequent in HC (Fig. 1; p=0.005). For psoriasis, when nails with clinical findings (n=83) were compared with clinically normal nails (n=86), there were no significant differences for the percentage of grade 3 PD (35 (42.2%) *vs*. 30 (34.9%); p=0.4). To understand the contribution of psoriasis in the absence of any nail findings, we compared the psoriasis group with HC by only including nails that had no clinical nail disease and found that HC had more grade 3 PD signals (25/38 (65.8%)) than patients with psoriasis (30/86 (34.9%); p=0.002) showing that psoriasis was associated with reduced PD signals on the nail bed.

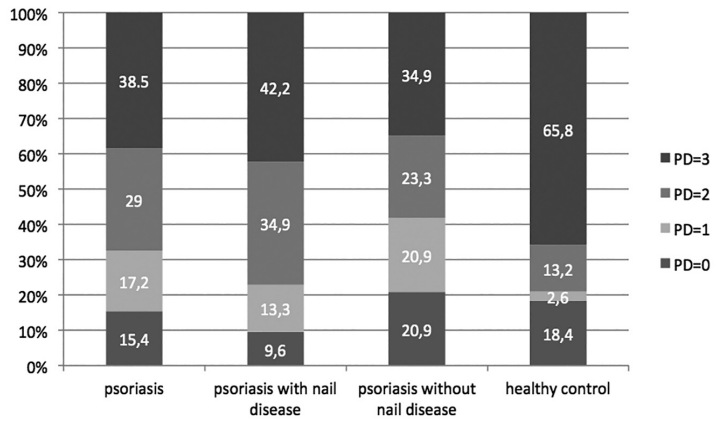

Fig. 1. The distribution of power Doppler (PD) signals (grade 0–3) in patients with psoriasis (whole group and subgroups with or without nail disease) and healthy controls.
Data are given as percentages.

Finally, patients with or without PsA were compared. Focusing only on healthy nails, the frequency of grade 3 PD signals was similar in both groups. However for nails that were abnormal, there were less grade 3 PD signals in case of arthritis (PsA: 10/38 (26.3%) *vs*. psoriasis 25/45 (55.6%); p=0.008).

Our findings are important for PD signal interpretation as a psoriatic nail disease marker. Previous studies investigated nail vascularity by measuring the resistive index showed that the resistive index was higher in psoriasis with nail disease suggesting decreased blood supply (8). Similarly capillaroscopy studies demonstrated capillary shortening and decreased maximum length/ width of the vessels in patients with psoriasis (9). These different approaches support our results where we noted more vascularity in HC nails then patients. Decreased blood supply in psoriatic nails may link to higher pressures in the nail bed or blood diversion to other sites of inflammation including enthesis and bone.

To conclude, the nail bed is a vascularised tissue, which can be detected by PDUS also in health. Whether nail bed vascularity changes have a predictive or diagnostic value needs further testing but should be investigated by including HCs.

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