



Know your local hotspots!

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Welcome to the another *Diabetes Digest*. The paper I have chosen to comment upon is by Qin et al from Japan. This study sets out to examine the relationship between plantar callus and local increased skin temperature. These are both reported to be precursors for neuropathic foot ulceration, but the inter-relationship between these has not been explored in the literature. This was a cross-sectional retrospective study involving data from 1,007 patients who attended a diabetic foot prevention clinic between 2008 and 2020. Subject data for demographics, neuropathy, PAD, deformity, dry skin, footwear, static foot pressures, foot calluses and callus thermographic hotspots were collected and analysed. Calluses were determined from clinical photographs and callus hotspots were confirmed from foot thermographs taken after 15+ minutes non-weightbearing rest. A callus hotspot was defined as a relative increase in temperature compared to the skin surrounding on the thermograph. Plantar pressures were measured using the FScan™ pressure sensor system.

Subjects with active ulceration were excluded. Neuropathy was determined by a 10-g monofilament, vibration at the ankle, Achilles' tendon reflex and a coefficient of variation R-R interval (CVRR) <0.2. An ill-fitting shoe was defined as the internal shoe length 1–2cm than the foot. Static barefoot peak pressures (SFPPP) were taken pre-callus removal. Callus-related variables were attributed as dry skin, foot deformity, ill-fitting shoes and static forefoot peak plantar pressure (SFPPP). Callus hotspot variables were ascribed as the number of calluses, location and whether or not they matched peak plantar pressure sites.

From the 2,014 feet, callus was present in 28.5% ($n=574$) with callus hotspots occurring in 106 (18.5%) of feet. The most frequent callus

sites were the second MTH (23.6%), first toe (21.6%) and fifth MTH (19.9%). A linear mixed model showed the factors associated presence of calluses were female sex (OR: 1.749, $P<.001$), higher SFPPP (OR: 1.008, $P<.001$), foot deformity (OR: 3.003, $P<.001$) and dry skin (OR: 1.513, $P=.007$). The factors associated with hotspots on calluses were BMI (OR: 0.912s $P=.029$), SFPPP (OR: 1.008, $P=.001$) and the number of calluses (OR: 1.540, $P=.003$). Interestingly, they were not significantly associated with neuropathy, deformity, poor footwear or dry skin.

There are several noticeable limitations to this study. Firstly, it was a cross-sectional retrospective study using data over 12 years with possible inconsistent data. There was no reported data regarding daily activity levels, frequency of footcare and self-care. Additionally, multiple consecutive thermographic and SFPPP measurements were not performed to assess for inflammation. Due to the study design, the causal relationship between factors and outcomes could not be postulated and due to subjects resting for at least 15 minutes before thermography, it would be intriguing and potentially more valid to examine for callus hotspots immediately after exercise and the time taken for these to return to resting values.

Despite these limitations, it is an interesting study which raises some interesting questions from clinical, research and educational perspectives, thus, it would be a good read for those seeking professional development. It also underlines the importance of identifying those who are at most risk of ulceration and provides markers for prevention. ■

Qin Q, Oe M, Ohashi Y et al (2021) Factors associated with the local increase of skin temperature, 'hotspot,' of callus in diabetic foot: a cross-sectional study. *J Diabetes Sci Technol* May 20; 19322968211011181

Acta Diabetol

Effectiveness of fast-track pathway for diabetic foot ulcerations

Readability ✓✓✓
Applicability to practice ✓✓✓
WOW! Factor ✓✓✓

1 The authors set out to determine the effectiveness of a fast-track pathway (FTP) that has been implemented in the management of diabetic foot ulceration (DFU) 2 years after its introduction. Patients referred to a specialised diabetic foot centre with DFUs formed the basis of the study group and then this group was split in two: early referral (ER) and late referral (LR) patients.

2 Under the FTP, those eligible for the ER group were patients with uncomplicated non-healing ulcers referred after 2 weeks, within 4 days for those with complicated ulcers and within 24 hours for those with severely complicated ulcers. Those falling outside of these parameters were allocated to the LR group. Follow-up was 6 months.

3 A total of 200 patients were included in the study. The mean age was 70 ± 13 years, 62.5% of the 200 patients were male, 91% were affected by type 2 diabetes with a mean duration of 18 ± 11 years. Some 79.5% had ER, while 20.5% had LR in the study group.

4 The results showed that, at multivariate analysis, ER was an independent predictor of healing and LR was an independent predictor for minor and major amputation, as well as hospitalisation.

5 The implementation of the FTP resulted in fewer cases of LR compared to ER. ER was found to be an independent predictor of positive outcomes, including healing, hospitalisation, healing time, limb salvage and survival.

Meloni M, Lazaro-Martinez JL, Ahluwalia R et al (2021) Effectiveness of fast-track pathway for diabetic foot ulcerations. *Acta Diabetol* [Online ahead of print]

PLoS One

Virtual triage and outcomes of diabetic foot complications during Covid-19 pandemic: A retro-prospective, observational cohort study

Readability ✓✓✓
 Applicability to practice ✓✓✓
 WOW! Factor ✓✓✓

1 The authors found that outcomes in people with diabetic foot complications including diabetic foot ulcer (DFU) who were given virtual triage and personalised video consultations during COVID-19 pandemic are not presently known.

2 Virtual triage was conducted on patients with foot complications attending the diabetic foot clinic prior to lockdown. This included clinical history, visual inspection of feet, domiciliary wound care (community nurse-assisted dressings) and offloading instructions.

3 The authors analysed and compared patients who presented during the following 24 weeks of COVID-19 lockdown (April-September 2020, assigned to group 1) with those attending a foot clinic during the corresponding period in 2019 (assigned to group 2). Group 1 included 561 participants with 41.3% of these having an active DFU ($n=227$), while group 2 included 650 participants with 56.31% having an active DFU ($n=366$).

4 It was concluded that virtual triage and teleconsultations during the pandemic for people with foot complications have similar ulcer and limb outcomes compared to face-to-face foot care delivery.

Rastogi A, Hiteshi P, Bhansali A, Jude EB (2021) Virtual triage and outcomes of diabetic foot complications during Covid-19 pandemic: A retro-prospective, observational cohort study. *PLoS One* 16(5): e0251143

J Wound Care

Topical oxygen therapy in the treatment of diabetic foot ulcers: a multicentre, open, randomised controlled clinical trial

Readability ✓✓✓
 Applicability to practice ✓✓✓✓
 WOW! Factor ✓✓✓

1 Insufficient perfusion and blood oxygen levels in individuals with hard-to-heal wounds due to poor circulation, vascular disruption and vasoconstriction, reduce the capacity of wounds to heal. This study set out to investigate the effect that topical oxygen has on healing rates in patients with hard-to-heal diabetic foot ulcers (DFUs).

2 A multicentre, open-label, community-based randomised clinical trial was carried out to compare standard care (SOC) with/without continuous topical oxygen therapy (TOT) for 12 weeks in those with DFUs or minor amputation wounds.

3 One-hundred-and-forty-five patients were randomised with their ulcers graded Infectious Diseases Society of America (IDSA) 1 or 2, or Wagner 1 or 2. A total of 18/64 (28.1%) patients healed in the SOC group by 12 weeks, compared with 36/81 (44.4%) in the SOC plus TOT group ($P=0.044$).

4 There was a statistically significant wound area reduction between the two groups: SOC group mean reduction: 40% (standard deviation (SD) 72.1); SOC plus TOT group mean reduction: 70% (SD 45.5); per protocol $P=0.005$. In conclusion, the addition of TOT to SOC acts as a contributor factor in the wound closure of hard-to-heal DFUs.

Serena TE, Bullock NM, Cole W et al (2021) Topical oxygen therapy in the treatment of diabetic foot ulcers: a multicentre, open, randomised controlled clinical trial. *J Wound Care* 30(Sup5): S7-S14

J Diabetes Sci Technol

Remotely delivered monitoring and management of diabetes-related foot disease: an overview of systematic reviews

Readability ✓✓✓
 Applicability to practice ✓✓✓
 WOW! Factor ✓✓✓

1 The authors set out to determine whether or not remotely delivered healthcare can reduce the disparity in terms of health outcomes for those with diabetes-related foot disease (DFD) living in remote localities by comparison to urban areas.

2 Current evidence on the effectiveness, stakeholder perceptions, and cost-effectiveness of remotely delivered healthcare for DFD was summarised. Five databases were analysed to identify systematic reviews published between January 2000 and June 2020.

3 Eight reviews were eligible for inclusion, involving 88 primary studies and 8,509 participants, of which 36 studies involving 4,357 participants evaluated the management of DFD in remote localities.

4 Most of the reviews identified displayed limited search strategies and poor reporting of participants, with only one review demonstrating a low risk of bias. Perceptions of telehealth were generally positive by both patients and clinicians, but its effectiveness is unclear and high-quality trials are required, in order to evaluate the risks and benefits of DFD management delivered remotely.

Droyandi A, Wong S, Seng L et al (2021) Remotely delivered monitoring and management of diabetes-related foot disease: an overview of systematic reviews. *J Diabetes Sci Technol* May 19;19322968211012456 [Online ahead of print]

“The relationship between plantar callus and local increased skin temperature are reported to be precursors for neuropathic foot ulceration, but the inter-relationship between these has not been explored in the literature.”