Shining a light on an underexplored area

Neil Baker
Consultant Podiatrist, Muzaini Vascular And Diabetic Foot Clinic, Global Medical, Kuwait

Welcome to another *Diabetes Digest*! The paper I have chosen to share and comment upon may at first appear to be relevant to only a highly specialist area of the multidisciplinary diabetic foot team. However, this paper is important for all the team members to consider. It hopefully will stimulate reflection of your diabetic foot management strategies, albeit for a small subgroup of patients.

It's a joy for me to see a topic examined which, clinically, I have long suspected to be true. This paper examines the long-term effectiveness of open vascular surgery compared to endovascular interventions in patients with diabetic heel ulceration and peripheral arterial disease (PAD). It was undertaken at Skåne University Hospital, Sweden. This study retrospective comparative study examined patients undergoing vascular interventions between 1983 and 2013 with follow-up until 2018. The aim of this study was to evaluate the difference in amputation-free survival (AFS) between open and endovascular revascularisation in patients with diabetes, PAD, and heel ulcers. Severe peripheral vascular disease (SPVD) was defined as toe pressure <45 mm Hg or ankle pressure <80 mm Hg, however, there was no definition of non-severe PAD.

Retrospective data were collected from the endocrinology, vascular and orthopaedic surgery databases from the two centres within the study region that had a population of 700,000 people. The two centres in this area are the only facilities that provide vascular interventions. Overall, 127 limbs with heel ulcers diabetes and PAD were included in the study, of which 121 underwent endovascular intervention and 30 by-pass surgery. There were no significant differences in demographic or comorbidities between the two groups. The mean age was 71 years (60–79) with 41% (n=53) being female. The median follow-up period was 40 months (interquartile range was 14–90 months. Patients in the by-pass group were more often current smokers (P=0.015), and more often had ischaemic heart disease (P=0.002) and SVPD (P=0.001) compared to the group not undergoing vascular surgery. Previous ulcer was more common in the endovascular group (P=0.001), compared with by-pass group, whereas patients treated with open vascular surgery more often had foot oedema (P=0.006) and local foot pain (P=0.038), compared to the endovascularly treated group. AFS was higher in patients undergoing by-pass group compared to the endovascular group (P=0.009). The obvious confounding/biases in this study are clear; it is retrospective, small group numbers, advanced changes in diagnostic imaging over the study period, no definition of PAD, only SPVD, and the improvements in pharmacological agents (e.g. statins, platelet aggregation inhibitors) in the latter years of the study period.

That said, heel ulcers are notoriously difficult to heal and this study clearly suggests that for heel ulceration and AFS rates, open by-pass surgery appears to have much better outcomes than endovascular interventions. This is an area that should be looked at more closely and perhaps hybrid approaches using endovascular and open surgery may yield better long-term AFS in all foot ulcers. ■

Butt T, Lilja E, Örneholm H et al (2019) Amputation-free survival in patients with diabetes mellitus and peripheral arterial disease with heel ulcer: open versus endovascular surgery. *Vasc Endovascular Surg* 53(2):118–25

Foot (Edinb)

Pressure distribution under the contralateral limb in Charcot arthropathy with different walking speeds

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

1 While the total contact cast is recognised as the 'gold standard' for treatment of Charcot neuro-osteoarthropathy (CN), removable cast walkers (RCWs) have become a viable alternative. The study aimed to measure the effect of walking speed on plantar pressure (PP) abnormalities induced by leg length discrepancy (LLD).

2 Sixteen patients with diabetes with unilateral CN were offloaded by RCW. In-shoe PP distribution was measured using an F-scan (Tekscan Inc.). Patients walked at their normal speed (53±4 steps/min) and with short slow steps (24±3/min) under the two walking conditions: neglected LLD and corrected LLD.

3 Largest reduction in PP was witnessed during a reduction of walking speed with corrected LLD, ahead of corrected LLD with normal walking speed. The highest PP was found when the patient remain on their normal walking speed and LLD was ignored.

4 In conclusion, patients should be advised to practice short slow steps while walking, to minimise the development of bilateral Charcot.

Motawea M, El-Nahas M, Armstrong DG (2019) Pressure distribution under the contralateral limb in Charcot arthropathy with different walking speeds. *Foot (Edinb)* 39: 15-21

Vascular

Effect of negative-pressure wound therapy on the circulating number of peripheral endothelial progenitor cells in diabetic patients with mild to moderate degrees of ischaemic foot ulcer

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

1 The authors set out to examine the effects of negative-pressure wound therapy (NPWT) on the circulating number of endothelial progenitor cells (EPCs) in patients with diabetes with mild to moderate ischaemic foot ulcers.

2 A total of 84 patients with an ulcer of at least 4 weeks and ankle-brachial index of 0.5–0.9 were selected for the study. The NPWT group included 56 patients and the non-NPWT group had 28.

3 The circulating number of EPCs significantly increased in both groups, while the circulating number of EPCs had no significant change in the non-NPWT group. Circulating levels of vascular endothelial growth factor (VEGF) and protein expressions of VEGF and stromal cell-derived factor-1α (SDF-1α) in the granulation tissue significantly rose in both the NPWT and the control group, but there was no significant change in the non-NPWT group.

4 NPWT may be useful in increasing the circulating number of EPCs in people with diabetes with mild to moderate ischaemic foot ulcer, which may be attributed to the upregulation of systemic and local VEGF and SDF-1α levels.

Mu S, Hua Q1, Jia Y et al (2019) Effect of negative-pressure wound therapy on the circulating number of peripheral endothelial progenitor cells in diabetic patients with mild to moderate degrees of ischaemic foot ulcer. *Vascular* 1708538119836360. doi: 10.1177/1708538119836360. [Epub ahead of print]

Int Wound J

Ulcer-free survival days and ulcer healing in patients with diabetic foot ulcers: A prospective cohort study

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

1 The aim of this prospective cohort study was to investigate ulcer-free survival days and ulcer healing in patients with diabetic foot ulcers; an area that the authors believe is under-investigated.

2 The study covered all referrals to the authors' diabetic foot expertise centre between December 2014 and April 2017 with a total of 158 patients included. A minimum follow-up period of 12 months was decided as the timeframe to determine outcomes, while primary outcomes were ulcer-free survival days and 12-month healing percentages.

3 Median ulcer-free survival days in the healed group came in at 233 days and 131 days in the overall population. Healing rate at 12-month follow up was 67% (n=106), while the recurrence rate was 31% (33/106). Ulcer-free survival day predictors were found to be the duration of diabetes, cardiovascular disease peripheral artery disease, end-stage renal disease and infection.

4 Ulcer-free survival days should be the main outcome when comparing management and prevention strategies relating to diabetic foot ulcers.

Akturk A, van Netten JJ, Scheer R et al (2019) Ulcer-free survival days and ulcer healing in patients with diabetic foot ulcers: a prospective cohort study. *Int Wound J* doi: 10.1111/iwj.13199. [Epub ahead of print]

J Wound Care

Referral of patients with diabetic foot ulcers in four European countries: patient follow-up after first GP visit

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

1 A two-part quantitative online questionnaire was disseminated among General Practitioners (GPs) in France, UK, Germany and Spain to analyse the characteristics of patients with a diabetic foot ulcer (DFU) during their first follow-up visit to a GP.

2 Part one of the questionnaire examined GPs' perceptions of referrals for DFUs, while part two collected data on recently managed cases of DFUs. Six-hundred questionnaires were collected (150 per country) in part one and part two looked at 1,188 patients managed for a DFU.

3 A diagnosis was reached in 60% in all cases due to a patient complaint. The toes and midfoot were the areas where wounds were most frequently found, they were mostly superficial (80% of the cases). Around 50% of the wounds were ischaemic. Ischaemia, wound necrosis, possible osteomyelitis and delayed wound healing were the key reasons for hospital admission during the first month after diagnosis.

4 Delay in specialised foot care was found to be a recurring topic in the treatment of DFUs across the European countries included in the study. There is a need to reinforce knowledge and education on DFUs among GPs and nurses to institute a global DFU care network, avoid hospitalisation and effectively manage high-risk patients.

Sánchez-Ríos JP, García-Klepzig JL, Manu C et al (2019) Referral of patients with diabetic foot ulcers in four European countries: patient follow-up after first GP visit. *J Wound Care* 28(Sup8): S4-S14. doi: 10.12968/jowc.2019.28.Sup8.S4.

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