Foot temperature monitoring at home reduced foot complications in high risk patients with diabetes

Lavery LA, Higgins KR, Lancot DR, *et al.* Home monitoring of foot skin temperatures to prevent ulceration. *Diabetes Care* 2004;27:2642–7.

Clinical impact ratings Internal Medicine ★★★★★☆ Endocrine ★★★★★☆

Q What is the effectiveness of at home, infrared foot temperature monitoring for preventing foot complications in high risk patients with diabetes?

METHODS

Design: randomised controlled trial.

Allocation: {concealed*}†.

Blinding: {unblinded*}†.

Follow up period: 6 months.

Setting: high risk diabetes foot clinics at the University of Texas Health Science Center, San Antonio, Texas.

Patients: 85 patients 18–80 years of age (mean age 55 y, 51% men) who had diabetes (World Health Organization criteria) and were at high risk of developing diabetic foot ulcerations (International Working Group on the Diabetic Foot risk group 2 or 3—ie, history of foot ulceration or lower extremity amputation, or peripheral sensory neuropathy with loss of protective sensation or foot deformity such as hallux valgus or claw toes). Exclusion criteria: open ulcers or open amputation sites, active Charcot arthropathy, peripheral vascular disease, active foot infection, dementia, impaired cognitive function, or history of drug or alcohol use in the previous year.

Intervention: enhanced (n=41) or standard therapy (n=44). All patients received standard care, which included therapeutic footwear, education, and foot evaluation by a podiatrist every 10–12 weeks. Patients in the enhanced therapy group also used a hand held, infrared skin thermometer (TempTouch, Xilas Medica, San Antonio, Texas) to measure the temperature of 6 predetermined sites on the sole of the foot (first, third, and fifth metatarsal head; great toe; central mid-foot; and heel) in the morning and evening; higher temperatures were considered to indicate ongoing inflammation. If the temperature of corresponding sites on the left and right foot differed by >2.2°C (4°F), patients were advised to contact a nurse case manager and to reduce the number of steps taken in the following days until the temperature difference was <2.2°C.

Outcomes: diabetic foot complications (incident foot ulcers, infections, Charcot fractures, and amputations).

Patient follow up: 100% (intention to treat analysis).

*See glossary.

†Information provided by author.

MAIN RESULTS

Patients in the enhanced therapy group had fewer diabetic foot complications overall and fewer ulcers (table). The groups did not differ for Charcot fractures (0 v 2), infections (0 v 2 [later required amputation]), or local foot amputations (0 v 2).

CONCLUSION

In high risk patients with diabetes, at home, infrared foot temperature monitoring reduced foot complications compared with standard care.

A modified version of this abstract appears in Evidence-Based Nursing.

Enhanced therapy with at home, infrared foot temperature monitoring v standard therapy for preventing foot complications in high risk patients with diabetes without peripheral vascular disease*

Outcomes at 6 months	Enhanced	Standard	RRR (95% CI)	NNT (CI)
Diabetic foot complications	1/41 (2.4%)	9/44 (20%)	89% (37 to 98)	6 (3 to 18)
Ulcers	1/41 (2.4%)	7/44 (16%)	85% (11 to 97)	8 (4 to 82)

*Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.

Commentary

Foot complications, including ulceration and amputation, are all too common in people with diabetes mellitus. Given this, development and evaluation of new approaches to prevent lower extremity complications are urgently needed.

The study by Lavery *et al* evaluates a unique approach for preventing foot ulceration by using a hand held, infrared skin thermometer to detect increases in foot temperature. The strengths of the study include its randomised design and high level of follow up. Unfortunately, the study does have some weaknesses. The study was not blinded, and the authors did not provide an operational definition for some of the outcomes (eg, foot ulceration or Charcot fracture).

The authors also did not report the rate at which intervention patients contacted the nurse case manager to seek advice. Thus, it is difficult to assess the relative contributions of the new technology and having access to an additional healthcare provider.

This is an exciting pilot study in an area urgently in need of ongoing research. It would be premature, however, to conclude that all patients with diabetes who are at high risk of foot ulceration should now do home monitoring of foot skin temperatures. Instead, this trial lays the groundwork for future studies.

In the meantime, we should continue to be vigilant in identifying patients at high risk of lower extremity complications and ensuring that they receive appropriate foot care education.¹

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1 McCabe CJ, Stevenson RC, Dolan AM. Evaluation of a diabetic foot screening and protection programme. *Diabet Med* 1998;15:80–4.

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