

## Serious Comorbidities Seen In Patients With Foot Ulcers

BY ROBERT FINN  
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Many diabetic patients with foot ulcers have peripheral arterial disease, infection, and disabling comorbidities, according to a large European study.

Of 1,229 consecutive patients presenting with new foot ulcers at 14 hospitals in 10 European countries, only 24% had neither peripheral arterial disease (PAD) nor infection, reported Dr. Leonne Prompers of University Hospital Maastricht, the Netherlands, and colleagues (*Diabetologia* 2007;50:18-25).

Twenty-seven percent had infection alone, 18% had PAD alone, and 31% had both PAD and infection.

In addition, 32% of the patients had one or more disabling comorbidities, including 15% with severe visual impairment, 6% with end-stage renal disease, and 11% with heart failure or severe angina pectoris. Ten percent were unable to stand or walk without help.

The European Study Group on Diabetes and the Lower Extremity (Eurodiale) enrolled the patients between September 2003 and October 2004 and followed them for 1 year. This report tabulates the patients' baseline data; follow-up data will be published at a later date.

"These baseline data ... contain an important message: many patients with diabetic foot ulcers are severely ill, and this is reflect-

ed by the severe underlying pathology and the presence of disabling comorbidity," the authors wrote. "Follow-up data on these patients, which are expected in the coming year, could give us more insight into the implications of the severity of this disease for clinical outcome, resource utilization and quality of life."

In patients with both PAD and infection, foot ulcers tended to be deep and at non-plantar locations. Increasing disease severity was significantly associated with age and prevalence of disabling comorbidity.

Overall, 48% of the ulcers were on the plantar surface. Twenty-two percent of patients had the classic plantar forefoot or mid-foot ulcer. The most common ulcer site was the dorsal or interdigital area of the toes, which was affected in 32% of the patients.

Deep ulcers, extending below the subcutis into tendons, muscle, or bone, were found in 45% of the patients.

The study has important implications for the evidence-based treatment of diabetic foot ulcers, wrote the authors. For example, there is relatively little published evidence on how to treat patients with the most severe disease. In addition, most studies focus solely on the management of plantar foot ulceration and do not include the management of nonplantar ulcers, despite the fact that healing rates might be lower in dorsal ulcers, compared with plantar ulcers, they noted. ■

## High Dietary Iron Linked to CHD in Women With Diabetes

BY DOUG BRUNK  
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The risk of coronary heart disease among women with type 2 diabetes appears to be elevated for those who consume high levels of heme iron and red meat, according to a large, long-term analysis from the ongoing Nurses' Health Study.

"Whether the increased iron intake is causally related to increased risk in CHD remains to be proven," Dr. Lu Qi, of the department of nutrition at the Harvard School of Public Health, Boston, and colleagues wrote. "These findings suggest that patients with type 2 diabetes may consider reducing their consumption of heme iron and red meat for the prevention of CHD."

The study included 6,161 women from the Nurses' Health Study who self-reported a physician diagnosis of type 2 diabetes between 1980 and 2000. The researchers excluded women with a history of CHD, stroke, or cancer as reported on follow-up questionnaires the women filled out prior to or during 1980 (*Diabetes Care* 2007;30:101-6).

At baseline, the women were divided into quintiles based on their median intakes of heme iron and red meat. The investigators then analyzed three of those five quintiles. In quintile 1, the median intakes were 1.70 mg/day and 0.55 servings per day, respectively. In quintile 3, the median intakes were 2.23 mg/day and 1.22 servings per day, re-

spectively. In quintile 5, the median intakes were 2.83 mg/day and 2.39 servings per day, respectively.

During the follow-up period, which included 54,455 person years, the researchers documented 550 cases of CHD among the 6,161 women. These included 259 nonfatal myocardial infarctions, 153 CHD deaths, and 138 bypass operations or angioplasties.

After the researchers adjusted for age and body mass index, they found that women who consumed high levels of heme iron and red meat faced a significantly increased risk of fatal CHD, coronary revascularization, and total CHD, compared with those who consumed lower levels. The risk of total CHD was 50% greater among women who consumed the highest levels of heme iron compared with those who consumed the lowest levels.

The associations remained consistent when adjusted for physical activity and other covariates.

Subanalysis revealed that postmenopausal women were at greater risk of CHD compared with premenopausal women, possibly because of the loss of iron during menstruation.

The researchers acknowledged limitations of the study, including its self-reported nature and "the possibilities of residual confounding because of imperfect measures of diet and lifestyle factors."

The study was funded by the National Institutes of Health. ■

## Daily Temperature Readings Help Avoid Foot Ulceration

BY ROBERT FINN  
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Patients with diabetic neuropathy who monitor their foot temperature daily can reduce their risk of ulceration more than fourfold, according to an article by Lawrence A. Lavery, D.P.M., of Texas A&M University, College Station, and colleagues.

In a physician-blinded trial, 173 patients with a previous history of diabetic foot ulceration were randomly assigned to one of three groups: standard therapy, structured foot examination, or enhanced therapy (*Diabetes Care* 2007;30:14-20).

Patients who were assigned to standard therapy received therapeutic insoles and footwear, participated in an educational program focused on foot complications and self-care, and had a lower extremity evaluation by a physician every 8 weeks. Those assigned to the structured foot examination group received the standard therapy as well as training to conduct a detailed self-examination with the assistance of a mirror to identify redness, discoloration, swelling, and local warmth.

The patients in the enhanced therapy group also received the standard therapy and were also taught to use a digital infrared thermometer to measure and record daily temperatures at six sites on each foot.

Of the 59 patients in the enhanced therapy group, 5 experienced ulceration over the 15-month treatment period, compared with 17 of the 58 patients in the standard group and 17 of the 56 patients in the structured foot examination group, a significant difference. The mean time to ulcerate was 378.5 days in the standard therapy group, 377.3 days in the structured foot examination group, and 429.5 days in the enhanced therapy group. The enhanced therapy group was significantly better than each of the other two groups, and those two groups did not differ from each other.

Patients in the enhanced therapy group were 4.48 times less likely to develop foot ulceration than those in the standard therapy group and 4.71 times less likely to develop foot ulceration than those in the structured foot examination group.

Within the enhanced therapy group, patients who were compliant with recording foot temperatures at least 50% of the time were 50 times

less likely to develop an ulcer than were patients who were not compliant. Four of the five foot ulcers were in patients who were not compliant.

Patients in the enhanced therapy group were taught to monitor temperatures on the great toe, the first, third, and fifth metatarsal head region, the midfoot, and the heel of each foot using a TempTouch digital infrared thermometer, available by prescription from Xilas Medical, San Antonio. They were instructed to contact the research nurse if skin temperatures were elevated by more



Patients took daily temperatures at six sites on each foot using an infrared foot thermometer.

than 4° F (2.2° C), compared with the corresponding side on the opposite foot for 2 consecutive days. They were also instructed to decrease their activity until temperatures normalized.

About 88% of the patients in the enhanced therapy group were compliant with daily temperature measurements. This compares quite favorably with published rates of compliance with daily glucose monitoring, which can be as low as 33%.

"It seems likely that the cost-benefit of home temperature monitoring might be much better than that for use in glucose strips for home monitoring," the investigators wrote. "In addition, a tool to adjust activity could help with the dilemma of exercising for better health versus the need to rest and protect the foot to avoid foot ulcers."

Several of the study's authors disclosed close relationships with Xilas Medical. Dr. Lavery owns stock in the company, and is a consultant and a member of its clinical advisory board. Two of the other authors are members of the company's board of directors. The study was supported by a grant from the National Institute of Diabetes and Digestive and Kidney Diseases. ■