Primary Care Physicians Tend to Underestimate Neuropathy

Diabetic peripheral neuropathy and its complications cost more than $4 billion annually in the United States.

REVIEWED BY WILLIAM H. HERMAN, MD, MPH

Even though the American Diabetes Association recommends an annual foot examination for all patients with type 2 diabetes, neuropathy screening is underutilized in primary care practice.

When physicians do evaluate patients for diabetic peripheral neuropathy, often they do not use monofilament testing. When this simple, noninvasive technique is not utilized, physicians tend to underestimate the prevalence of neuropathy.

William H. Herman, MD, MPH, and colleagues undertook the GOAL A1C study (Glycemic Optimization with Algorithms and Labs At Po1nt of Care) to assess methods of HbA1c testing and insulin glargine titration monitoring strategies in a large nationwide primary care sample of patients with type 2 diabetes. As part of the study, physician perception of the presence of neuropathy was assessed via survey before monofilament testing was performed. Dr. Herman, from the department of internal medicine and epidemiology at the University of Michigan Medical Center, and clinician-investigators from across the United States compared physician perception and monofilament testing and reported their results in *Diabetes Care*.

MONOFILAMENT TESTING

GOAL A1C was a multicenter, randomized, open-label, parallel, four-arm study. Patients included were ≥18 years, inadequately controlled on oral agents and candidates for insulin therapy. "During the pretreatment phase, physician perception of neuropathy was assessed," Dr. Herman and colleagues reported. "Physicians responded 'yes' or 'no' to a survey question." The same physician then conducted monofilament testing.

COMPANIES THAT SUPPLY MONOFILAMENTS

- Center for Specialized Diabetes Foot Care
  PO Box 373
  405 Hayden St
  Belzoni, MS 39038
  800-543-9055
  - Single 5.07 (10-g) $10.00

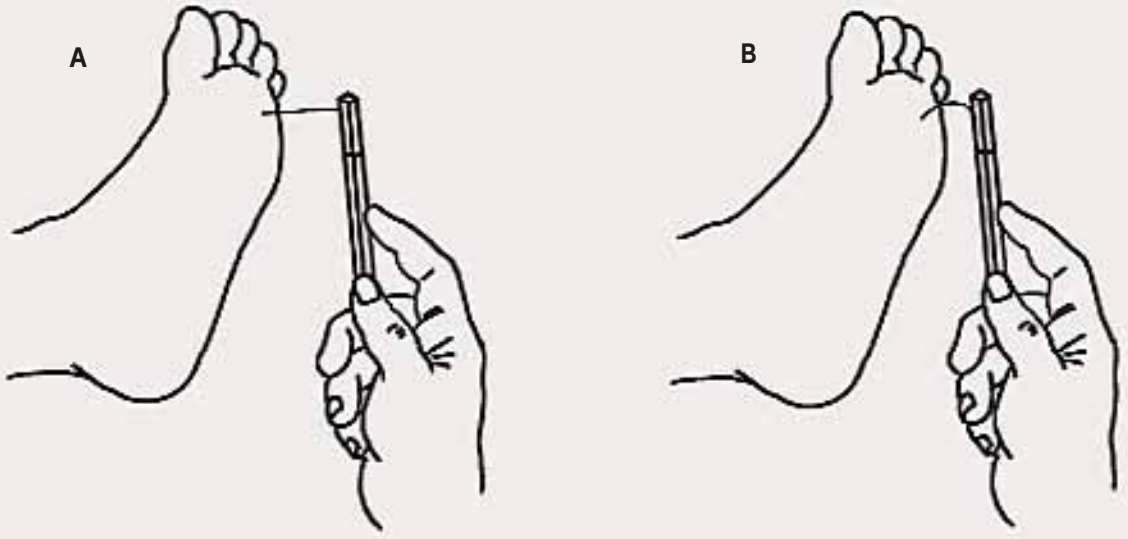
- Curative Health Services
  14 Research Way, Box 9052
  East Setauket, NY 11733-9052
  516-689-7000
  - Single 5.07 (10-g) $10.00

- North Coast Medical, Inc
  187 Stauffer Blvd
  San Jose, CA 95125-1042
  408-283-1900
  - Set of six, assorted sizes $124.95 or Single 5.07 (10-g) $24.95

- Sensory Testing Systems
  1815 Dallas Drive, Suite 11A
  Baton Rouge, LA 70806
  504-923-1297
  - Single 5.07 (10-g) $10.00

- Smith & Nephew, Inc
  PO Box 1005
  Germantown, WI 53022-8205
  800-558-8633 or 800-228-3693
  - Set of five, assorted sizes $99.75 or Single 5.07 (10-g) $18.95

MONOFILAMENT TESTING WITH A 10-G (5.07 SEMMES-WEINSTEIN) NYLON FILAMENT



- Perform the exam in a quiet and relaxed setting. Do not allow the patient to watch the examination.
- Mount the monofilament on a holder that has been standardized to deliver 10 grams of force when applied.
- Test the monofilament on the patient's hand.
- Apply the device perpendicularly to the surface of the skin, as shown in A.
- Apply sufficient force to make the filament bend or buckle, as shown in B.
- The test, from contact on the skin to departure, should take 1 to 1.5 seconds.
- Apply the filament along the perimeter. Do not apply to an ulcer, callus, scar or necrotic tissue. Do not slide the filament across the skin and do not make repetitive contact at the site of the testing.
- Apply the monofilament to the skin, and allow it to buckle one or two times. Say "time one" or "time two" to indicate length of contact. Ask the patient to identify when they noticed the instrument touching their skin. Randomize the sequence of applying the filament throughout the examination.

Source: National Diabetes Education Program

Of the 7,892 patients enrolled, baseline data was available for 7,378 patients. Mean age was 57 years, the duration of diabetes was 8 years and average baseline HbA1c was 8.9%.

SURFACE OF THE FOOT, TOE

Two monofilaments were used, 3.61 and 5.07. Patients felt the monofilament on their hands before they had it applied to the plantar surface of the great toe on one foot. The monofilament was applied in random sequence, up to three times each, and with enough force to bend the monofilament. The investigators said that with their eyes closed, patients indicated when a touch occurred. If a patient felt both monofilaments, no neuropathy was noted; if he or she felt the 5.07 but not the 3.61 monofilament, mild/moderate neuropathy was noted; if the patient was unable to feel either monofilament severe neuropathy (insensate foot) was noted; and if he or she felt the 3.61 but not the 5.07 it was a nonsense result.

Overall, physicians reported an 18% prevalence of neuropathy. Monofilament testing detected mild/moderate neuropathy in 30% of patients and severe neuropathy in 7%. According to monofilament testing, the remaining 63% of patients had no neuropathy. The physician perception and subsequent monofilament testing were concordant in just 14% of the patients.

Dr. Herman and colleagues compared correct diagnoses between endocrinologists and nonendocrinologists. Physicians prospectively identified only 31% and 66% of patients with mild/moderate and severe neuropathy, respectively. Nonendocrinologists, which accounted for 90% of the investigators, correctly identified mild/moderate and severe neuropathy in 31% and 64% of patients, respectively. Endocrinologists correctly identi-

fied mild/moderate and severe neuropathy in 36% and 74% of patients, respectively.

NONINVASIVE PREDICTOR

"Monofilament testing is a simple, noninvasive independent predictor of risk for foot lesions," Dr. Herman said. "Monofilament testing detected a 37% prevalence of neuropathy in patients with type 2 diabetes in our large nationwide sample, which is more than twice the prevalence identified by physicians before testing."

Because physicians underestimate neuropathy they may be missing opportunities for early intervention, Dr. Herman and colleagues concluded. "Systematic monofilament testing can facilitate earlier diagnosis and appropriate preventive care to reduce adverse outcomes." ■

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Herman WH, Kennedy L, for the GOAL AIC Study. Group Underdiagnosis of peripheral neuropathy in type 2 diabetes. *Diabetes Care.* 2005;28:1480-1481.

USE GUIDELINES TO SCREEN FOR DIABETIC NEUROPATHY

By Laura Suarez, Associate Editor

An eight-part foot screening instruction set is directed at assisting primary care physicians, certified nurses and other health care providers to examine the feet of diabetic patients. The National Diabetes Education Program's (NDEP), "Feet can Last a Lifetime" kit is an effort to prevent diabetic neuropathy through early identification, diagnosis and intervention.

The kit can be accessed at www.ndep.nih.gov/resources/feet/screenin.htm, and it includes information on how to screen patients, diagnose foot dysfunctions, create a management plan and inform patients on diabetic neuropathy. It is a free booklet and may be ordered online.

Foot screening objectives include: identifying patients with current foot problems or those who are at risk for developing complications of the lower extremities; gathering current health status; documenting any foot deformities or disabilities; examining therapeutic footwear needs; utilizing diabetes education; and continuing foot examinations in the future. Each objective is explained in detail. Below is a brief summary of the eight-part test:

- Part One, Medical history: Obtain medical history and pay attention to diabetes duration and other indications that the patient is at an increased risk for diabetic peripheral neuropathy.
- Part Two, Current history: Ask patients the following questions to evaluate the progression of foot complications.
    1. Is there any change in the foot since the last examination?
    2. Is there sign of ulceration or is there a history of ulceration?
    3. When walking, does pain ensue in the calf muscles?
- Part 3, Foot exam: Check the toenails, pedal pulses, skin condition and note any foot deformities.
- Part 4, Sensory foot exam: Perform monofilament testing with a 10-g (5.07 Semmes-Weinstein) sensory test to accurately assess for diabetic neuropathy.
- Part 5, Risk categorization: After the foot and sensory foot examinations, label patients as low-risk or high-risk for recurrent ulceration.
- Part 6, Footwear assessment: Provide patients with information on proper footwear, including fit and style of shoes. If foot deformities are present or if a patient is at high-risk for diabetic neuropathy, suggest therapeutic or custom footwear products.
- Part 7, Education: Because patient education is an important part of preventing diabetic neuropathy, indicate that education is available.
- Part 8, Management plan: This plan should include patient education, referrals to podiatrists and follow-up. Managing diabetic neuropathy should be done as a team approach.

The foot-screening instructions should be used with the NDEP's screening form. Parts one through seven are general objectives and may be assessed by office staff or practicing physician. Part eight should be completed by the physician. The "Feet can Last a Lifetime" kit is a tool for all health care providers to properly assess for diabetic neuropathy. With its use and other screening methods, it is possible to initiate preventive foot care in to every day practice. ■