OBSERVATIONS

# Self-Monitoring of Blood Glucose, Cutaneous Finger Injury, and Sensory Loss in Diabetic Patients

To achieve glycemic targets and prevent complications of diabetes, self-monitoring of blood glucose (SMBG) is recommended three or more times daily, especially in patients treated with insulin (1). However, increasing the number of these tests may provoke unexpected adverse events (2).

The manner in which diabetic patients perform SMBG and its outcomes, including pain, finger injury, and sensory loss, were studied in 165 consecutive diabetic patients, from four French specialized centers, who were performing SMBG at least three times daily. The mean ± SD duration of diabetes was 17 ± 12 years and A1C was 8.1 ± 1.4%; 90% were treated with insulin, and 24% had distal neuropathy. Patients performed SMBG 4.1 ± 1.6 times daily, 30% never changed the site of pricking, and 33% pricked the pulp. The lancet was always reused by 29%, and 30% never cleaned their hands before pricking.. Painful fingertips were reported by 11%.

More than five finger lesions (hematoma, induration, keratosis, or scarring) were found in 37% of patients and were associated with longer duration of diabetes (20 ± 2 vs.15 ± 1 years; $P < 0.001$), longer duration of SMBG (≤5 years: 14% vs. >5 years: 41%; $P < 0.05$), and higher frequency of pricking (4.8 ± 0.2 vs. 3.6 ± 0.1 daily; $P < 0.001$), but not with A1C, neuropathy, site rotation, or lancet reuse. Using logistic regression, frequency of pricking was the main explanatory factor of finger injury ($P < 0.001$).

Randomized stimulations of the pulp of the fingers were performed using a five-monofilament set (CT-BIO Connecticut Bioinstruments, Riverdale, NY). Correct responses were scored as 1, wrong as 0. The sum of scores from ten fingers using the five filaments was higher in patients without neuropathy (38 ± 7 vs. 31 ± 8; $P < 0.001$) and correlated negatively with age ($R^2 = 0.35$; $P < 0.001$) and duration of diabetes ($R^2 = 0.15$; $P < 0.001$). The sum of scores was not significantly associated with finger injury. In multiple regression, age, neuropathy, and duration of diabetes were included successively ($P < 0.001$).

In this study, many best-practice shortfalls were observed, including poor hygiene, needle reuse, pricking the pulp, or always using the same fingers. These occurred in educated patients who were followed with annual quality control programs. Therefore, evaluation and intervention should address not only knowledge, but also the motivation and psychological aspects of a patient (3).

Pain and finger injury proved to be related to the frequency of pricking. As alternative testing sites currently remain a matter of discussion (4), further improvement in sampling methods are needed.

Mild sensory loss detected in diabetic patients did not relate to SMBG and should not limit its practice. However, mild sensory loss was associated with duration of diabetes and peripheral neuropathy, suggesting a degenerative mechanism.

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