PRIZE P1

Use of Neuropad in the diagnosis of diabetic peripheral neuropathy

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Diabetic peripheral neuropathy (DPN) affects ~30% of the diabetic population. In DPN the function of the sweat glands is impaired making the feet making the skin brittle and dry, and susceptible to fissuring leading to foot ulceration. The Neuropad measures sweat production and examine the function of the sweat glands by means of a colour indicator, a cobalt-II- salt, which is applied in the form of a plaster to the plantar skin on the foot. In healthy subjects, the moisture (sweat) on the foot changes the colour of the Neuropad plaster from blue to pink normally within minutes. However, if the colour does not change completely or very slowly, this indicates initial nerve damage. In this study we set out to look at the role of the Neuropad in patients with DPN. Methods: 66 subjects (non-diabetic controls: n=18, age: 53.5 ±11.6 years; diabetic subjects without neuropathy: n=19, age: 59.4±9.2; diabetic subjects with painless DPN: n=18, age: 62.2±8.9; and diabetic patients with painful DPN; n=11, age: 61.7 ±10.2 years), were recruited. DPN was diagnosed when NDS was ≥3. Sudomotor function was assessed using the Neuropad test. The Neuropad was applied for 10 min under the first metatarsal head in the sitting position of both feet and evaluated as normal (pink color) or abnormal (blue color or any other combination of colors). Results: The Neuropad test was more often abnormal in the subjects with diabetes than controls (62.0% vs. 27.8%, x^2=6.22, P=0.01). Using a cut-off value for NDS of ≥ 3 for the diagnosis of DPN, the Neuropad was significantly more common abnormal in those with DPN than in those without (77.4% vs. 36.8%, x^2=8.23, P=0.04) and with a cut-off value for NDS ≥ 6 was 91.3% vs. 33.4% (x^2=20.53, P<0.001). The Neuropad result was no different between patients with painful and painless DPN (81.8% vs. 77.8%, x^2=0.07, P=0.79). The performance of the Neuropad test for the diagnosis of DPN using a cut-off NDS value ≥ 3 was as follows: sensitivity: 79.3%; specificity: 63.2%; positive predictive value: 69.4%; and negative predictive value: 84.3%. The performance of the test Neuropad for the diagnosis of DPN using a cut-off NDS value ≥ 6 was as follows: sensitivity: 91.3%; specificity 66.7%; positive predictive value: 58.3%; and negative predictive value: 93.7%. Conclusions: Sudomotor dysfunction assessed with the Neuropad test is more common in patients with diabetes and DPN than in those without DPN. However, sudomotor dysfunction is not more common in subjects with painful DPN.