Painful and painless neuropathies are distinct and largely undiagnosed entities in subjects participating in an educational initiative (PROTECT study)

Ziegler D, Landgraf R, Lobmann R, Reiners K, Rett K et al.
Diabetes Res Clin Pract. 2018 May; 139:147-154.

At a glance:

- Distal sensory polyneuropathy (DSPN) was not diagnosed in 69.5% of the participants detected with DSPN during the PROTECT study.
- Increased HbA1c levels were detected in about 40% of participants without previous history of diabetes and were correlated with the presence of DSPN in this subgroup.
- This study shows the need for preventive screening investigations for diabetes and neuropathy.

Introduction & Background

DSPN is the most common diabetic neuropathy, affects about one third of all diabetic patients and accounts for 75% of diabetic neuropathies. It is characterized by the presence of symptoms and/or signs of peripheral nerve dysfunction in diabetic patients after the exclusion of other causes. The painful variant of the disease affects 13-26% of all patients suffering from diabetes and has a significant impact on quality of life. Up to 50% of diabetic neuropathies are asymptomatic. This variant of DSPN implies an increased risk of injury to the numb feet if DSPN is not recognized and preventive foot care is not provided. Bedside screening tools, such as the tuning fork or the 10-g monofilament, can predict foot ulcers. Currently, in most primary care practices, these screening options are not used annually in diabetes patients, as recommended by the American Diabetes Association (ADA). Furthermore, the clinical impact of DSPN continues to be underestimated not only by patients but also by physicians, and many people with diabetes are not aware that they have neuropathy.

The aim of the study was to determine the prevalence and risk factors of diagnosed and undiagnosed painful and painless DSPN within the framework of a nationwide awareness initiative.

Materials & Methods

The awareness initiative was conducted in Germany and included promotional booths and educational activities, such as lectures on diabetes. 1850 participants were recruited in

shopping centers and in diabetes and health care fairs. Information on age, sex, history of type 1 or type 2 diabetes, and whether they had ever been diagnosed with neuropathy and were currently being treated for neuropathy, was collected. In addition, a foot examination, including bilateral assessment of pressure, temperature, and vibration sensation was performed twice on each foot. DSPN was diagnosed if at least 1 out of the 3 tests (pressure, temperature, vibration perception) was abnormal. Painful DSPN was considered present when accompanied with pain and/or burning at rest in the feet. The painless entity of DSPN was defined when accompanied by paresthesias, numbness, or in case of absence of symptoms. The presence of DSPN symptoms only during walking was defined as atypical DSPN.

Results

Out of 1850 participants, 781 had no history of diabetes (ND), 126 had type 1 diabetes (T1D) and 943 had type 2 diabetes (T2D). 35.5% of the ND subjects had HbA1c values indicative of prediabetes and 3.7% were presumed to have diabetes that had not been previously diagnosed. The group with T1D also had higher HbA1c levels compared to the T2D subjects ($P < 0.05$). The occurrence of peripheral arterial disease (PAD) was significantly more frequent in the T2D group than in the ND group. DSPN was detected in 48.2% of ND, 44.3% of T1D, and 55.3% of T2D subjects. DSPN was significantly more frequent in the T2D group compared to the other two groups ($P < 0.05$).

Taken together, in more than two-thirds (69.5%) of participants detected with DSPN, the DSPN has been previously unrecognized. The highest percentage of undetected DSPN was found in the painless DSPN subgroup (81.1%), with still more than half of participants even in the painful DSPN subgroup (61.5%) having never been diagnosed with neuropathy. The group with ND subjects had the highest rate of undiagnosed DSPN (75.2%), followed by the groups with T2D patients (69.9%) and a significant lower proportion of T1D patients (53.3%) as compared to the other groups ($p < 0.05$) (see Table 1). Similarly, the ND subgroup was found with the highest proportion of previously undiagnosed DSPN within the painful (69.5%) and painless DSPN (84.3%) entities, respectively. While 81.9% of participants in the T2D group had an undiagnosed painless DSPN, this was significantly lower in the T1D group (55.6%).

The correlation analyses showed that painless DSPN correlated with male gender in T2D and ND patients ($P < 0.05$).

Table 1 | Prevalence of previously diagnosed and undiagnosed neuropathy in subjects with distal sensory polyneuropathy (DSPN) in subjects who completed the questionnaire.

	No diabetes	Type 1 diabetes	Type 2 diabetes	All
DSPN total				
Diagnosed	24.8	46.7	33.1	30.5
Undiagnosed	75.2	53.3#	69.9§	69.5
Painful DSPN*				
Diagnosed	30.9	53.3	43.0	38.5
Undiagnosed	69.5	46.7	57.0§	61.5
Painless DSPN*				
Diagnosed	15.7	44.4	18.1	18.9
Undiagnosed	84.3	55.6#	81.9	81.1

* Excluding subjects with symptoms during walking only. # $P < 0.05$ no diabetes vs type 1 diabetes. § $P < 0.05$ no diabetes vs type 2 diabetes

Painful and painless DSPN correlated positively with age in the ND group ($P < 0.05$). While painful DSPN correlated positively with BMI, painless DSPN was inversely correlated with BMI in the T2D group ($P < 0.05$). PAD correlated with painful DSPN in T2D and with painless DSPN in the T1D and ND groups ($P < 0.05$). ND participants with DSPN and HbA1c values in the diabetes range of 6.5%, had higher mean HbA1c values compared to participants without DSPN (8.3 ± 0.4 versus 7.1 ± 0.1%; $P = 0.003$). DSPN correlated with HbA1c levels in the ND group, with HbA1c levels of 6.5% ($P = 0.009$).

Discussion & Conclusions

The findings show that DSPN was undiagnosed in 70% of cases and an increased risk of diabetes was detected in almost 40% of the participants without previous history of diabetes. Additionally, the surprisingly high rate of undiagnosed painful DSPN in non-diabetic subjects may indicate, that neuropathic pain is subject to undertreatment and that unrecognized diabetes may represent an important risk factor of neuropathy. Thus, effective strategies to reveal both undetected diabetes and neuropathy should be established.

Please scan the QR code to access the original publication

A service from Wörwag Pharma