THE RELATIONSHIP BETWEEN THE SCREENING EXAMINATION OF LARGE AND SMALL NERVE FIBERS AND THE RISK OF DIABETES-RELATED FOOT DISEASE (DFD)

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Background : Accurate screening for diabetic peripheral neuropathy is critical for stratifying the risk of **diabetes-related foot disease (DFD).** Current screening predominantly targets large nerve fibers testing using a 10g monofilament and a 128 Hz tuning fork. **However, recent guidelines suggest incorporating small nerve fibers assessment to detect earlier neuropathy stages (2-5).**

Aim: This study aimed to compare the diagnostic value of large and small nerve fibers screening tools in relation to DFD risk categories in diabetic patients who were consecutively examined at a single workplace within one year.

Methods: A prospective study of DFD risk assessment according to the IWGDF Guidelines took place at a single diabetes clinic over a 12-month period (1/2024 - 12/2024)

A total of 92 patients with diabetes were consecutively examined

Large nerve fibers test (monofilaments and a tuning fork) and small nerve fibers test (sharpness discrimination using NeuroTips) were evaluated in terms of:

1.The sensitivity for detection of neuropathy (it means that the test was positive if the patient was in moderate or high risk of DFD category, where neuropathy has been present based also on medical reports or according to typical deformities or history of foot ulcer, amputation or end-stage renal disease)

Sensitivity: the probability of positive result when the condition is present

Sensitivity = TP/(TP + FN)

TP… true positive, FN … false negative

2. The specificity for excluding neuropathy (it means that the test was negative if the patient was in very low DFD risk category where neuropathy is not present)

Specificity: the probability of negative result when the condition is absent.

Specificity = TN/(FP + TN) TN…true negative FP .. false positive

3. Youden index (J) that summarizes the performance of Binary diagnostic test.

It is defined by J (%) = (sensitivity + specificity) – 100

Results:

Main characteristics of 92 diabetic patients :

mean age 65 ± 12 years; 63% male; 78% T2DM, mean duration of DM 9 ± 9 years

BMI 31 ± 6 kg/m^2 , HbA_{1C} 54,6 ± 14 mmol/mol

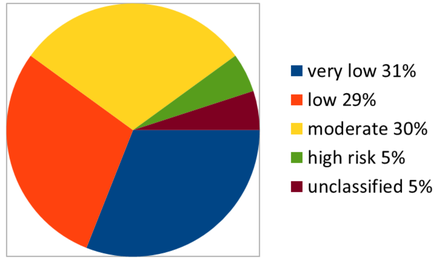
Deformity 33 (36%), PAD by Doppler index 16 (17%)

Fig 1 shows the distribution of DFD risk categories

Fig 2 shows sensitivity for detection of neuropathy in moderate or high risk of DFD and specificity for excluding neuropathy in very low DFD risk category using the assessment of large nerve fibers testing with 10g monofilament and 128 Hz tuning fork and the assesment of small nerve fibers with Neurotips sharpness discrimination test

Fig 3 shows Youden index (J)

Fig1. DFD risk category according to the IWGDF Guidelines (1)



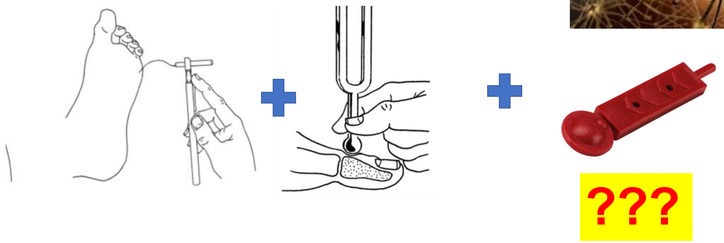


Fig 2. Sensitivity for detection of neuropathy in moderate or high risk DFD category and specificity for excluding neuropathy in very low DFD risk category

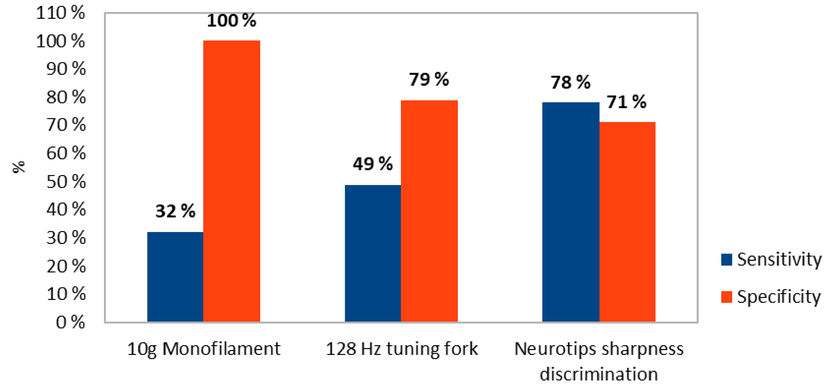
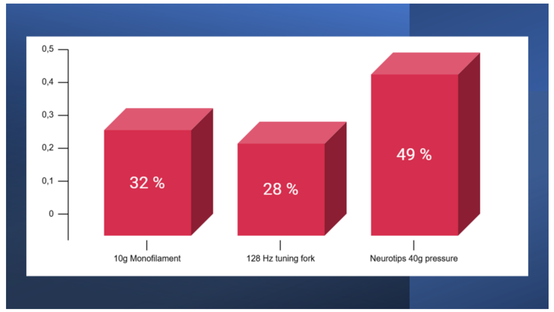


Fig 3. Youden index that summarizes the performance of sensitivity and specificity



CONCLUSION: Our findings suggest that incorporating small nerve fibers assessment significantly increases the sensitivity of DFD risk screening and appears essential for the early identification of at-risk patients in terms of neuropathy, potentially allowing for more timely preventive interventions

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