

A European Hemodialysis Multicenter Implementation of a Standardized Diabetic Foot Examination Protocol

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Introduction

- There is an increased risk for patients with diabetes to develop several states of foot problems, mainly caused by diabetic neuropathy alone or in combination with peripheral artery disease, arteria media sclerosis and microvascular problems.
- The same applies to patients on hemodialysis: foot complications are caused by uremic neuropathy, peripheral artery disease, arteria media sclerosis and microvascular problems related to secondary hyperparathyroidism and vascular calcifications.
- Therefore, diabetic patients on hemodialysis are at increased risk for diabetic foot ulcers, infections, limb amputation, and other severe complications. Pain and other symptoms are often reduced due to neuropathy, resulting in late diagnosis.
- Hemodialysis has been described as an independent risk factor for foot ulcers.

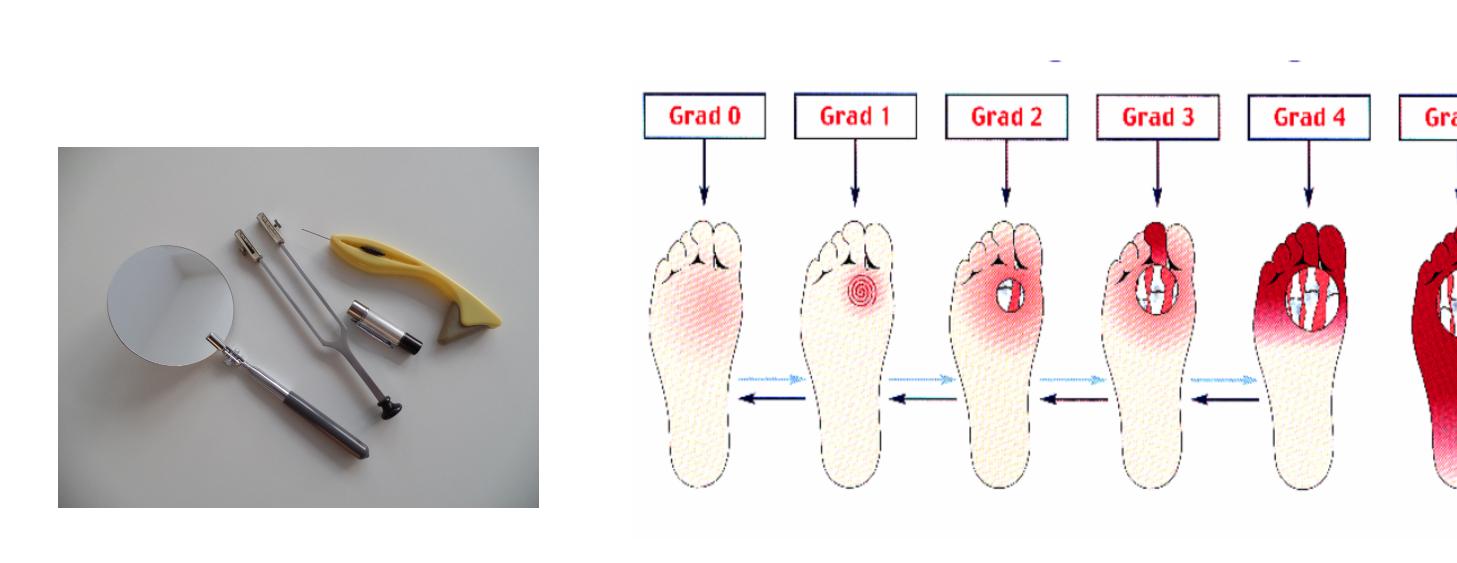
Objective

- The aim of this study was to analyze the frequency of foot complications following implementation of a standardized foot examination in a large cohort of prevalent diabetic hemodialysis patients in 26 DaVita centers in Germany (n = 14), Poland (n = 8), and Portugal (n = 4).
- We analyzed country specific differences in foot complications, arterial pulses, skin ulcers and sensory levels and also associations with demographic data, practices and laboratory data.

Methods

- A standardized foot examination was performed in 1025 prevalent diabetic hemodialysis patients in Germany (n = 674), Poland (n = 179) and Portugal (n = 172). Mean age 70.4 years.
- The protocol included: patient history (previous foot ulcer, amputation etc), inspection of feet (skin, nails), examination of the pedal pulses (a dorsalis pedis and a tibialis posterior), and examination of foot sensory level using monofilament and tuning fork.
- Foot complications were classified according to Wagner (grade 0-5) and peripheral artery disease was classified by clinical pulse measurement (normal = 0, weak = 1, missing = 2).

Diagnostic Tools and Wagner Classification



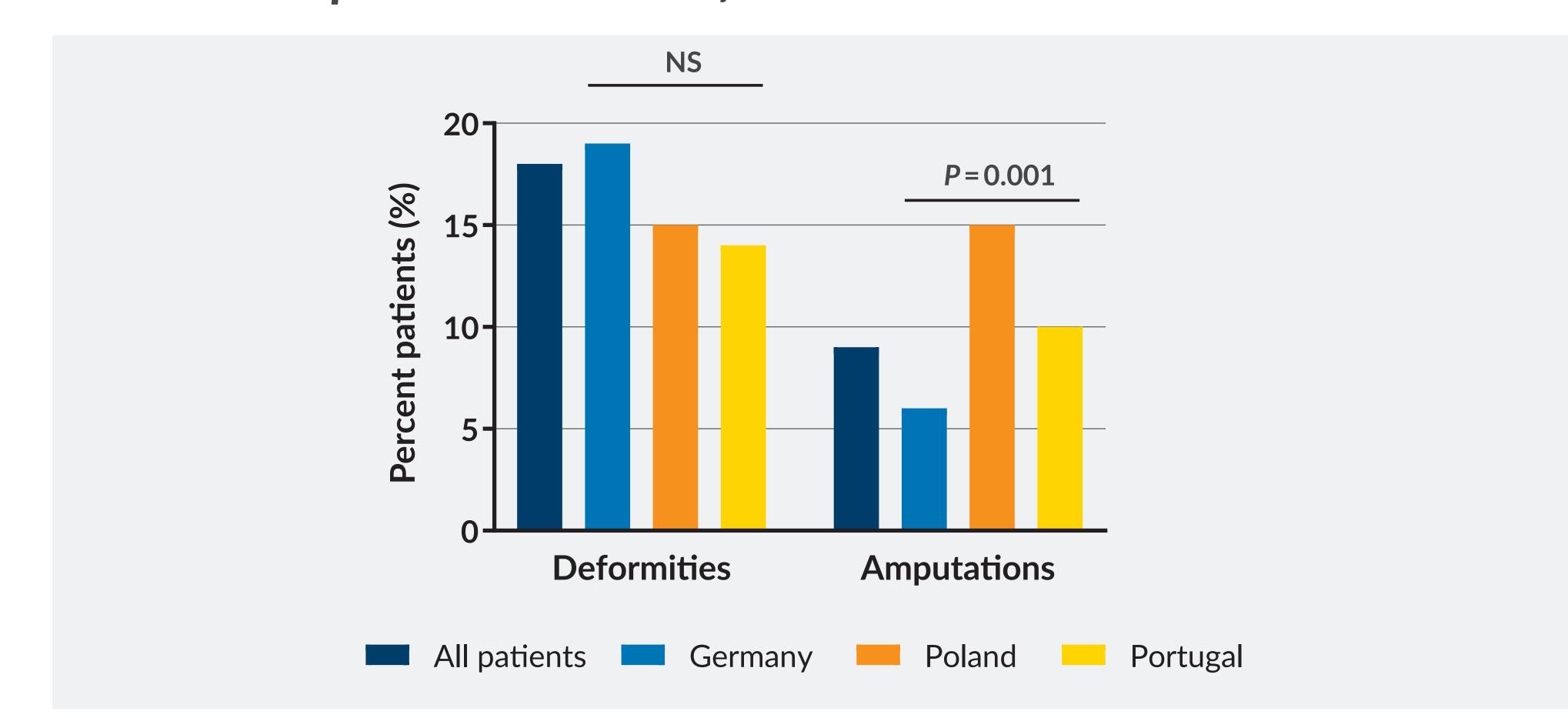
Grade	Wagner Classification
0	No break in skin
1	Superficial ulcer
2	Exposed tendous joints
3	Exposed bone and/or abscess/osteomyelitis
4	Gangrene of toes or forefoot
5	Midfoot or hindfoot gangrene

Results

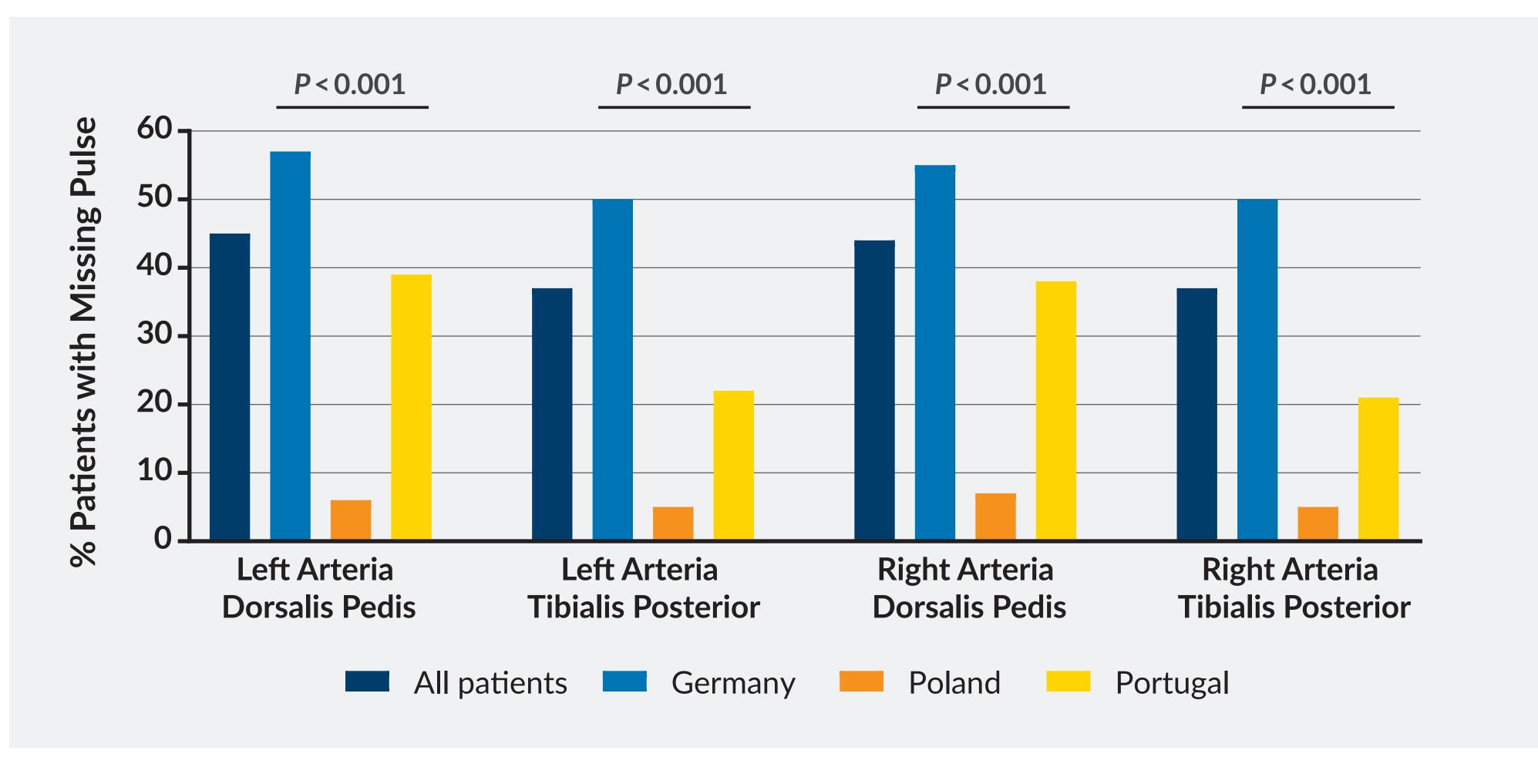
- Mean (SD) patient age was 70.4 (14) years (NS between countries).
- 8.7% had a prior amputation; this was less common in Germany (*P* < 0.001).
- A normal pulse in left and right a dorsalis pedis was present in 45% and 44% of patients, respectively; pulses were absent in 33% and 34% (*P* < 0.001 between countries).
- For left and right a tibialis posterior, normal pulse was present in 37% and 37% of patients, respectively, pulses were absent in in 43% and 42% (*P* < 0.001 between countries).
- Wagner classification score was 0 or 1 in 95.5% of patients and 4-5 in 1.8% (NS between countries).
- In a subgroup of 351 patients from Poland and Portugal there were no significant correlations between Wagner score and age, sex, BMI, Kt/V, vascular access, Charlson comorbidity index, Hb, albumin, phosphorus, and PTH.
- Patients with skin edema were older (P < 0.05), had higher Charlson comorbidity index (P < 0.05), lower Hb (P < 0.05), lower albumin (P = 0.01) and higher phosphorus (P = 0.004).

Results

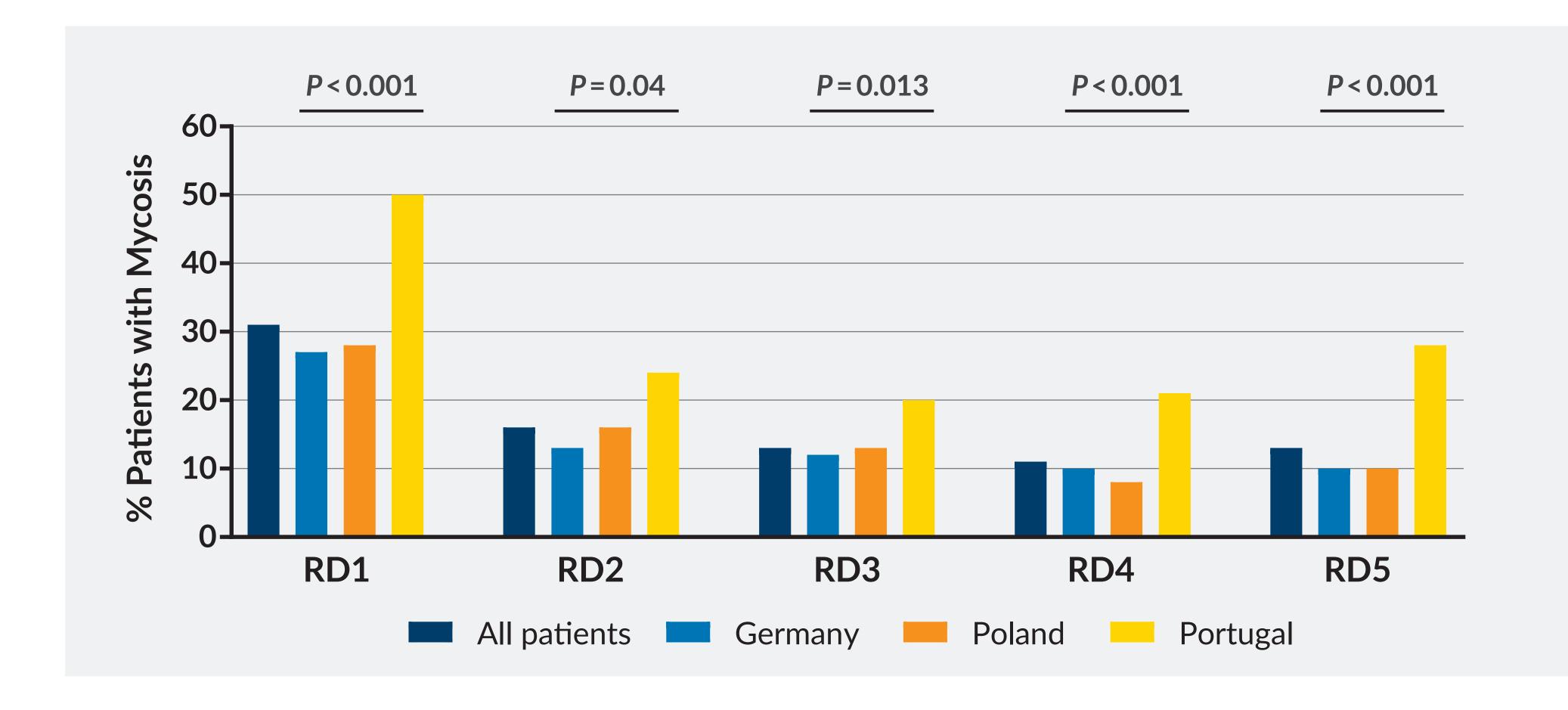
Previous Amputations and Deformities



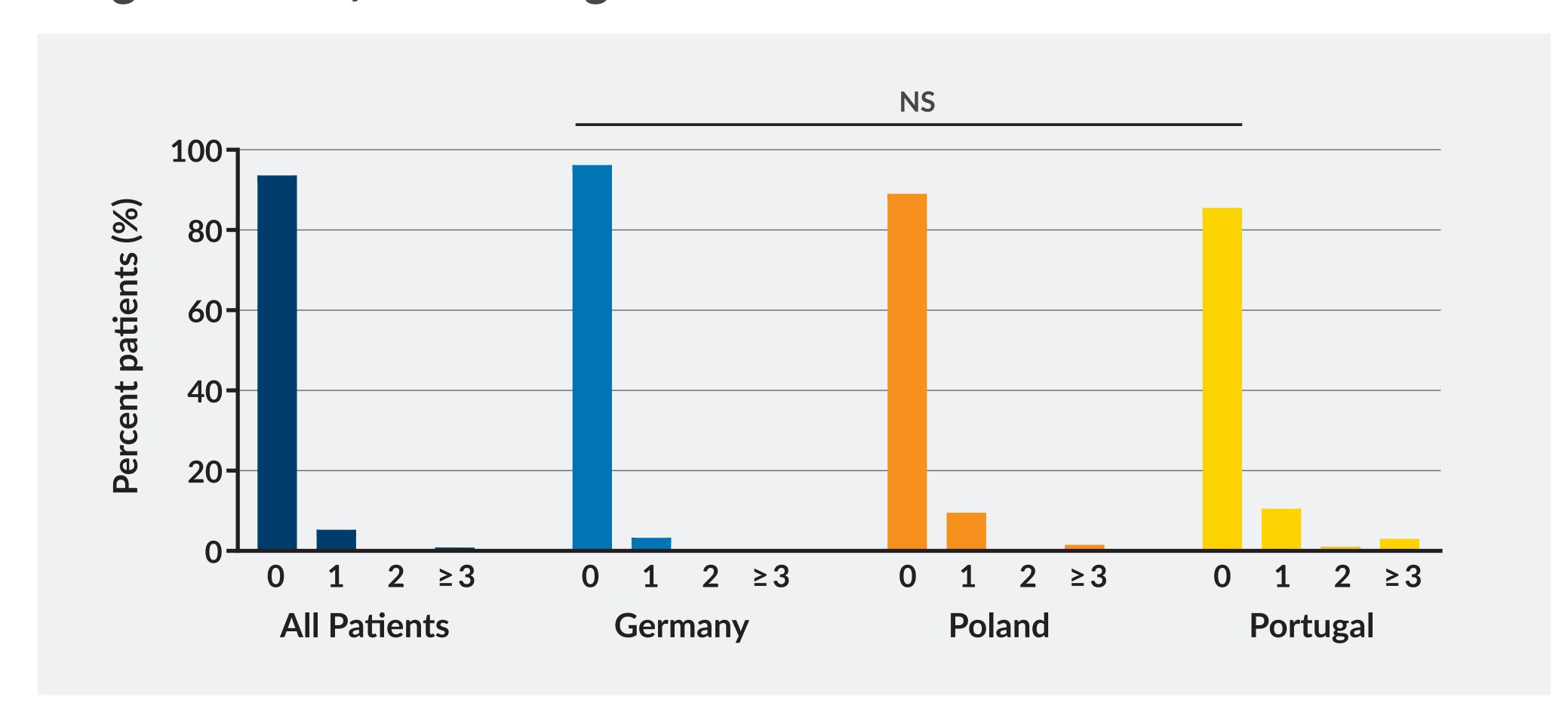
Missing Pulses in A Dorsalis Pedis and A Tibialis Posterior



Mycosis: Right Foot (dig 1-5)



Wagner Classification: Right Foot



Conclusions

- Implementation of a standardized foot examination protocol in a large cohort of European diabetic patients on hemodialysis revealed a high prevalence of clinically significant complications that warrant close attention.
- This simple clinical tool is suitable to identify patients at high risk and could be the basis of a program to improve health outcomes.

References

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- 2. Schomig M, Ritz E, Standl E, Allenberg J. The diabetic foot in the dialyzed patient. *J Am Soc Nephrol*. 2000;11(6):1153-9.

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