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Background

Charcot foot is a rare but devastating complication of diabetes, leading to uncontrolled inflammation and high risk of osteolysis in its acute phase. Preserved local perfusion is believed to be a prerequisite for the detrimental inflammatory response. Previous studies have shown that the microvascular hyperemic response is preserved in patients with Charcot foot, compared to those with diabetic neuropathy only (1). It has been hypothesized that recurrence or even incidence of Charcot foot may be prevented by loss of nerve-mediated vasodilatation (2). To date, there is no epidemiological data to support this hypothesis.

Aims of the study

We sought support for the hypothesis that Charcot foot seems to occur preferentially in patients with preserved lower-limb perfusion by studying the prevalence of previous lower limb revascularisation, as a marker of peripheral macroangiopathy, in patients with diabetes and Charcot foot.

Study design

Belgian recognized diabetic foot clinics (DFC, N=36) treat and follow patients with diabetic foot ulcers (DFU) and diabetic patients with Charcot foot.

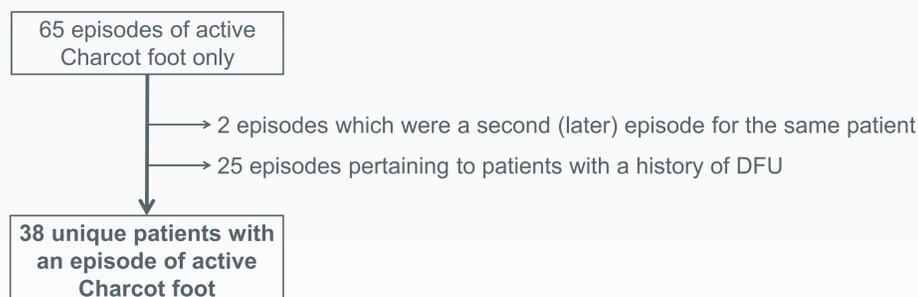
DFCs participate in a nation-wide initiative for quality of care monitoring. Patient-level data with regard to medical history, diagnosis, treatment and outcome are routinely collected (3). For this study, data from the 2005, 2008 and 2011 audits were pooled. It contained data of 3,331 unique patients and 3,646 episodes of DFUs (Wagner grade 2 or more) or of (in)active Charcot foot.

Episodes (N=3,646) were put in 5 categories: DFU only (N=3,379, 92.7%), active Charcot foot only (N=65, 1.8%), active Charcot foot + DFU (N=53, 1.5%), inactive Charcot foot only (N=3, 0.1%), inactive Charcot foot + DFU (N=146, 4.0%).

In this database, and using the categories mentioned above, cases and controls were identified

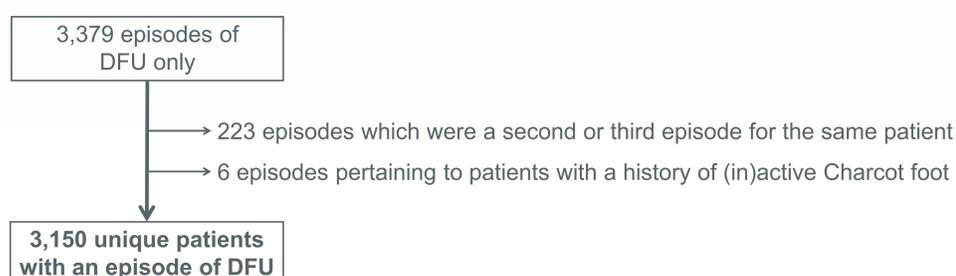
Cases

Cases were defined as follows: unique patients with an episode of active Charcot foot only, without a history of DFU.



Controls

Controls were defined as follows: unique patients with an episode of DFU only, without a history of (in)active Charcot foot.



Statistical analyses

Age-adjusted prevalence of lower-limb revascularization was calculated using logistic regression.

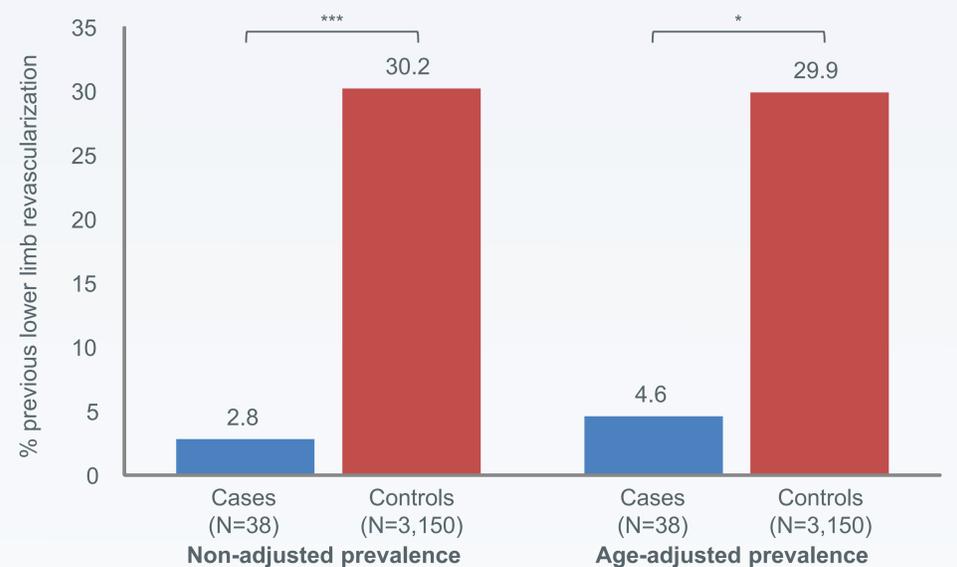
Results

Demographic data

	Cases (N = 38)	Controls (N = 3,150)
Age, years	58.6 ± 10.4***	69.1 ± 12.1
Diabetes duration, years	14.7 ± 9.3	15.8 ± 11.6
% men	65.8	64.1
% type 1 diabetes	18.4	9.2

*** p < 0.001 vs. controls
Mean ± standard deviation

Prevalence of previous lower limb revascularization



*** p < 0.001 vs. controls; * p < 0.05 vs. controls

Medical history

Prevalence of...	Non-adjusted		Adjusted for age	
	Cases (N = 38)	Controls (N = 3,150)	Cases (N = 38)	Controls (N = 3,150)
Smoking, %	17.9	19.1	10.9	16.3
Prior cardiovascular disease, ^a %	23.5	38.7	45.1	38.2
Prior renal insufficiency, %	20.6	31.1	17.5	30.6
Prior end-stage renal disease, %	5.7	8.9	0.0**	8.6

^a Defined as: myocardial infarction / CABG / PCI / stroke / transient ischemic attack

** p < 0.01 vs. controls

Conclusions

Charcot foot in diabetes seems to occur preferentially in patients without a history of lower limb revascularization. Despite the limitation of the cross-sectional nature of this study, our findings support the hypothesis that among patients with diabetes, Charcot foot occurs preferentially when lower limb perfusion is preserved.

References

- (1) Baker N, Green A, Krishnan S, Rayman G. Microvascular and C-Fiber Function in Diabetic Charcot Neuroarthropathy and Diabetic Peripheral Neuropathy. *Diabetes Care* 30 (2007): 3077–79.
- (2) Rudrappa S, Game F, Jeffcoate W. Recurrence of the Acute Charcot Foot in Diabetes. *Diabetic Medicine* 29 (2012): 819–21.
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