

Cardiac autonomic neuropathy as a risk factor of diabetic foot amputations

T. Zelenina¹, N. Vorokhobina¹, O. Mamontov¹, A. Zemlyanoy², A. Zelenin³¹St. Petersburg Medical Academy of Postgraduate Studies, St. Petersburg,²Institute of surgery named after A. V. Vishnevskiy of Russian Academy of Medical Science, Moscow, ³Moscow State Technical University of Civil Aviation, Department of Medical Statistics, Russia.

Background and aims: Cardiac autonomic neuropathy (CAN) and chronic peripheral diabetic neuropathy (PDN) both associate with early morbidity and mortality in diabetic patients. In addition autonomic nerves dysfunction may also connect with development and progression of diabetic foot ulcers and high risk of amputations.

The aim of this study deals with investigation of the role of CAN and PDN in development of diabetic foot ulcers and amputations. Subjects and Methods: 57 diabetic patients with foot ulcers and local signs of infection who had required surgery operations and amputations were examined (M/F 31/26). Surgery debridement had been performed for the treatment of foot abscess (Wagner 2) in 19 cases and 32 patients were amputated on the level of foot (Wagner 3). Diagnosis of PDN was based on neuropathy symptom score, neuropathy disability score and vibration perception threshold. All patients had palpable foot pulses. Cardiovascular autonomic functional tests were performed and arterial baroreflex sensitivity (ABS) was determined. Results: CAN and significant decrease of ABS were found in overall patients. Any links between ABS and duration of diabetes, HbA1c% level, lipid parameters weren't established as well as PDN. Patients with severe CAN had significant longer duration of diabetes (14.4 ± 2.15 vs 10.74 ± 1.59 years, $p=0.04$), PDN (8.0 ± 1.13 vs 2.85 ± 0.69 , $p=0.007$), higher level of HbA1c% (9.59 ± 0.71 vs 7.55 ± 0.69 , $p=0.069$). Deep of lesion, presence of X-Ray changes, MRSA, previous amputations and severe CAN were the only factors that predicted amputations (rate of amputations was 66.7% vs 30.8 % between patients with severe/moderate or functional CAN respectively, $\chi^2=13.85$, $p=0.0001$). No difference of duration of diabetes, severe PDN, HbA1c%, lipid parameters were established between patients with or without amputations. Notably only CAN not PDN could determine foot amputations. Conclusion: Diabetic patients with moderate/severe CAN had twice increased risk of foot amputations as compared with patients who had functional CAN. At the same time PDN as seems doesn't predict the progression of inflammation process and deep of foot lesions. Further studies are required for the more definitions of links between diabetic neuropathy and development and progression of foot tissue lesions.