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Immune Functions in Patients with Diabetic Foot Ulcers Infected especially by Resistant Microorganisms

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The presence of chronic non-healing diabetic foot ulcers (DFU) particularly infected by resistant pathogens could be associated with a more serious alteration of immune system. The **aim** of our study was to compare selected immune parameters between patients with infected DFU and diabetic controls focusing on the presence of infection caused by resistant pathogens. **Methods**: We included into our study 29 patients treated in our foot clinic from 10/2011 to 2/2012 for infected chronic DFU (Texas II-III/B or D; mean age 59.8±6.6 years, mean HbA1c according to IFCC 6.9±1.7%, DFU duration 14.5±11 months) and age and type of diabetes matched 15 controls (mean age 56.3±7.1 years, mean HbA1c 5.2±1.2%). Patients with infected DFU were then subdivided into two subgroups according to the type of causal pathogen [first subgroup infected by sensitive microorganisms (group SP; n=22) and a second subgroup infected by resistant microorganisms (group RP; n=7)]. Biochemical parameters were assessed by standard biochemical methods, subclasses of immunoglobulins by nephelometry, subpopulations of lymphocytes including CD4 and CD8 naive and memory T-lymphocytes together with phagocytosis by flow cytometry. **Results**: Patients with infected DFU had significantly higher markers of infection - CRP (14.3±18.4 vs. 2.6±2mg/L;$p<0.01$), leukocytes (8.3±1.8 vs. 7.3±1.3;$p<0.05$), monocytes (0.6±0.15 vs. 0.5±0.24;$p<0.01$), IgA (5.6±4.5 vs. 2.9±2.9g/L;$p<0.001$) and IgG1 (7.5±2.4 vs. 4.7±0.8g/L;$p<0.001$) compared to diabetic controls. There was also found in such patients compared to controls an alteration in non-specific immunity represented by a decreased amount of effector monocytes CD14+cells expressing HLA-DR (90.7±13.1 vs. 97±1.7;$p<0.05$) associated with a more serious course of infection. As naive and memory T-lymphocytes as phagocytosis did not differ significantly between patients with infected DFU and diabetic controls. Subgroup RP had significantly lower number of B-lymphocytes producing Antibodies (CD19+lymphocytes - 126±75 vs. 233±146;$p<0.05$), lower concentrations of IgG2 (2.7±1.6 vs. 3.9±1.6g/L;$p<0.05$) and IgG4 (0.16±0.08 vs. 0.6±0.5g/L;$p<0.01$) compared to patients infected by sensitive bacteria. Patients from the group RP had higher incidence of IgG2 deficiencies (57.1% vs. 22.7%; $p=0.16$) in contrast to the group SP. **Conclusion:** Even though our study showed an activation of inflammatory markers in patients with infected DFU, patients infected by resistant pathogens revealed mainly abnormalities of humoral immune functions – a decreased amount of B-lymphocytes together with decreased concentrations of IgG subclasses.
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