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A decrease in VEGF and inflammatory markers is associated with diabetic proliferative retinopathy

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Diabetic retinopathy is the most severe ocular complication of diabetes mellitus (DM), is associated with micro-vascular damage. The more advanced stage, proliferative diabetic retinopathy, has been linked to an increased risk of cardiovascular morbidity and mortality. Our hypothesis was that inflammatory and angiogenic markers will detect the different stages of type 2 diabetes, and may predict development of micro-vascular damage. Seventy three type II diabetic patients were randomly assigned to three groups (A - 25 patients {12 males], no diabetic retinopathy; B - 25 patients {19 males], non-proliferative retinopathy; and C - 23 patients {13 males], proliferative retinopathy) when they came for a routine follow-up visit in the ophthalmologic outpatient clinic. Twenty-three healthy subjects (14 males) served as controls. High-sensitivity C reactive protein (hs-CRP), soluble vascular cell adhesion molecule 1(sVCAM-1) and vascular endothelial growth factor (VEGF) were studied. The duration of type II diabetes differed between group A (9 ± 6 years) and B (17 ± 9 years) patients ($p = 0.001$). No such difference was revealed between groups B and C (19 ± 6 years) ($p = 0.30$). A difference in hemoglobin A1C (HBgA1C) levels was detected between groups A (7.1 ± 2.7%) and B (8.5 ± 1.5%) ($p = 0.02$), but none was found between groups B and C (8.5 ± 1.6%) ($p = 0.98$). Only six patients (out of 23) used insulin treatment in group A, compared with 16 in group B (out of 25) and 17 in group C (out of 25) ($p = 0.004$). All three groups of diabetic patients were older (62.8 ± 10.8, 61.9 ± 9.4, 59.2 ± 10.3 years, respectively) than controls (44.3 ± 11.6 years) ($p \leq 0.001$). Hs-CRP levels were higher in diabetic patients (4,391 ± 4,175, 4,109 ± 4,533, 3,005 ± 3,842 ng/mL, respectively) than in controls (1,659 ± 1,866 ng/mL); however, only the levels in patients of groups A ($p = 0.01$) and B ($p = 0.03$) were significantly different from those of the controls, in contrast to group C, which did not differ ($p = 0.180$). Similar findings were observed for sVCAM-1 (706 ± 347, 746 ± 328, 638 ± 208 ng/mL, respectively, vs. controls {552 ± 143 ng/mL]); sVCAM-1 levels of groups A and B, but not C, differed from the controls ($p = 0.05$, $p = 0.01$ and $p = 0.125$, respectively). With the exception of group B ($p = 0.03$), soluble VEGF DM type II levels (493 ± 353, 625 ± 342, 368 ± 223 pg/mL, respectively) did not vary from those of the controls (392 ± 355 pg/mL, $p \geq 0.05$). However, as the disease progressed, there was a significant decrease in VEGF levels, accompanied by a significant difference between groups B and C ($p = 0.006$). Patients with diabetes type 2with no-retinopathy and with non-proliferative retinopathy had high levels of inflammatory and angiogenic markers, which decreased in patients with diabetic proliferative retinopathy. Biomarkers of inflammation and angiogenesis may detect the progression of diabetic vascular disease and may lead towards earlier interventions that would prevent systemic complications.

Biography

Arnon Blum, MD, is a cardiologist who is head of a department of medicine in Baruch Padeh hospital affiliated to Bar Ilan University, Israel. His research is vascular biology, endothelial function and stem cell research and stem cell transplantation to the cardiovascular system.

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