THE IMPORTANCE OF ADVANCED GLYCATION END PRODUCTS, LIPID AND REDOX BIOMARKERS DETERMINATION IN PATIENTS WITH DIABETES MELLITUS

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Non-enzymatic glycation, oxidative stress (OS) and dyslipidemia are the main metabolic alterations behind the development of macrovascular complications (cardiovascular diseases) of diabetes mellitus (DM). However, clinical relevance of biomarkers of these processes in patients with microvascular complications (nephropathy, neuropathy, retinopathy) is less understood. Therefore, the aim of this study was to examine advanced glycation products (AGEs), biomarkers of OS, and dyslipidemia in 100 DM patients (33 without microvascular complications and 77 with complications) and 30 subjects without DM. AGEs levels were higher in patients with complications than in those without complications (median: 5.72; interquartile range: 4.60-6.54 U/mL vs. median: 4.84; interquartile range: 4.10-5.40 U/L; $P<0.05$). In addition to AGEs, the group with diabetic retinopathy had higher plasma total antioxidant capacity ($P<0.05$), while the group with diabetic nephropathy had smaller LDL size than the patients without these complications (25.48±1.26 nm vs. 26.21±1.19 nm; $P<0.05$). The patients with co-existing cardiovascular disease were further characterized by dysfunctional HDL particles, as evidenced by increased small HDL particles ($P<0.05$) and reduced paraoxonase-1 activities. Significant increase in both pro-oxidant-antioxidant balance and ischemia-modified albumin ($P<0.05$), with simultaneously decreased activity of superoxide-dismutase ($P<0.05$) was found in patients with progressive diabetic neuropathy, indicating the highest degree of oxidative damage. It can be concluded that patients with microvascular complications of DM have aggravated redox imbalance and lipid profile alterations. In addition to metabolic control, strategies aimed at lowering OS and correcting dyslipidemia can contribute to the prevention of microvascular complications of diabetes.

References

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ZNAČAJ ODREĐIVANJA PRODUKATA UZNAPREDOVALE GLIKACIJE I BIOMARKERA LIPIDNOG I REDOKS STATUSA KOD PACIJENATA SA DIJABETES MELITUSOM

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Neenzimska glikacija, oksidativni stres (OS) i dislipidemija su glavni metabolički procesi koji dovode do razvoja makrovaskularnih komplikacija (kardiovaskularnih bolesti) dijabetesa melitusa (DM). Međutim, klinički značaj određivanja biomarkera ovih procesa kod pacijenata sa mikrovaskularnim komplikacijama (retinopatija, nefropatija, neuropatija) nije dovoljno razjašnjen. Cilj ovog istraživanja je bio ispitivanje produkata uznapredovale glikacije (AGE), biomarkera OS i dislipidemije kod 100 pacijenata sa DM (33 bez mikrovaskularnih komplikacija i 77 sa komplikacijama) i 30 ispitanika bez DM. Nivo cirkulišućih AGE je bio značajno viši u grupi pacijenata sa komplikacijama (medijana: 5,72; interkvartilni raspon: 4,60-6,54 U/mL) u odnosu na pacijente bez komplikacija (medijana: 4,84; interkvartilni raspon 4,10-5,40 U/L; $P<0,05$). Pored povišenih koncentracija AGE, pacijenti sa dijabetesnom retinopatijom su imali i povišene vrednosti totalnog oksidativnog statusa ($P<0,05$), a pacijenti sa dijabetesnom nefropatijom manje dijametre LDL čestica (25,48±1,26 nm) u poređenju sa sa pacijentima bez komplikacija (26,21±1,19 nm; $P<0,05$). Nadalje, kod pacijenata sa pridruženim makrovaskularnim komplikacijama (kardiovaskularnim bolestima) utvrđeno je prisustvo disfunkcionalnih HDL čestica, na osnovu povećanog udela malih HDL čestica ($P<0.05$) i smanjene aktivnosti paroksonaze-1. Pacijenti sa progresivnom dijabetesnom neuropatijom su imali značajno povišene vrednosti prooksidativno-antioksidativnog balansa i ishemijom modifikovanog albumina ($P<0,05$), uz istovremeno sniženje aktivnosti superoksid-dismutaze ($P<0,05$), što ukazuje da je stepen oksidativnog oštećenja u ovoj grupi bio najveći. Može se zaključiti da, pored adekvatne metaboliče kontrole, strategije usmerene ka sniženju OS i korekciji dislipidemije, mogu doprineti prevenciji razvoja mikrovaskularnih komplikacija dijabetesa.

Literatura

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