INTRODUCTION

Type 1 diabetes mellitus (DM1), a chronic metabolic disorder of autoimmune origin, has been associated with oxidative stress (OS), which plays a central role in the onset, progression and long-term complications of the disease1. The markers of OS lipid peroxidation products, lipid hydroperoxides (LOOH), and also malondialdehyde (MDA) and thiobarbituric reactive substances (TBARS) that oxidatively modify proteins (Pr) i.e., PrMDA and PrTBARS, respectively, have been associated with DM2, DM1, diabetic neuropathy, and microalbuminuria2-3.

AIM

The aim of the present study was to investigate LOOH, PrMDA and PrTBARS as diagnostic and prognostic markers of DM1 in 50 children and adolescents with DM1 and 21 controls.

METHOD

Fifty children and adolescents with DM1 (2.58 to 17.5 years old, (mean ± SD: 10.99 ± 3.48)) and 21 healthy age-matched controls (2 to 14 years old, (mean ± SD: 9.05 ± 3.66) were recruited from the Department of Paediatric Endocrinology of the University Hospital of Patras in Greece. Lipid peroxidation was assessed by the direct marker lipid hydroperoxide (LOOH) and by its decomposition aldehyde products that are bound to oxidized proteins, such as malondialdehyde (MDA) and other aldehydes (PrTBARS; protein-bound thioarbituric reactive substances). The employed assay was developed by our group for the determination of LOOH and PrMDA, and applied after modification for the measurement of PrTBARS for the first time in the present study. The determination of the aforementioned markers was performed in blood serum.

RESULTS

The novel OS marker PrTBARS was assessed for the first time in children and adolescents with DM1. LOOH and the pair PrMDA/PrTBARS, representing early and late peroxidation stages, respectively, are found to be significantly higher (130%, 50/90%, respectively, at p<0.001) in patients with DM1 compared to controls (Figure 1). The studied OS parameters did not differ with age, age at diagnosis, sex, duration of DM1, presence of recent ketosis/ketoacidosis, or mode of treatment (Table 1).

CONCLUSIONS

We propose that LOOH, PrMDA and the new marker PrTBARS could identify OS in children and adolescents with DM1, and may, perhaps, hold promise as a prognostic tool for future complications associated with the disease.

REFERENCES


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