Assessment of lipid and protein peroxidation markers in non-pregnant and pregnant female dogs

M. Szczubiał¹, M. Kankofer², R. Dąbrowski¹, M. Bochniarz¹, R. Urban-Chmiel³

¹ Department and Clinic of Animal Reproduction, Faculty of Veterinary Medicine, University of Life Sciences, Głęboka 30, 20-612 Lublin, Poland
² Department of Animal Biochemistry, Faculty of Veterinary Medicine, University of Life Sciences, Akademicka 12, 20-033 Lublin, Poland
³ Sub-department of Veterinary Prevention and Avian Diseases, Institute of the Biological Bases of Animal Diseases, Faculty of Veterinary Medicine, University of Life Sciences, Akademicka 12, 20-033 Lublin, Poland

Abstract

The aim of the study was to investigate oxidative stress during normal pregnancy in female dogs based on an evaluation of plasma markers for lipid and protein peroxidation. Twenty clinically healthy female dogs (10 non-pregnant and 10 pregnant) were used in the study. Blood samples from the pregnant animals were collected at 19-21, 38-40, and 56-58 days of pregnancy. Blood samples from non-pregnant female dogs were obtained between 20 and 35 days after ineffective breeding. As indicators of oxidative stress, we measured the following using spectrophotometric and spectrofluorimetric methods: thiobarbituric acid reactive substances (TBARS), radical cations of N,N,die-thylpara-phenylene diamine (RC-DEPPD), sulfhydryl groups (SH groups), bityrosine and formylkynurenine. The mean plasma TBARS concentration in the pregnant dogs (0.486 ± 0.071 – 0.581 ± 0.191 μmol/g protein) was significantly higher (p<0.05) than that found in the non-pregnant animals (0.274 ± 0.111 μmol/g protein). A marked, although not significant, decrease in SH group content, as well as an increase in bityrosine and formylkynurenine concentration were concurrently observed in the pregnant dogs. No significant differences were found in terms of the studied markers in the pregnant animals when comparing the values obtained during the investigated periods of pregnancy, although there was a progressive decrease in TBARS concentration and a progressive increase in RC-DEPPD, bityrosine and formylkynurenine contents. Our findings suggest that normal pregnancy in female dogs is associated with oxidative stress. Further studies are necessary to establish the physiological ranges of antioxidative/oxidative profiles in pregnant dogs and to explain if and how the intensity of oxidative stress might contribute to the risk of the complications of pregnancy.

Key words: oxidative stress, pregnancy, lipid peroxidation, protein oxidative damage, female dogs

Correspondence to: M. Szczubiał, e-mail: marek.szczubial@up.lublin.pl, tel.: +48 81445 61 98