

RELATIONSHIP BETWEEN OXIDATIVE STRESS AND SEMEN QUALITY IN INFERTILE MEN

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INTRODUCTION and OBJECTIVES: Chronic exposure to elevated levels of reactive oxygen species (ROS) in semen can deplete the limited antioxidants resulting in oxidative stress. The purpose of our study was to evaluate seminal levels of ROS, and the non-enzymatic total antioxidant capacity (TAC) in different sub-classes of subfertile men.

METHODS: Semen specimens from 298 men attending our infertility clinic were examined. Patients were classified as: oligospermic (n = 14, 11%), asthenospermic (n = 68, 23%), teratospermic (n = 11, 4%), oligoasthenospermic, n = 38 (13%), oligoteratospermic, n = 5 (2%), asthenoteratospermic, n = 32 (11%), and astheno-terato-oligospermic n = 61 (21%). Sixty nine patients (23%) did not fall into any of the above categories. Semen characteristics were compared with normal healthy controls (n = 19). White blood cell concentration, sperm morphology, ROS production by the chemiluminescence assay, and total antioxidant activity in the seminal plasma by an enhanced chemiluminescence assay was determined in these patients.

RESULTS: Compared to the controls, the ROS levels were significantly elevated in the non-asthenoteratooligospermic group (p = 0.04), whereas, the TAC and ROS-TAC scores were significantly depressed (P = 0.001). Semen characteristics (concentration, motility, morphology), TAC, and ROS-TAC scores (p = 0.001) were significantly lower in all patient groups (when the above category was excluded) which were either oligospermic, asthenospermic, or teratospermic as compared to the controls. ROS levels were significantly elevated in these patient categories as compared to the controls (p = 0.001). Multivariate analysis of variance in the three main categories (oligo, astheno, or terato) showed significantly high levels of ROS in oligospermic (p <0.001), and teratospermic groups (p <0.013). Lowest TAC level was seen in asthenospermic men (p <0.04), whereas, the ROS-TAC scores were lowest in oligospermic men (p <0.0001).

CONCLUSIONS: Presence of seminal oxidative stress in both men with normal semen characteristics as well as in various categories of infertile men suggests its role in the etiology of male infertility. Markers of oxidative stress may play an important role in the selection of appropriate treatment strategies for these men.