RELATIONSHIP BETWEEN CIGARETTE SMOKING AND THE LEVELS OF ANTIOXIDANTS AND LEUKOCYTES IN INFERTILE MEN: A PROSPECTIVE STUDY

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Introduction and Objective: Cigarette smoke is a known somatic cell mutagen and carcinogen and it is known to adversely affect male reproductive health. Even though studies have shown the harmful effects of smoking on sperm quality, a handful of studies have found no association between smoking and sperm function or sperm nuclear DNA damage. Superoxide dismutase (SOD) and catalase are important antioxidant enzymes that can quench excess free radicals such as: superoxide anion and hydrogen peroxide respectively. The objective of our study was to evaluate and correlate the seminal antioxidant enzymatic activity (SOD and catalase levels) among fertile and infertile men who are cigarette smokers.

Methods: The Institutional Review Board approved this study. Ten fertile donors and 112 infertile patients were included in the study. Semen analysis was performed according to the World Health Organization guidelines and sperm morphology according to Kruger strict criteria. Superoxide dismutase and catalase levels were determined with a spectrophotometer. Results: A significant difference was noted in the number of cigarettes smoked/day between infertile (4.8 ± 0.9) and fertile men (1.5 ± 0.5; p = 0.03). Significantly lower levels of SOD (14.67 ± 12.27 and 38.03 ±21.65) and catalase (14.87 ± 16.95 and 34.03 ± 20.65) were seen in infertile patients compared to fertile donors (P <0.0001). A significant correlation between catalase and SOD was observed (r = 0.461, P = 0.0001). Superoxide dismutase was significantly correlated with sperm concentration (r = 0.204, P = 0.034) and negatively correlated with leukocytospermia (r = -0.228, P = 0.021). Cigarette smoking was inversely correlated with SOD levels (r = -0.251, P = 0.01), but not with catalase levels (r = -0.147, P = 0.130). Conclusions: Decreased antioxidant enzyme levels are associated with male infertility. The detrimental effects of cigarette smoking on sperm motility and antioxidant levels (negative correlation with SOD) may be a possible reason for infertility in men who smoke cigarettes. As low antioxidant levels are linked to decreased fertility, physicians should advise infertile patients who smoke cigarettes to quit smoking.

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