

RELATIONSHIP BETWEEN OXIDATIVE STRESS AND CLINICAL DIAGNOSIS IN MEN UNDERGOING FERTILITY INVESTIGATION

Anthony J. Thomas Jr., Fabio F. Pasqualotto, Rakesh K. Sharma, David Nelson, and Ashok Agarwal, Cleveland, OH (Presented by Dr. Pasqualotto).

INTRODUCTION AND OBJECTIVES: High levels of reactive oxygen species (ROS) can overwhelm the antioxidant capacity and disrupt sperm function by inducing peroxidative damage to the sperm plasma membrane and DNA. High levels of ROS plays an important role in the etiology of male infertility. The purpose of our study was to compare the levels of ROS, and total antioxidant capacity (TAC) between subfertile men with different diagnoses and normal healthy men (control).

METHODS: Semen specimens from 299 men attending our infertility clinic between 1997 to 1998 were examined according to the World Health Organization criteria. ROS production was measured by the chemiluminescence assay. The results were expressed as $[\text{Log}(\text{ROS} + 1) \times 10^4 \text{ counted photons/minute}/20 \times 10^6 \text{ sperm}]$. Total antioxidant activity was measured in the seminal plasma by an enhanced chemiluminescence reaction and results were expressed as Trolox equivalent. The parameters of oxidative stress were compared between each group of diagnoses and the controls (n = 19). Patients were divided into the following 7 groups according to their clinical diagnosis: varicocele (n = 77), prostatitis and other infections (n = 46), vasectomy reversal (n = 43), primary infertility (n = 36), varicocele associated with prostatitis (n = 11), other diagnoses (n = 25), and no known cause (n = 60).

RESULTS: The highest levels of ROS were seen in the patients with varicocele associated with prostatitis (3.2 ± 0.35), followed by primary infertility (2.3 ± 0.21) and varicocele (2.2 ± 0.13). These values were significantly higher than controls ($p < 0.005$). TAC levels were depressed in all 7 patient groups as compared to the controls. Significant difference in TAC activity were noted between the controls (1653.98 ± 115.28) and subfertile men with prostatitis (899.2 ± 74.2), primary infertility (1014.7 ± 79.2), and varicocele associated with prostatitis (1026.33 ± 150.32) ($p < 0.001$).

CONCLUSIONS: The presence of oxidative stress as indicated by high levels of ROS, and depressed TAC activity in subfertile men irrespective of their diagnosis suggests its role in the pathophysiology of their infertility. Medical or surgical treatments in these men should also include strategy to reduce seminal oxidative stress.