IS REACTIVE OXYGEN SPECIES (ROS) AN INDEPENDENT MARKER OF MALE FACTOR INFERTILITY?
KP Nallella, R Guruswamy, A Agarwal, Cleveland Clinic Foundation

Generation of reactive oxygen species (ROS) in the male reproductive tract has spurred real concern due to their potential toxic effects at high levels on sperm quality and function, leading to male infertility. However, there is no consensus on including measurement of ROS as a routine diagnostic test in the evaluation of male factor infertility (MFI). The purpose of this study was to define the reference values of ROS in normal healthy donors (NHD), and to observe its abnormal pattern in MFI patients at a tertiary care infertility center. We assessed the ROS levels in 60 MFI patients and 71 semen samples from 33 NHD. Among the MFI patients, all three semen parameters (concentration, motility, and morphology) were abnormal in 35 men and normal in 25 men according to WHO criteria. Female factors were ruled out for all of these MFI patients. Men with leukocytospermia were excluded. After simple sperm washing, ROS levels were determined by chemiluminescence assay using luminol. The third percentile value of ROS levels was calculated from NHD. These values are traditionally used as cut-off points of normality in a biological system. In our experiment this value (calculated as 0.48) indicates that ROS levels were below this cut-off in 97% of NHD. We applied this cut-off value to differentiate patients with high ROS levels in MFI group. ROS levels were significantly higher in overall MFI patients as compared to NHD ($P < 0.0001$) by Fisher’s exact test. Similarly the ROS levels were significantly different between NHD and patients with normal and abnormal semen parameters ($P = 0.002; P < 0.0001$). However, the percentage of samples with elevated ROS levels was comparable between the MFI patients with normal and abnormal semen parameters ($P = 0.18$). Furthermore, no significant correlation was observed between different semen parameters and ROS in both these patient groups ($P > 0.05$). In conclusion, high ROS levels may be an independent marker of male factor infertility irrespective of the presence or absence of abnormal semen parameters. We suggest that measurement of ROS levels be included as part of infertility evaluation of male patients. Patients with high ROS levels may be treated for underlying pathology or considered for antioxidant therapy.