Objectives: Elevated level of reactive oxygen species (ROS) in the semen adversely affects sperm fertilizing capacity by inducing lipid peroxidation process in sperm membrane. Antioxidants in semen reduce the oxidative stress due to elevated ROS and protect the sperm. We determined the nonenzymatic total chain breaking antioxidant content (TAC) of seminal plasma in normal controls and compared it to that of subfertile men. We also evaluated the relationship between ROS and TAC levels in the semen of these men.

Design: Determination of seminal plasma ROS and TAC in a population of subfertile men.

Materials and Methods: This study was approved by the Institutional Review Board. Semen from 49 male patients attending our infertility clinic was examined. Sixteen healthy volunteers with normal semen parameters were used as controls. TAC was measured by an enhanced chemiluminescent reaction in which luminol is oxidized by hydrogen peroxide in a reaction catalyzed by horse radish peroxidase. Addition of water soluble tocopherol analogue trolox interrupted light emission temporarily. Light output was restored after an interval that was related to the molar quantity of the antioxidant. TAC was quantified and expressed as mean ± SE trolox equivalent.

Results: Subfertile men had significantly lower levels of TAC (925.2 ± 71.6) compared to normal controls (1,397.2 ± 116.8) (P < 0.001). Elevated levels of seminal ROS were seen in subfertile men (2,162.8 ± 813.8) compared to controls (69.3 ± 30.5) (P < 0.04). Subfertile men had poor sperm concentration (P < 0.02) and morphology (P < 0.004).

Conclusions: Lower levels of TAC and elevated ROS in the semen of subfertile men suggests that their sperm may be susceptible to peroxidative damage. We speculate that direct addition of anti-oxidants to the sperm during assisted reproduction may protect spermatozoa from oxidative stress.

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