LEUKOCYTOSPERMIA IS ASSOCIATED WITH POOR SEMEN QUALITY, OXIDATIVE STRESS AND INCREASED DNA DAMAGE

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Objective:
The incidence of leukocytospermia ranges from 10% to 20% among infertile men. However, the role of leukocytospermia in the pathogenesis of male infertility remains highly controversial. Our study evaluated the relationship between leukocytospermia and standard semen parameters, levels of seminal reactive oxygen species (ROS), and the extent of sperm nuclear DNA damage.

Design:
Prospective study examining the relationship between leukocytospermia and semen quality.

Materials/Methods:
Semen specimens from 48 men attending the male infertility clinic were examined according to the World Health Organization (WHO) criteria. Patients were classified into two groups, leukocytospermic (>1 x 10^6 leukocytes/mL) (n = 16) and non-leukocytospermic (≤1 x 10^6 leukocytes/mL) (n = 32). A group of normal donors (n = 13) served as a control. ROS production was determined by the chemiluminescence assay in the washed cell suspension (containing both sperm and leukocytes). Results were expressed as X 10^6 counted photons per minute (cpm)/20 X 10^6 sperm/mL. Sperm nuclear DNA damage was assessed by sperm chromatin structure assay (SCSA) to determine the percentage of cells outside the main population (COMPαt) with abnormal chromatin structure.

Results:
Leukocytospermia was associated with an abnormality in one or more of the standard semen parameters in 93% (15/16) of cases. Sperm motility (mean ± SD) was significantly lower in the leukocytospermic group (37.9 ± 15.2) compared to the non-leukocytospermic group (47.7 ± 15.3%; P <0.04) and the donor group (66.6 ± 10%; P <0.001). Patients with leukocytospermia had poor sperm morphology (16.9 ± 9.1%) compared to the donor group (36.7 ± 6.1%; P = 0.0003). Abnormal sperm morphology was observed in 88% of leukocytospermic samples versus 47% of non-leukocytospermic samples. ROS levels [median (25%, 75% interquartile range)] were significantly higher in the leukocytospermic group [177.9 (31.5, 430.1)] compared to the non-leukocytospermic group [2.7 (0.5, 12.2)] (P <0.0001) and the donor group [0.4 (0.1, 2.5)] (P <0.001). Significantly higher levels of %COMPαt (mean ± SD) were observed in the leukocytospermic group (28.8 ± 9.3) versus non-leukocytospermic group (22.6 ± 10.8; P <0.02), and the donors (15.8 ± 6.8; P = 0.002). A COMPαt value of ≥27% was seen in 62% of leukocytospermic samples compared to 25% in non-leukocytospermic samples. A significant negative correlation was seen between leukocyte concentration in semen and sperm motility (r = 0.31, P = 0.01) and sperm morphology (r = 0.28, P = 0.03). Leukocytospermia was positively correlated with high ROS levels (r = 0.7, P <0.0001) and % COMPαt values (r = 0.32, P = 0.01).

Conclusions:
Our results show a strong correlation between leukocytospermia and poor semen quality, oxidative stress and increased sperm nuclear DNA damage. COMPαt values ≥ 27% have been recently reported to be an indicator of negative pregnancy outcome in assisted reproduction. Therefore, infertile men with leukocytospermia should be counseled concerning the potential negative effects of increased sperm DNA damage in their pregnancy outcome.

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