

Session title: Andrology

Session type: Poster viewing session

Presentation number: P-021



Abstract title:

The relationship between seminal leukocytes and oxidative stress markers in semen..

Biography

A distinguished urologist and andrologist with 12 years of working experience in related hospitals of Yokohama City University, Since 2017, he has been working in Yokohama City University Reproduction Center as an andrologist. He is a board certified fellow of the Japanese Medical Genetics and Genomics, and also certified fellow of Japanese Society for Reproductive Medicine. He had published a lot of papers especially in the field of male infertility and urolithiasis.

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Study question:

Does leukocyte concentration in semen and semen parameters correlate with oxidative stress markers?

Summary answer:

Seminal leukocytes concentration was strongly correlated with ROS level in semen, and ORP was more negatively correlated semen parameters than ROS.

What is known already:

Reactive oxygen species (ROS) in semen has been reported to have negative effect to male fertile capacity, and recent studies reported the efficacy of oxidation-reduction potential (ORP) which reflects the balance of oxidants and antioxidants in semen. The source of ROS in semen is considered as immature spermatozoa and seminal leukocytes though the detail is still unknown. Pyospermia, globally defined as the presence of more than one million leukocytes in 1 mL of semen, is considered as an indicator for genital infection and inflammation.

Study design, size, duration:

Between November 2018 and July 2019, 50 infertile males who visited our hospital were enrolled. All patients underwent semen analysis and measurement of ROS and ORP levels and the concentration of leukocytes in semen. The correlation between these values were analyzed retrospectively.

Participants/materials, setting, methods:

ROS level in semen was measured using Monolight 3010™ Luminometer. Before and after adding 40 mL of 100 mmol/L luminol to 500 mL of semen sample, the subtraction of the integrated chemiluminescence was measured between 0 and 200 seconds. ORP level per sperm concentration (sORP) was measured using MiOXSYS System™. The concentration of leukocytes were evaluated using myeloperoxidase staining (Endtz test). The relationships between these values and semen parameters were evaluated using non-parametric correlation analysis.

Main results and the role of chance:

The average patient's age was 37.1 (20-53). ROS level was positively correlated with leukocyte concentration ($\rho=0.646$, $p<0.001$) although sORP didn't show significant correlation. Both ROS level and sORP showed negative correlation with sperm concentration and motility significantly, although the Spearman correlation coefficient was higher in sORP than in ROS ($\rho= -0.873$ vs -0.425 , -0.547 vs -0.228 , respectively). sORP was also negatively correlated with straight velocity and mean amplitude of lateral head displacement (mean ALH). When the positive cut-off value of ROS level was set 4332 RLU as previously reported, ROS was positive more than 1.1×10^5 /ml of leukocytes in semen according to ROC curve (AUROC= 0.862) .

Limitations, reasons for caution:

This study is retrospective and single center analysis with small number.

Wider implications of the findings:

Seminal leukocyte was considered as a source of ROS in semen. ROS was positive even under the global definition of pyospermia, thus fewer leukocytes than definition may have adverse effects to sperm quality through ROS generation. ORP have potential as keener biomarker to reflect the sperm quality than ROS.

Keywords:

reactive oxygen species
oxidation-reduction potential
Male infertility
pyospermia