OXIDATIVE STRESS AND SEMEN SCORE – NEW MEASURES OF SEMEN QUALITY IN PATIENTS UNDERGOING INFERTILITY TREATMENT
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INTRODUCTION AND OBJECTIVES: We developed a new measure of oxidative stress called ROS-TAC score and also reduced 9 sperm characteristics into 2 semen scores. The purpose of this study was to determine if the ROS-TAC and semen scores can be used to quantify the semen quality in patients with various diagnoses of infertility.

METHODS: Semen characteristics, reactive oxygen species (ROS) levels, non-enzymatic total antioxidant capacity (TAC) and composite ROS-TAC score were examined using samples from 238 infertile patients with various clinical diagnoses and 9 normal, healthy donors. ROS-TAC score was determined from levels of ROS and TAC. Principal component analysis was applied to these parameters after log transformation to reduce the effects of varying scales and distribution.

RESULTS: Of the 238 patients, the distribution of clinical diagnoses included: varicocele (n = 77), prostatitis and infection (n = 46), vasectomy reversal (n = 43), varicocele and infection (n = 11), idiopathic infertility (n = 36), and others (n = 25). The first principal component (a weighted sum of all semen characteristics accounted for 64.7% of the overall variability) was named “SQ” (semen quality). The second component (a weighted sum of 8 characteristics subtracted from concentration) was considered a measure of relative quantity and was thus named “RQ”. The distribution of SQ and RQ among the controls was standardized to a mean of 100 ± 10. All groups had SQ values significantly different from control (P <0.03). RQ values were comparable between the controls and all clinical diagnosis, indicating that their concentrations were at levels expected based on the other characteristics. Increased oxidative stress was significantly correlated with both decreasing semen quality (SQ, P <0.001) and relative quantity (RQ, P <0.04) in all clinical diagnoses.

CONCLUSIONS: Semen characteristics can be reduced to 2 scores which account for over 80% of the variability expressed by all semen characteristics.
individually. As these scores are significantly related to oxidative stress, they can be used to evaluate the semen quality and to predict pregnancy outcome. Source of funding: Grant from Cleveland Clinic Foundation