ABSTRACTS

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SPERM FROM FERTILE MEN AND THOSE SEEKING FERTILITY EXAMS DIFFER IN THEIR ABILITY TO CAPACITATE

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Introduction: Routine semen analysis correctly identifies male infertility only half the time. Localization patterns of GM1 in human sperm are highly associated with capacitation and their ability to fertilize. Here, the laboratory developed Cap-Score™ Sperm Function Test was used to define a standard capacitation profile for men of proven fertility, which was then compared to a group of men seeking male fertility workups.
Methods: Two cohorts were defined: 1) normal fertile men (pregnant partner or having a child within 3 years), and 2) potential subfertile/infertile men seeking semen analysis at the Urology Group of New Jersey. Subsequent to obtaining consent, collection and liquefaction, sperm were washed, incubated, fixed and then evaluated via fluorescence microscopy to determine Cap-Score.
Results: The Cap-Score mean (μ=39) and SD (σ=7) from 41 fertile men were used to estimate the number of fertile men needed to establish a robust fertile capacitation profile. For a power analysis, an acceptable range about the mean was set at 3%, and a two-tailed t-test at the $p<0.01$ level with a probability of detecting a difference this large of 90% was applied. Results suggested that a valid standard can be established with ≥85 individuals. A preliminary fertile standard was created using 125 observations from 41 unique donors. Cap-Scores were averaged by donor and converted to z-scores ($(X-\mu)/\sigma$; X=observation, μ=39; σ=7). This transformed the μ to 0 and the σ to 1, with converted values representing the distance from the μ (mean) in units of σ (S.D.). The normal fertile standard was tested against Cap-Scores from 93 men seeking fertility exams. This cohort scored significantly below the fertile population ($p=1.6E-5$), with 27 and 38% having z-scores ≤-2 and between -1 and -2. Only 35% scored near or above the mean. These data suggest that in comparison to fertile men, many men seeking fertility exams have defects in capacitation.
Conclusions: Classic analyses provide little information on the ability of a semen sample to fertilize. Capacitation is required for fertilization and can be assessed using GM1 localization. A robust capacitation profile can be defined and employed for identifying abnormalities. Remarkably, 65% of men questioning their fertility had z-scores ≤-1 versus an expected result of 16%. Combining the Cap-Score™ Sperm Function Test with traditional analyses should prove valuable in diagnosing male infertility.
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SONOGRAPHIC MEASUREMENT OF VISCERAL ADIPOSE TISSUE (VAT) WAS SUPERIOR TO OTHER ANTHROPOMETRIC MEASURES OF BODY FAT AS A PREDICTOR OF SPERM COUNT, MOTILITY AND DNA FRAGMENTATION (DFI).

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Introduction: Spermatogenesis is highly complex and affected by numerous intrinsic and extrinsic factors. Previous studies have shown that obesity has an impact on sperm production. VAT has been studied as a predictor of gestational diabetes, but its impact on gametogenesis has not been previously reported. For this study, we assessed for a correlation between VAT and various sperm parameters, and compared it as a predictor to other anthropometric measures of body fat.
Methods: This study included 91 male patients referred with their partners to a university-affiliated infertility clinic. After giving informed consent, each had an adiposity scan to measure VAT and subcutaneous adipose tissue (SCAT) by abdominal ultrasound. We evaluated for correlations between various anthropometric measures of body fat, including: VAT, SCAT, BMI and waist-hip-ratio (WHR) with semen analysis (SA) parameters and DNA fragmentation index (DFI). A pairwise analysis was conducted between these parameters.
Results: VAT had a significant negative correlation with sperm count [-26.0% (CI: -48.0%, -1.0%)] and motility [-17.2% (CI: -41.0%, -0.8%)], and positive correlation with DFI [+23.1 (CI: 3.9%, 47.0%)], while BMI had a significant negative correlation with sperm count and motility [-32.0 (CI: -56.1%, -2.9%) and -18.5% (-46.3%, -1.6%), respectively], but no correlation with DFI. SCAT had a negative correlation with sperm morphology [-29.6 (CI: -52,2%, -3.1%)] WHR did not correlate with any SA parameters or DFI. There was no correlation between semen volume and any anthropometric parameter.
Conclusion: Both BMI and VAT, but not WHR or SCAT significantly correlated with both sperm count and motility. Interestingly, VAT, but not BMI, also correlated with DFI measurement. Our findings suggest a strong metabolic impact of VAT on both sperm count and motility, together with the level of sperm DNA oxidative damage. These findings emphasize the close relation between metabolic status and male gametogenesis. The relevance of VAT is strengthened due to its reversibility by life style modifications. Sonographic scanning for VAT has potential to be a useful addition to the initial male infertility evaluation and follow up.