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New semen collection technique/container improves semen quality

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OBJECTIVE

To date, the common thread in the use of semen collection/extension techniques, whether being used for intraruterine insemination, cryopreserved semen, or advanced reproductive techniques such as in vitro fertilization, is that the samples are collected into a dry, unprotected specimen container. This container, by its nature, allows for drastic shifts in temperature and pH resulting in damage to the spermatozoa. Previous studies in the canine and limited studies in humans have shown that collecting semen into a modified collection vessel containing a warmed, osmotically balanced media, semen parameters can be improved by lessening cold and pH shock upon collection. The objective of this study was to determine if the use of this new semen collection technique/container would yield similar improvements in semen parameter in the human as compared to the traditional collection container.

DESIGN

The study was designed as a Latin Square to account for the variations between collections within the same donor and subjects were randomized by first collection.

MATERIALS AND METHODS

Twelve donors provided three semen samples each to be used in three separate treatments. The control samples (Treatment I) were collected into a standard, dry specimen container. Treatment II and III samples were collected into a modified specimen container that allowed the sample to be funneled into an insulated, reduced-volume center well containing 1ml of pH buffered media. In the case of Treatment II, the media was at 37° C, while the media in Treatment III was held at room temperature (23°C). After collection, the samples were held at 37°C and allowed to liquefy before processing using a standard semen washing technique. The samples were then placed into 5 ml of fresh media and maintained in a 37°C, 5% CO2 incubator at 95% relative humidity. Standard semen parameters and biochemical markers were evaluated at 0, 1, 3, 6, 12, 18, and 24 hours post-processing. Data analysis was performed with SPSS using the general linear model and appropriate t tests.

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RESULTS

A higher percentage of motile sperm were maintained in both of the treatment groups as compared to the control ($p < .001$), over the 24-hour period. At 24 hours, the motility in treatment II was at least 40% higher than the control, while the motility in treatment III was at least 55% higher than the control. In addition, viability ($p < .001$), linearity ($p < .001$), and velocity ($p < .001$) were also higher in both treatments as compared to the control. There was no difference in morphology between the treatments and the control or between treatments. Measurements of biochemical parameters, including acrosome reaction, are ongoing.

CONCLUSION

Modification of the semen collection/extension procedure resulted in improved semen parameters for extended time periods post-collection. The data suggests the described technique can yield significantly more motile sperm by placing the sample into a physiologically favorable environment (eliminating pH and cold shock), thus making more sperm available for use in a variety of infertility treatments. In addition, the improvement in semen parameters over time as seen in both treatments may lead to improved patient care by allowing the patient to collect at home while maintaining superior semen quality. Further studies, evaluating pregnancy rates, will be needed to confirm these observations.

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