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Improving semen quality using a modified collection technique

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OBJECTIVE

The common practice of semen collection/extension techniques in humans, whether being used for intrauterine insemination, cryopreservation, or an advanced reproductive technique, is to collect the sample into a dry, unprotected specimen container. Empirically, the environment provided by this container would allow drastic shifts in specimen temperature and pH resulting in spermatozoa damage. Previous studies in the canine have demonstrated long-term (days) improvement in semen parameters when the semen is collected into a modified collection device that provides a warm environment that is both pH and osmotically balanced. The objective of the present study was to determine if the same modification could be used to improve semen parameters in the human.

DESIGN

Comparison of three semen collection techniques using a Latin Square to account for the variations between collections within the same donor.

MATERIALS/METHODS

Eight donors provided three semen samples each for the study. The study design was randomized by first collection. Control samples (Trt A) were collected into a standard, dry specimen cup. No attempt was made to hold the sample at body temperature prior to processing. The remaining two samples were collected into a modified specimen container that funneled the sample into a reduce volume central well, which contained 1 mL of a pH buffered, serum-free media and which was insulated from temperature fluctuations. In one case (Trt B), the media was at 37°C, in the other (Trt C) the media was held at room temperature (23°C). Once collected, the samples were held for 15 min at 37°C prior to processing using a standard semen washing technique. The samples were then placed in 5 mL of fresh media and incubated at 37°C with 95% relative humidity and 5% CO2. Standard semen parameters and biochemical markers were evaluated at times 0, 1, 3, 6, 12, 18 & 24 hr post-processing. Data analysis was performed with SPSS using the general linear model and appropriate t-tests.

RESULTS

Both treatment groups maintained greater motility ($p < .001$), viability ($p < .001$), linearity ($p < .001$), velocity ($p < .001$) over time as compared to the control over the 24 hr period. Motility in the two treatment groups was 6-fold higher than the control at 24 hrs. There was no difference in morphology at any time point in any treatment. Data for biochemical parameters (including acrosomal reaction) are pending.

CONCLUSIONS

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, thus making those sperm available for use in a variety of infertility treatments. Further studies, including evaluating pregnancy rates, will be needed to confirm these observations.