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Improvement of the semen collection environment using a new semen collection device

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OBJECTIVE

It is well established that rapid changes in specimen temperature can be detrimental to semen quality. While specimen containers are often warmed to 37°C prior to collection, it is not uncommon for the collection to last long enough to allow significant cooling of the container and it specimen. Further, transport issues and/or delays in processing might allow for further temperature shifts. Recently, a new specimen collection device (SCD) was introduced (ReproMax; Embryonic Technologies, Austin, TX). Previous work with experimental devices, suggests the SCD improves semen motility ($P < .001$) and forward progress ($P < .02$), by improving cooling rates over a standard specimen container. The objective of the present study was to verify the improved cooling curves of SCD and the resultant improvement in semen quality.

DESIGN

Laboratory testing of new collection device.

MATERIALS AND METHODS

Trials of temperature maintenance were performed using a standard specimen cup, a Corning 15 mL conical test tube and a new SCD pre-warmed to 37°C. Each container was loaded with saline warmed to 41°C. An initial temperature was read for each device followed by temperature measurements being taken every minute intervals for 30 minutes. During this time the container was left, unprotected on a standard laboratory benchtop with room temperatures and relative humidity remained constant at 21.4°C and 18 % respectively. Resulting data were subjected ANOVA with repeated measures.

RESULTS

In all cases, filling the different containers, place the temperature probe and collecting the initial reading took least that 15 seconds. Yet in that time period the water temperature in the standard specimen cup had dropped approximately 3 C and 2 C in the conical test tube. However, the temperature of the SCD changed only .1 C ($P < .001$). Further, it took only 3 minutes for the temperature of the water in the standard specimen cup to drop 10 degree from the initial 41°C

reading. Further, the unprotected test tube, which improved the surface area to volume ration, still lost 10°C in temperature in under 8 minutes. However it took over 20 minutes for the SCD to show the same 10°C drop in temperature, over a 600% improvement in temperature maintenance ($P < .001$). Further, it took over 45 minutes for the fluid in the SCD to reach room temperature. Experiments to determine the effects of these temperature changes on semen function are pending.

CONCLUSION

Results of the present study confirm rapid loss of specimen temperature in a standard specimen cup. The rapid decrease in temperature in a standard specimen cup would be expected to the activation of cold shock proteins which might interfere with normal sperm cell function. Preliminary data from the SCD suggests it will improve semen parameters by maintain temperature over the entire period of the collection, transport and processing period.

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