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Urethral catheterization and sperm vitrification for simplified semen banking in felids
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Semen banking of domestic cats and wild felids represents a vital resource for their long-term conservation, but current methods require access to advanced training and specialized equipment for effective use. A newer method of semen collection, urethral catheterization of medetomidine-treated cats, allows recovery of high sperm numbers, but it is unclear if this approach permits maximal sperm recovery or is feasible using less expensive alpha-2 agonists.1 Similarly, a newer sperm preservation approach, vitrification, offers advantages of simplicity and minimal equipment needs, but its efficacy in combination with urethral catheterization has not been investigated.2,3 Our specific objectives were to 1) evaluate sequential semen recovery with urethral catheterization and electroejaculation in domestic cats, 2) assess the effectiveness of a weak (xylazine) vs. strong (dexmedetomidine) alpha-2 agonist for inducing sperm release, and 3) compare post-thaw sperm motility, acrosome status and function of catheter-recovered samples after vitrification or straw freezing. For semen collection, male domestic cats (n=3) were anesthetized with a ketamine-dexmedetomidine or ketamine-xylazine combination. At 15 and 20 min of anesthesia, a 3.5 Fr urinary catheter was inserted 9 cm into the urethra and recovered fluid assessed for volume and sperm concentration. Electroejaculation was conducted immediately following the second catheter collection and similar seminal parameters evaluated. Additional catheter samples were recovered from dexmedetomidine-treated males (n=3; 3 ejaculates/male), divided and processed for vitrification or straw freezing over LN2 vapor, using a soy lecithin-based cryoprotectant containing either 0.2 M sucrose (vitrification) or 4% glycerol (straws). Post-thaw motility and acrosome status were assessed over time, and preliminary evaluation of in vitro fertility was conducted. Results indicated that electroejaculation following repeated catheterization allowed the recovery of additional spermatozoa (range, 8-55 x 10^6 sperm/male) and that xylazine was ineffective for inducing meaningful sperm release (range, 0-0.4 x 10^6 sperm/male). Post-thaw motility and acrosome status of vitrified catheter samples (37.8 ± 2.8% motile, 24.2 ± 3.3% intact; 0 h post-thaw) did not differ (P > 0.05) from that of straw frozen samples (41.1 ± 2.8% motile, 22.4 ± 2.6% intact). Preliminary results indicated that vitrified catheter sperm can fertilize oocytes in vitro, and fertilization success (9/30, 30%) did not differ (P > 0.05) from that observed with straw frozen samples (17/30, 57%). In conclusion, urethral catheterization of dexmedetomidine-treated cats allows recovery of substantial sperm numbers but electroejaculation still may be warranted for maximal sperm recovery. Xylazine is not suitable as an inexpensive alternative to dexmedetomidine for catheterization procedures. Vitrification of catheter samples, without further pre-freeze processing, results in similar post-thaw parameters relative to straw freezing and may be adequate for use with IVF procedures. Further refinement of vitrification methods for catheter-recovered samples may be necessary to improve consistency for applied use. Funded, in part, by the Institute of Museum and Library Services.