Evaluation of embryo formation via comparisons of oocyte harvesting methods

McKayla Meyer,[a] Fabio Amoroso,[b] Giovana Catandi,[b] Roxxi Vickery,[b] Jennifer Hatzel[a]
[a]Department of Clinical Sciences, [b]Department of Biomedical Sciences
College of Veterinary Medicine and Biomedical Sciences
Colorado State University, Fort Collins, CO

Increased popularity of intracytoplasmic sperm injection in equine reproduction has created a need for investigating efficacy of various techniques. Postmortem oocyte recovery is one such procedure. We evaluated the role of immediate scraping to isolate oocytes in comparison to delayed scraping, with the objective of increasing efficacy of in vitro embryo development. Our hypothesis was that the interval that the oocyte spent remaining in ovarian tissue during transport, as is the current method for shipping whole ovaries, decreases blastocyst rates. Using 2 ovaries from the same mare as a treatment and a control is an efficient comparison, since both ovaries are expected to have similar parameters. Follicles from 1 ovary were scraped and placed in a commercially available embryo holding medium (EMCARE™) on average 2.6 hour after removal from the mare and stored overnight at 22°C, to mimic conditions for a private practitioner. Control ovary was held overnight at 22°C, mimicking a common method of shipping whole ovaries. Ovaries were collected from 10 mares (average age 10.75 years) randomly assigned to either group for follicular scraping. Data were analyzed using the Shapiro Wilcoxon signed rank test. Statistical significance was set at $p \leq 0.05$. More oocytes were collected from the group scraped early compared to ovaries held overnight (68 versus 50, respectively; $p = 0.04$) but oocyte recovery rate per follicle was not different (78 versus 68%, $p = 0.8$). Number of oocytes reaching meiotic metaphase II to number of oocytes collected (maturational rate) was greater ($p = 0.006$) in group scraped early compared to control group (72 versus 22%). In total, 60 oocytes (49 from early scraped and 11 from control) were injected with frozen-thawed semen from the same stallion. There were no differences between group scraped early and control group for either cleavage rates (32.7 versus 36.4%, respectively; $p = 0.5$) or blastocyst rates (10.0 versus 0.9%, $p = 0.08$). Early scraping yielded an increased population of meiotically competent oocytes for sperm injection.

Keywords: Equine, assisted reproductive techniques, ovary, transport