Relationship between donor mare age, semen type, and early embryonic development
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The goal of this retrospective study was to determine if a relationship exists between mare age, semen type (cooled vs. frozen), and early embryonic development in mares. Our hypotheses were that a) embryos collected from mares bred with frozen semen will be smaller than embryos collected from mares bred with cooled semen and b) embryos collected from older mares would be smaller than embryos collected from younger mares.

Donor mares were managed at the Equine Reproduction Laboratory, Colorado State University. Embryo recovery data were included only if the age of the donor mare, semen type (i.e. cooled vs. frozen semen), and date of a single ovulation were known. An embryo flush procedure was performed on day 7 or 8 after ovulation (day 0 = day of ovulation). Embryos were evaluated for morphologic stage, quality, and size. Comparisons of embryo size between groups were made using SAS. All values are presented as the mean ± s.e.m.

Diameter of embryos recovered on day 7 (n=114) from mares bred with cooled semen (401.9 ± 19.6 µm) were larger (p<0.05) than embryos recovered from mares on day 7 (n=11) bred with frozen semen (258.2 ± 33.3 µm). Embryos (n=24) collected on day 8 from mares bred with cooled semen tended (p=0.0553) to be larger (716.9 ± 104.9 µm) than embryos (n=10) collected on day 8 from mares bred with frozen semen (383.5 ± 54.9 µm).

Embryos collected from mares ≤ 5 years of age tended (p<0.1) to be larger than embryos collected from mares > 5 years of age. There was no difference in embryo size of embryos collected from mares ≤ 15 or > 15 years of age.

In summary, embryos collected from older mares were not significantly different in size than embryos collected from younger mares. However, size of embryos collected on a given day was affected by semen type, with embryos recovered from mares bred with cooled semen being smaller in diameter than embryos recovered from mares bred with frozen semen. The equine embryo has been reported to enter the uterus between 144 and 156 hours after ovulation. A delay in embryonic development may be associated with a corresponding delay in the time of embryo passage through the oviduct into the uterus. Consequently, it may be advantageous to postpone embryo recovery attempts by 12 to 24 hours for mares bred with frozen semen.

Keywords: Equine, embryo development, embryo transfer, frozen semen