Influence of oocyte quality, culture media and gonadotropins on cleavage rate and development of in vitro fertilized buffalo embryos

The present study was designed to examine the influence of oocyte quality, culture media and gonadotropins on cleavage rate and development of in vitro fertilized buffalo embryos. Three experiments were conducted. In Experiment 1, oocytes were classified by number of cumulus cell layers and morphology of the ooplasm as Good, Fair or Poor. Oocytes were cultured for IVM, IVF and IVC in CRlaa medium. In Experiment 2, good quality oocytes were cultured for maturation in: (1) CRlaa; (2) CR2aa; (3) TCM 199; (4) MEM or (5) RPMI-1640, and then fertilized using frozen thawed buffalo spermatozoa in CRlaa. The oocytes were cultured in the same medium used for maturation after fertilization. In Experiment 3, oocytes were classified into 3 groups: Group (1) was without gonadotropin and serve as a control; Group (2) in which IVM medium was supplemented with 10 μg/ml FSH; and, Group (3) in which IVM medium was supplemented with 10 IU/ml eCG. In all experiments, oocytes were kept at 38.5 °C under 5% CO₂ for IVM, IVF, IVC and examined for cleavage and embryo development rates on Days 3 and 8, respectively. Good and fair quality oocytes produced a higher cleavage rate (P<0.01) than poor quality oocytes. Morula production rate was also higher (P<0.01) for good as compared to fair quality oocytes. Embryo development with poor quality oocytes was arrested at the 2 to 16-cell stage. In Experiment 2, the cleavage rate was higher (P<0.05) in CRlaa than CR2aa, and higher (P<0.01) than TCM-199, MEM and RPMI-1640. The numbers of morulae and blastocysts were higher (P<0.01) for oocytes cultured in CRlaa and CR2aa medium than TCM-199 or MEM. In Experiment 3, the addition of FSH or eCG to the maturation medium increased (P<0.01) cleavage and developmental rates of buffalo embryo compared to control medium.

In conclusion, the IVM of good quality buffalo oocytes in CRlaa or CR2aa medium and the addition of FSH or eCG in maturation medium produced higher cleavage and developmental rates of IVF buffalo embryos.

Key Words: Buffalo, IVF, oocyte quality, culture media, gonadotropins, cleavage and embryo developmental rates.

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