Journal of Andrology, Vol 20, Issue 2 280-288, Copyright © 1999 by The American Society of Andrology

JOURNAL ARTICLE

Fertility and its relationship to motility characteristics of spermatozoa in ewes after cervical, transcervical, and intrauterine insemination with frozen-thawed ram semen

L. G. Sanchez-Partida, D. P. Windsor, J. Eppleston, B. P. Setchell and W. M. Maxwell

Department of Animal Science, University of Adelaide, Glen Osmond, Australia. sanchezp@ohsu.edu

The fertility of ewes after artificial insemination and the relationship between fertility and motility characteristics assessed by a computerized motility analysis system were examined with ram semen frozen in diluents reported to improve postthaw motility. The percentages of motile and progressive spermatozoa were better when frozen in proline- or glycine betaine-containing or HEPES-based, rather than Tris-based, diluents ($P < 0.01$). The fertility of spermatozoa frozen in diluents containing proline or glycine betaine was slightly reduced, whereas when both compatible solutes were present, the reduction was more pronounced, in comparison with semen frozen in Tris- or HEPES-based diluents (9.5 versus 71.1 and 66.6%; $P < 0.01$). Fertility of frozen-thawed spermatozoa was higher after laparoscopic insemination than after cervical or transcervical insemination ($P < 0.01$). Similarly, higher fertility was obtained after cervical insemination with fresh than with frozen-thawed semen (32.4 versus 11.3%; $P < 0.01$). Furthermore, loss of embryos was lower after laparoscopic insemination of ewes with semen frozen in a Tris diluent than with semen frozen in proline diluents, in glycine betaine diluents, or in proline-plus-glycine betaine diluents (0.0 versus 26.0, 38.5, and 60.0%; $P < 0.001$). A wide variation in the postthaw percentage of motile (31.6-59.7%) and progressive (22.6-43.1%) spermatozoa and in the fertility of spermatozoa from individual rams was also observed after laparoscopic (29.2-59.7%) or cervical insemination (8.7-30.5%). Postthaw motility results from immediately after thawing and fertility results from experiments where intrauterine insemination was performed with semen frozen in proline- or glycine betaine-containing or HEPES- or Tris-based diluents were pooled and subjected to a pairwise correlation procedure. The correlation analysis showed relationships between some of the motility characteristics ($P < 0.01$), but there were no relationships between the motility characteristics and fertility.

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