

A Comparison of the Laparoscopic Intrauterine and the Gourley Scope Transcervical Methods of Artificial Insemination of Ewes. (1998)

Cooperators

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Objective

Compare the reproductive performance of ewes that have been laparoscopically inseminated or transcervically inseminated by a fiber-optic scope apparatus (Gourley Scope™, Elite Visions, Waukon, IA).

Procedure

Prior to the experiment, ewes were randomly assigned to be inseminated laparoscopically (LAI) or by the Gourley Scope™ (GAI), a small flexible fiber-optic scope apparatus that is passed through the cervix to deposit semen directly into the uterus. Ewes were inseminated on either December 3 or 4, 1998. LAI ewes were inseminated by one experienced technician and GAI ewes were inseminated by a different technician with experience using the Gourley Scope™. For the GAI method, an additional two ml of diluent was used to flush the semen out of the sheath and guarantee delivery of the entire dose into the ewe. The diluent used for flushing and thawing was the same diluent used to freeze semen for this experiment. Fertile rams were put with the ewes as a cleanup measure on December 14, 1998.

Ewes were ultrasounded by an experienced technician on February 8, 1999 (67 or 68 days after insemination), and fetal age was estimated by fetal body width measurements. Ewes with predicted gestational age of 62 days or greater were considered to have conceived to artificial insemination. At the time that this report was prepared, ewes had not yet lambed. Lambing data later fully supported the conception rates indicated by ultrasound examination as mentioned below.

Results

Conception rates to artificial insemination were low for both methods: none of the GAI ewes, and only 46% of the LAI ewes, were predicted to be pregnant (Table 1). Sperm concentration used for insemination in the present experiment was high and may have been detrimental to conception for both methods. Also, repeated exposure to PMSG is known to lower conception rates. Conception rates to LAI were higher ($P < .05$) on December 3 than on December 4 (data not shown) and may have been due to a difference in semen quality between the two days. Four- and five-year-old ewes had the highest ($P < .05$) predicted conception rate, two- and three-year-old ewes were intermediate, and none of the six-year-old and greater ewes were predicted to be pregnant. The older ewes may have relatively low fertility and conception rates because of their age or quite possibly because of prior multiple laparoscopic examinations and inseminations. The previous year's artificial insemination method (Guelph System of transcervical insemination, by laparoscope, or no artificial insemination) did not significantly affect conception rate.

Insemination procedure time for the GAI method was nearly twice ($P < .05$) that of the LAI method. Procedure time was shortened ($P < .05$) when ewes were bred closer to the onset of heat rather than later.

For further information about this study, please see:

Crooks, A.E., B.C. McKusick, R.G. Gottfredson, R.D. Zelinsky, D.L. Thomas. 1999. Comparison of two artificial insemination methods in Rambouillet ewes. Proceedings of the 1999 NCR-190 Technical Committee. pp. 21-23.

Results for artificial insemination procedure time, and conception rates predicted by ultrasonography at 68 d post-insemination

Factor	Number of ewes inseminated	Procedure time, min	Conception to A.I., %
1997 A.I. method			
Transcervical (Guelph Sys.)	47	5.30 ^a	20.7 ^a (10/47)
Laparoscopic	46	2.14 ^b	43.9 ^b (20/46)
1998 AI method			
Gourley Scope®	39	4.54 ^a	0 ^a (0/39)
Laparoscopic	36	2.33 ^b	45.6 ^b (17/36)
Day			
December 3	38	3.49	28.9
December 4	37	3.39	17.1
Ewe age			
2 to 3 yr	38	3.21	25.9 ^a
4 to 5 yr	22	3.43	44.3 ^b
6 yr	15	3.67	0 ^c

^{a,b,c} Within a column and of an independent factor, means lacking a common superscript letter are different ($P < .05$).

Intrauterine artificial insemination of frozen-thawed ovine semen in the United States provides a valuable alternative to natural mating for more efficient genetic improvement of sheep breeds. Laparoscopic insemination remains superior to transcervical insemination for acceptable pregnancy rates and the inferiority of the latter is due largely to its inconsistency. From our experience it appears that no transcervical method of artificial insemination has shown the consistent pregnancy rates as seen in our laparoscopic inseminations. Our enthusiasm and work of searching for effective methods of transcervical insemination in sheep is far from over. There are several ideas out there that we are excited about. It will take time and experience to determine whether or not they will be able to replace laparoscopic AI.