SOWS FERTILITY AFTER TRANSCERVICAL INTRAUTERINE INSEMINATION (the sumarize of ours results)

FERTILITATEA SCROAFELOR DUPĂ INSEMINARE INTRAUTERINĂ TRANSCERVICALĂ (rezumatul cercetărilor noastre)

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We have investigated the potential advantages of transcervical artificial insemination into the caudal portion of the uterus (corpus uteri), compared with conventional sperm-dose deposition into the posterior region of the cervix. Three experiments was carried out to investigate: (1) the influence of insemination-dose volume, (2) sperm number per dose and (3) type of insemination catheter on sows fertility (farrowing rate and litter size). Classic intracervical insemination was performed in the total of 50 sows (25 inseminated with 100ml doses and 25 with 50ml doses). Intrauterine insemination was performed in the total of 50 sows (25 inseminated with 100ml doses and 25 with 50ml doses). Significant greater farrowing rate (88%) and live born piglet per litter (10,77 or 11,86) was found after intrauterine insemination, then after intracervical insemination (76 or 72% farrowing rate, and 10,42 or 9,89 live born piglets per litter). Classic intracervical insemination was performed in the total of 90 sows, with different catheter type. Intrauterine insemination was performed in the total of 90 sows, with $5x10^9$,$3,7x10^9$ or $2,5x10^9$ spermatozoa per dose. No significant differences in farrowing rate was found between intracervical and intrauterine insemination (83,3 to 86,7%). Significant greater live born piglet per litter was found after intrauterine insemination with $2,5x10^9$ spermatozoa per dose. Obtained results suggest that intrauterine insemination can be performed by significant reduction of insemination dose volume and sperm number in dose, without decreasing sows fertility. It can result in significant increasing of boar reproductive efficiency.

Key words: intrauterine insemination, ferility, sow.

Introduction

The usage of artificial insemination (AI) in pigs has increased repidly in recent years. It proposed the significant increasing the eficiency of reproductive exploatation of genetically supperior boars. A large portion of the current swine artificial insemination research is focused on a means to reduce the number of sperm required per service (i.e. estrus), without compromising sow farrowing rate and litter size *(Rath, 2002; Stančić, 2002; Stančić et al., 2003; Stančić et al., 2007).*

One strategy proposed to accomplish this is to decrease the number of sperm per insemination dose by depositing semen within the uterus (intrauterine insemination), instead of cervix (intracervical insemination), as is the case with natural mating and convetional AI *(Belstra, 2002; Flowers, 2003)*. It has been suggested that sperm deposition deeply into the uterine horn resulted in higher fertility in swine, when compared with vaginal or cervical insemination *(Hancock, 1959)*. With the recent development of special catheters that allow the cervix to be penetrated easily, it has been shown that the sperm dose can be deposited into the uterine horn. Moreover, insemination dose volume and sperm number can be significantely reduced *(Rath, 2002; Mezalira et al., 2005)*.

The objective of this paper was to present some ours results of sows fertility, after intrauterine insemination with reduced insemination dose volume and sperm number, as well as influence of different insemination catheter type on sows fertility.

Materials and Methods

First experiment: The total of 100 sows was inseminated with 100ml or 50ml diluted sperm dose, containing $5x10^9$ motile spermatozoa, intracervical or transcervical into the uterine body.

Second experiment: The total of 90 sows was inseminated with 100ml diluted sperm dose, containing $5x10^9$, $3{,}5x10^9$ or $2{,}5x10^9$ motile spermatozoa, transcervical into the uterine body.

Third experiment: The total of 90 sows was inseminated with 100ml diluted sperm dose, containing $5x10^9$ motile spermatozoa, transcervical into the uterine body, with different intrauterine catheters (Spirette safe blue, Foamtip safe blue and Foamtip classic - Minitüb, Germany).

Sows was inseminated in the estrus detected 4 to 6 days after 28 days of lactation. First insemination was performed about 5 to 6h and second 24h after standing estrus detection.

Results and Discussions

Intrauterine insemination were result in significant higher (P<0,01) farrowing rate in comparation with standard intracervical insemination (88% vs. 76 or 72%). The dose volume were not significant effect on farrowing rate (Table 1).

Table 1. Sows fertility after intracervical or intrauterine insemination by various doses volume *(Stančić et al., 2006)*

		Catheter/dose volume			
		IC/100ml	IC/50ml	IU/100ml	IU/50ml
Sows inseminated (n)		25	25	25	25
Conception up to 24. day (%)		96	84[a]	100[b]	92
Sows farrowed	n	19	18	22	22
	%	76[a]	72[a]	88[b]	88[b]
Live born piglets per litter		10.42[a]	9.89[ba]	10.77[a]	11.86[bb]

IC – Intracervical catheter; IU – Intrauterine catheter.
[ab] – Values with different superscripts are significantly different (P<0,01).

The significant (P<0,01) greatest number of live born piglet per litter (11,86) were obtained after intrauterine insemination with duble reduced inseminated dose in comparation with 100ml dose, as well as with both doses volume after classic intracervical insemination (Table 1).

Reduction of spermatozoa number per dose were not significant influence on the sows farrowing rate (86,7%, 83,3% and 83,3%). The significant greater (P<0,05) number of live born piglets per litter were obtained after intrauterine insemination with the 2,5 x 10^9 spermatozoa per doze (Table 2).

Table 2. Sows fertility after intrauterine insemination with different number of spermatozoa in dose *(Radović et al., 2007)*

		Spermatozoa number per dose		
		5 x 10^9	3,5 x 10^9	2,5 x 10^9
Number of sows inseminated		30	30	30
Farrowing rate (%)		86.7[a]	83.3[a]	83.3[a]
Average litter size	alive	10.58[a]	10.56[a]	11.08[b]
	avital	0.42	0.56	0.88
	dead	0.19	0.44	0.60
	total	11.19	11.56	12.56

Values with different superscript are significantly different (P<0,05).

The inflence of catheter type on the farrowing rate and litter size, after intrauterine insemination, were presented in the Table 3.

Table 3. Sows fertility after intrauterine insemination with different catheters *(Radović et al., 2007)*

Catheter type	*Sows AI* (n)	*Farrowing rate* (%)	*Average litter size* (n)			
			alive	*avital*	*dead*	*total*
Spirette safe blue	30	83.3[a]	10.28[a]	0.44[a]	0.20[a]	10.92[a]
Foamtip safe blue	30	86.7[a]	10.08[a]	0.48[a]	0.20[a]	10.76[a]
Foamtip classic	30	66.7[b]	10.35[a]	0.60[a]	0.0[a]	10.95[a]

Values with different superscript are significantly different (P<0,05).

Intrauterine insemination with catheter Foamtip safe blue and Spirette safe blue were result in significant greatest (P<0,05) farrowing rate (86,7% and 83,3%) in comparation with Foamtip classic catheter (66,7%). Average liter size at farrowing were not significant influenced with catheter type (Table 3).

The results of other autors (*Vansickle, 2002; Rozeboom et al., 2004; Mezalira et al., 2005; Roberts and Bilkei, 2005; Dimitrov et al., 2007; Stančić et al., 2007)* clearly demonstrated thet intrauterine insemination, with $1x10^9$ to $5x10^9$ spermatozoa per dose, result with similar or better farrowing rate and litter size in comparation with classic intracervical insemination. *Watson and Behan (2002)* conclude that transcervical intrauterine insemination in the sow is simple, effective and safe, and allows the sperm dose to be reduced to 1 billion spermatozoa.

Conclusions

According to the results of ours investigation it can be concluded that:

1. Intrauterine insemination with reduced insemination dose volume result with similar or better farrowing rate and litter size, compared with classic intracervical insemination.
2. Reduction of spermatozoa number per doze (from $5x10^9$ to $2,5x10^9$) was not significant influence on farrowing rate and litter size, after transcervical intrauterine insemination.
3. Intrauterine inseminatin with Foamtip safe blue and Spirette safe blue catheters result in better sows fertility, in comparation with Foamtip classic catheter.

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