Normal and abnormal uterine response to sperm deposition in the bitch

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OBJECTIVES AND METHODS: Little is known about the response of the bitch’s reproductive tract to semen deposition. Coitus causes an increase in uterine contractions (1) and recently we have documented an influx of polymorphonuclear neutrophils (PMNs), an increase in uterine artery blood velocity and vasodilation associated particularly with uterine deposition of seminal plasma and prostatic fluid (PF). The PMN influx appears to be perturbed in healthy bitches with cystic endometrial hyperplasia, probably representing a mating-induced endometritis similar to that observed in other species. In unpublished studies we demonstrated that PMNs reduce the ability of sperm to attach to uterine epithelium and that this effect is ameliorated in the presence of PF. These studies suggest that dog accessory gland secretion has an important role in the initiation and regulation of a uterine inflammatory response to mating but as yet its clinical significance is not fully understood.

In this clinical study the bitch uterine response to mating was investigated by examining the mechanism(s) by which uterine contractions are initiated at coitus with particular reference to the role of PF. Furthermore, the role of PF on pregnancy rate and litter size was examined in bitches inseminated trans-cervically (TCI) with fresh or frozen semen flushed along the uterus using either phosphate buffered saline (PBS) or homologous PF. In the first study uterine contractions were measured ultrasonographically in eight bitches following either; natural mating, teasing, mechanical stimulation of the vagina, vaginal endoscopy, TCI with semen flushed along the uterus using PBS, TCI with semen flushed using PF, TCI with semen flushed using PBS followed by mechanical stimulation of the vagina, and TCI with semen flushed using PF followed by mechanical stimulation of the vagina. In a second study of four groups of 18 bitches, pregnancy rate and litter size was examined when TCI with fresh or frozen semen was followed by flushing with either PBS or PF.

RESULTS: Teasing, endoscopic examination and TCI followed by PBS flush did not increase uterine contractions above basal values, whilst mechanical stimulation of the vagina produced a significant increase in the number of uterine contractions. TCI with PBS flush followed by mechanical stimulation of the vagina produced large numbers of uterine contractions similar to those at natural mating. Interestingly, TCI with PF flush combined with mechanical stimulation of the vagina was associated with reduced number of contractions compared with the same regime using PBS flush. Pregnancy rates and litter size was significantly increased for both frozen and fresh semen when PF rather than PBS was used as the flush after TCI.

CONCLUSION: There are important mechanisms for the transport and elimination of sperm from the female reproductive tract. Whilst some of the physical aspects of coitus are involved in initiating uterine contractions, male accessory gland secretions, particular PF, appear to have an important role in modulating uterine perfusion, sperm-PMN binding, uterine contractions and fertility.