



Artificial insemination in dogs

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Historically the first recorded scientific research on artificial insemination in dogs was conducted by an Italian monk, Abbe Spallanzani in 1780. But unlike in cattle this technique had no commercial value in dogs until late 1960s. With the onset of purebred dog breeding artificial insemination has become a focus of attention.

Indications

- Perceived inability of the male or female to breed
- Major size difference between mates
- Inexperienced male or female
- Mate preference
- History of attacking the mate
- Some bitches never appear to enter standing oestrus refusing all breeding attempts
- Some owners wish to avoid venereal diseases resulting from contact between mates
- To utilise the possibility of import of new germplasm.

Semen collection

A specific schedule should be made for collection and evaluation of semen. The dog should not be used for breeding for at least 4 days prior to examination. If the dog has

not been used regularly as a stud, as many as three collections and examinations may be required for a reliable assessment of the semen.

A veterinary hospital is usually a strange and even hostile environment for a male dog, and this may affect the quality of his semen. When collection of semen is especially difficult, the vet may decide to perform the procedure at the breeder's home. Only one collection in the dog's usual environment may be needed to gain his confidence. Semen can be collected satisfactorily from most dogs at the veterinary hospital. However it is impossible to collect semen without the dog's co-operation.

It is always preferable to use a teaser bitch to collect semen. Even though semen can be collected with an artificial vagina it is preferable to collect semen directly into a glass beaker (since rubber may have a deleterious effect on the spermatozoa). Semen is collected using a gloved hand (to avoid cross-infection and also to avoid damage to the engorged surface of the penis) and holding the penis just behind the bulbus glandis (which has been exteriorized after partial erection). Another advantage of using a glass beaker is that the operator can see exactly what is being produced and to ensure that only the sperm rich fraction together with small amounts of pre-sperm and post sperm fractions are collected. It is always better to avoid diluting the semen excessively with pre-sperm or post sperm rich fractions.

The dog's behaviour may also help in this regard; typically vigorous thrusting movements are associated with the pre-sperm fraction, but the dog settles down when the sperm rich fraction is being produced. The sperm-rich fraction is usually produced within 30-60 seconds. After this stage the male tries to turn and after a minute or so the prostatic secretion (post sperm fraction) is produced. This stage may last for some 10 - 30 minutes. Usually this fraction is not collected for the purpose of insemination. Volume of sperm rich fraction obtained is normally between 1 and 3 ml and two collections can normally be made approximately 1 to 2 hours apart so that enough spermatozoa are obtained to inseminate one or two bitches intravaginally.

Semen evaluation normally consists of assessment

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of sperm motility, a sperm count, measurement of ejaculate volume, a live/dead stain and morphological analysis. Usually after the assessment of sperm motility insemination may be carried out without further delay and other laboratory evaluation may be performed later.

Technique of insemination

Two methods have been described for inseminating the bitch, one is into the vagina and the other into the uterus.

Intravaginal insemination

Semen is deposited into the cranial half of the vagina by means of a catheter. Instead a glass pipette connected to a syringe via a rubber tube may be used. The owner may be advised to rest the hind legs of the bitch over his lap while sitting on a chair. The bitch's hind quarters should remain elevated for about 15 minutes after insemination. It is better to limit the volume inseminated to a few milliliters. It is generally accepted that intra vaginal insemination gives lower conception rates.

Intra uterine insemination

This procedure is technically difficult in the bitch because a catheter has to be threaded through both



the cervix and the pseudocervix (a constriction of the vagina prior to the actual cervix) for which special equipment is needed.

Conception rate after insemination

Farstad (1984) compared the fertility of bitches after natural mating and artificial insemination and found that the birth rate after natural service was 92 percent, while 84 percent conception rate was obtained when fresh semen was deposited in the 'uterine' body. Intravaginal insemination with fresh semen resulted in 25 per cent conception. Bonca et.al.(1994) artificially inseminated five bitches that refused natural service and three of them conceived and whelped 1 to 9

puppies.

In order to obtain maximum conception rates, it is imperative to deposit the semen close to the time when there are eggs ready to be fertilized. The detection of time of ovulation is critical in the management of breeding in dog. The change in female behavior from rejection to acceptance of the male might occur synchronously with pre-ovulatory release of LH (Concannon et al 1975). Softening of the vulva, when observed, normally occurs about one day after the LH peak.(Concannon et al 1989) and ovulation occurs over a span of 38 to 44 hours following the LH peak.

In bitches, ova are released as primary oocytes, which are not capable of being fertilised until about 60h (range 48 to 72 h) after ovulation, when they undergo the first meiotic division to become secondary oocytes (Tstui, 1989). The mature oocytes could retain their ability to fertilize for another 2 to 3 days or more (Concannon et.al., 1989). Finally, canine spermatozoa retain their ability to fertilize for at least another 6 days in the bitch's uterine environment. Thus, best conception rate and litter size can be achieved in the bitch by mating or inseminating with either fresh/chilled semen 2 to 3 days after ovulation (Johnston, 1995).

Exfoliative vaginal cytology is a simple indirect method to approximately predict the time of ovulation and thus to suggest the optimum time for insemination.

At present intravaginal insemination with fresh semen after examining the vaginal smears is the best option. Lot of developments in the frozen semen technology is expected in the coming years and a day will come when frozen semen of world champion stud dogs will be imported and used in the pedigreed dogs of Kerala.

References

- Bonca,G., Cernescu,H.,Mircu, and Ardelean,V.(1994). Artificial insemination in dogs: practical aspects and results. *Revista Romana de Medicina Veterinara*. 4. 2: 145-148
- Concannon,P.W.,Hansel,W.and Visek,W.J.(1975).The ovarian cycle of the bitch.*Biol.Reprod*.13:112-121
- Concannon,P.W.,McCann,J.P. and Temple,M.(1989).Biology and endocrinology of ovulation, pregnancy and parturition in the dog. *J.Reprod.Fert.,Suppl*.39:3-25
- Farstad,W.(1984).Bitch fertility after natural mating and after artificial insemination with fresh or frozen semen. *J.Small Anim.Pract*.25:561-565
- Johnston,S.D.(1995). Breeding management of the bitch. In: Textbook of Veterinary Internal Medicine. Diseases of the Dog and Cat. Eds. Ettinger, S.J. and Feldman E.C., Vol.2, W.B. Saunders Company, Philadelphia. 4th Ed. pp 1604-1606
- Tsutsui,T(1989).Gamete physiology and timing of ovulation and fertilization in dogs. *J.Reprod.Fert.,Suppl*.39:269-275

