

Review Article

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Artificial Insemination in Dogs (Canines)

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ABSTRACT

Artificial insemination is a procedure where semen is collected from a male dog and deposited into the female dog's reproductive tract, either the cervix or uterus, at the proper time of the oestrous cycle, to achieve pregnancy. It is a useful way of decreasing the stress on parent stock who were separated by large geographical distances. It provided information for the preservation of wild animals' semen which were endangered. AI is also useful in reducing sexually transmitted diseases, such as TVT, Brucellosis, and Herpes virus. It is very useful in crossing between different breeds of dogs of different sizes which couldn't mate naturally.

Introduction

In Artificial Insemination (AI) the semen is collected manually from a male and thereafter deposited (inseminated) in the female so that fertilization can occur, there is no need of natural mating. Artificial insemination (AI) has been widely used in cattle & horses for many years, but only in recent years the demand for AI amongst dog breeders have increase. Artificial insemination is an assisted reproductive technique that can be used to compensate for some causes of canine infertility (1-3).

There are many reasons which may require artificial insemination in dogs. In most cases either male or female not co-operate for natural mating and sometimes breeders want cross of different breeds of dog, sometimes owner want puppy of his own old pet which is along with them (5-7). For AI skilled and specialized veterinarian should

be there who has knowledge of the reproductive physiology and pathology of the species and the skills to collect semen and to inseminate the female without risking animal health or welfare (8-10)

History of AI in Dogs

This first AI was performed by Lazzaro Spallanzani in 1780 by inseminating a bitch which later gave birth to three pups (4, 11). He is also called as "Father of modern artificial insemination".

Selection of Animal for AI

Animal should be completely healthy, there should not be any disease (1). The general health of animal is assessed with physical examination of animal (both male and female), breeding soundness. Animal should have no any heritable genetic defects. Check and evaluate semen

Quality and Quantity. Poor quality semen should not be used for AI.

Objective of AI in Dogs

There are so many reasons for doing AI in dogs some of them are – male and female which can't naturally or dogs that are unable to conceive through natural means due to various problems like want pups of cross breeds, abnormal genital parts (Vulva, vagina), aggressive male or female, poor male which is not able to mount on female (arthritis, prostatic disease).

Volume of semen required

It depends on the size of the female: Bitches less than 10 lbs need 1.5-3 ml of semen per insemination. Bitches 10-50 lbs need 3-5 ml of semen. Bitches over 50 lbs need 5-8 ml of semen.

Evaluation of semen

Physical tests

Colour: The normal colour of whole ejaculate is greyish-white. Pathological colours include: green-greyish typical for the presence of the pus in semen; red or pink specific for erythrocytes contamination.

Volume: calculate with help of semen collecting tube, decrease semen volume are seen in inflammation of prostate and other parts of male reproductive tract.

PH: it should be in range of 6.4 to 6.8

Biochemical test -e.g., Fructolysis index: to check metabolic activity of spermatozoa.

Biological test- here we examine motility, concentration and morphology of spermatozoa under microscope.

When to Inseminate Semen

For this we can check the stage of oestrous cycle in bitch by two methods. 1) Vaginal cytology 2) Progesterone level.

Bitch should be inseminated on estrus stage of cycle to achieve a successful outcome, we can go for two to three times insemination in female from two days before to two days after ovulation, each on alternate day.

Place the semen at proper position gently at front of cervix or in uterus with the help of AI sheath or pipettes.

AI equipment's 1) Semen collecting tube 2) latex cone 3) 10 ml syringe 4) AI sheath or pipette 5) latex gloves 6) Artificial vagina

Points to be remember for semen collection and storage

Semen can be used fresh or frozen for AI.

Store semen for less than 10 days because after that some morphological abnormalities can be seen in semen spermatozoa.

Semen extenders can be used to nourish the semen like Tris-fructose -citric acid buffer.

The conception rate is best with fresh semen (80%), followed by chilled (60%) and frozen (50% to 60%).

Try to avoid latex product because some studies tell that latex reduce motility of sperm.

Collect semen from male dog when he is not in stress and collect the semen from same dog at the gap of 2-3 days and also don't use the same dog daily for semen collection.

Insemination Procedure

Hold the female in standing position.

Draw the require amount of semen from collecting tube or from stored utensil.

Insert AI sheath blunt end or pipette in reproductive tract of bitch till cervix or uterus.

Now connect the syringe filled with semen to AI sheath and push the semen in female reproductive tract, after complete again fill syringe with air and push the air in sheath so that no any semen remains in sheath.

Elevate hind legs of bitch for 10 minutes and remove AI sheath from female reproductive tract (fig.3)

Vaginal wall is stimulated with inserted finger for several minutes.

Don't allow to urinate or jump to female for 1 hour and also don't push abdomen of female.

Figure.1



Figure.2



Figure.3



Figure.4

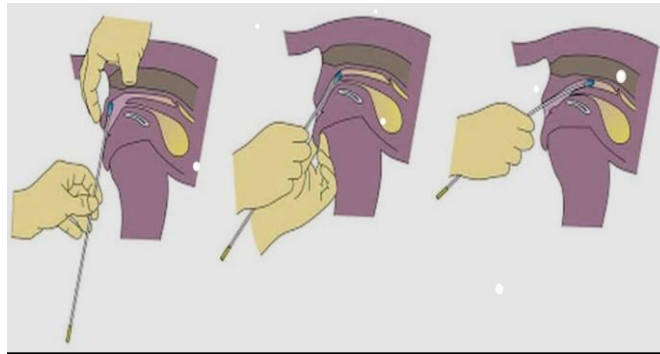


Figure.5

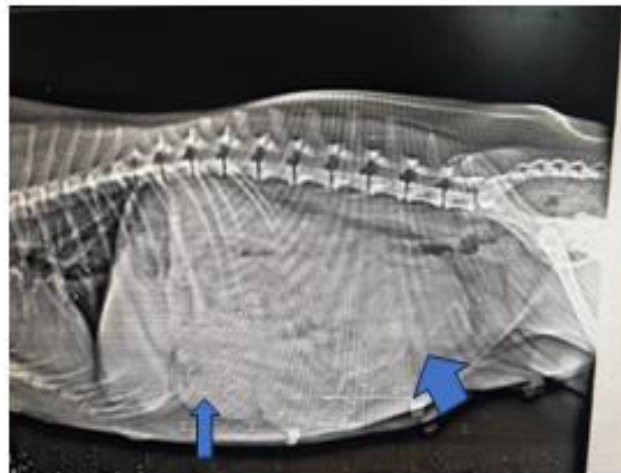


Figure.6



Figure.7

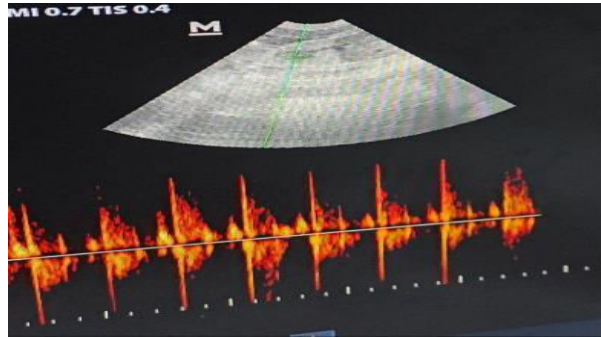


Figure.8

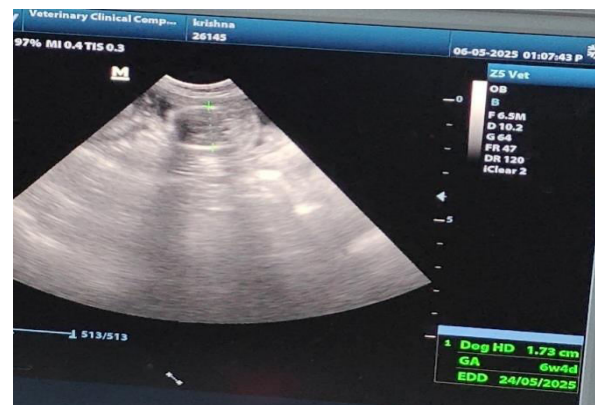


Figure.9 Five healthy puppies with natural parturition (whelping)



Artificial Insemination in Bitch

Surgical insemination can also be performed in dogs but it is not effective.

Results of AI in bitches

Natural breeding there is 80-95% success rate of pregnancy with AI using fresh semen, 62-100% success rate with AI using chilled semen, 59-80% success rate

with AI using frozen semen deposited into the vagina and 52-60% success rate with AI using frozen semen deposited into the uterus, respectively.

Pros of AI in Bitch

- 1) **Genetic improvement:** it allows breeders to use top-quality studs worldwide, improving breed standard and genetic diversity.
- 2) **Reduce stress and risk:** Eliminates the need for travel

and reduces stress for both dogs, especially if natural mating would be risky or difficult.

3) **Disease Control:** Helps prevent the transmission of sexually transmitted infections and parasites between dogs.

4) **Better Timing:** Enables precise breeding with hormonal monitoring, increasing the chances of successful conception.

5) **Preservation of Semen:** Semen can be collected, frozen, and stored for future use—even after a stud dies.

6) **Access to Distant Studs:** Allows breeders to use semen from dogs in other countries without transporting animals.

Cons of AI in Bitch

1. Ethical Concerns

Overbreeding: AI (artificial insemination) can make it easier to breed a bitch repeatedly, potentially leading to overuse and neglect of her health.

Lack of natural selection: It bypasses natural mate choice, which may affect genetic diversity and behaviour.

2. Health Risks

Infection or injury: Improper AI procedures can cause infections, damage to reproductive organs, or pain.

Inherited disorders: Easier breeding may lead to passing on genetic issues if proper genetic screening isn't done.

3. Cost and Accessibility

Expensive: High-quality AI can be costly, especially with semen collection, storage, shipping, and professional insemination.

Not always successful: AI doesn't guarantee pregnancy and may require multiple attempts, increasing costs and stress on the dog.

4. Loss of Natural Behaviour

Reduced instinctual mating: Frequent reliance on AI might lead to a loss of normal sexual behaviours in both male and female dogs over generations.

Coinfirmation of AI Bitch

It can be confirmed by USG & X- ray. If insemination has done before 30 days, we can go for x ray and below 30 days we can go for USG.

In X-ray we can get foetal skeletal also we can know how many foetus are there (fig.5)

In USG we can examine foetal sacs, heartbeat, EDD etc (fig.6, 7, 8)

We performed AI in female Pomeranian with male Shih tzu.

There was no any complication seen during gestation period of female Pomeranian

We got five healthy puppies with natural parturition (whelping)- as in Fig.-9

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Author Contributions

Amit Kumar Yadav: Investigation, formal analysis, writing—original draft. Rahul sepat: Validation, methodology, writing—reviewing. K. Murali Mohan:— Formal analysis, writing—review and editing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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