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Case Report / *Olgu Sunumu*

Artificial insemination in a cat: Report of first successful performance resulted with parturition in Turkey

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Abstract: In this case, semen that handled by urethral catheterization was deposited into the deepest point of the vagina of an anesthetized queen. Intravaginal artificial insemination was applied on the 2nd day of onset of the oestrus and only single insemination was performed. Insemination time was determined by behavioural and cytological evaluations. Two healthy kittens were obtained 62 days after insemination. The case has important reports in terms of being the first artificial insemination performance in cats in Turkey, resulted in parturition.
Keywords: Artificial insemination, queen, tomcat, urethral catheterization.

Bir kedide suni tohumlama: Türkiye'de ilk defa doğumla sonuçlanan başarılı bir uygulama raporu

Özet: Bu vakada bir erkek kediden üretral kateterizasyon yöntemiyle alınan sperma, bir dişi kedinin vaginal kanalının en derin noktasına bırakılarak suni tohumlama işlemi gerçekleştirildi. Intravaginal suni tohumlama, östrusun 2. gününde yapılan tek tohumlama şeklinde gerçekleştirildi. Tohumlama zamanı, davranışsal ve sitolojik değerlendirmeler sonucunda belirlendi. Suni tohumlamadan 62 gün sonra iki adet sağlıklı yavru doğumu gerçekleşti. Bu vaka raporu, Türkiye'de canlı yavru doğumu ile sonuçlanan kedilerdeki ilk suni tohumlama uygulaması olması dolayısıyla önemli bilgiler içermektedir.
Anahtar sözcükler: Dişi kedi, erkek kedi, suni tohumlama, üretral kateterizasyon.

While artificial insemination (AI) and reproduction techniques have been widely applied in other species in the world, they are not commonly applied in cats. Although AI studies in cats are very limited, there is only one study conducted on this subject in Turkey (1). Studies are still continuing to improve the effectiveness of AI by scientists and clinicians today, even after approximately 50 years from the first kittens obtained by artificial insemination (9). There are many practical limitations for AI in cats such as behavioral or physical indications, proestrus aggression, semen collection techniques, semen volume, determining the optimal time for insemination, ovulation induction and the contraindication of sedation procedures (7, 10). The primary reasons for using assisted reproductive techniques in cats are to preserve the genetic material of the valuable species that can be protected and used in different conditions and breeding the cats without physical disabilities or behavioral disorders (10). On the other hand, the knowledge and experience gained from domestic cats could be used in attempts to protect wild cat species (7, 12, 13). Domestic cats may also be a useful model for research into human diseases (5).

The aim of the case is to report the first kittens obtained from the first successful AI of Turkey.

A queen and a tomcat were referred to the Reproduction and Andrology Clinic by the owners with a history of a queen that did not allow males to mate or even approach to her, even though she showed estrus behaviors. Thus, performing AI with fresh semen was decided.

Queen was a British Shorthair, 22 months old, 3 160 g indoor cat with unknown fertility. She had no recent or previous diseases reported. On the first examination, the

queen was bright, responsive with normal vital parameters, good body condition score, and body temperature.

Tomcat was a British Short Hair, 25 months old, 3 960 g indoor cat, living together with the queen. He had mating experiences for many times with different queens and had kittens from these matings. On the first examination, the tomcat was bright and responsive with normal vital parameters, good body condition score, and body temperature.

Queen and tomcat were presented to the Reproduction and Andrology Clinic on the second day after onset of the oestrus behaviors. Oestrus behavior histories were taken by the owners such as vocalization, lordosis, rolling, rubbing, etc. Vaginal cytology was performed by using a cotton swab to confirm the oestrus. Smear was prepared and stained with Diff-Quick stain. The vaginal cells were evaluated at 200x magnification under a light microscope. Oestrus was confirmed by detecting a vaginal smear with a rate of superficial cells greater than 80%.

Tomcat was anesthetized using Medetomidine 0.32 ml + Propofol 1.0 ml for semen collection (7, 13). Urethral catheterization technique was used for semen collection (13). Urethral catheter (1.0 x 130 mm, 3FG) was lubricated and gently inserted into the urethra. The catheter was kept in the urethra for a minute to allow the semen to fill up into it. After catheter removal, 0.8 ml Atipamezole hydrochloride was used to arouse the tomcat (Figure 1). After removing the catheter, the semen was examined for its color and immediately marked on the catheter with a marker pen to determine the semen volume (Semen filled length [2.5 cm] x ∏ [3.14] x radius of the catheter [0.5 mm]). Then the catheter was filled up with a heated isotonic solution until the catheter was full.

On the same time with the tomcat, queen was anesthetized by medetomidine 0.20 ml + Propofol 1.0 ml (7, 8). The semen filled catheter was inserted into the vagina and 27.5 µL extended semen is deposited. After the catheter was removed, vaginal stimulation was performed by using a glass rod to induce ovulation provocation. No antisedatives were used to arouse the queen to prevent from return of the semen from the vagina (Figure 1).

To authorize Reproduction and Andrology Clinic to perform an AI in cats practice and its requirements, informed consent form was signed by owners.

After the AI procedure was completed, semen was examined in terms of volume, color and motility. The semen had creamy color. Semen volume was calculated approximately as 6.25 µL (Lenght of native semen was 2.5 cm). The semen remaining in the catheter after the insemination was examined subjectively in terms of motility by a light microscope. The percentage of sperm motility was around 60%. Concentration could not be determined because only a small amount of semen remained in the catheter.

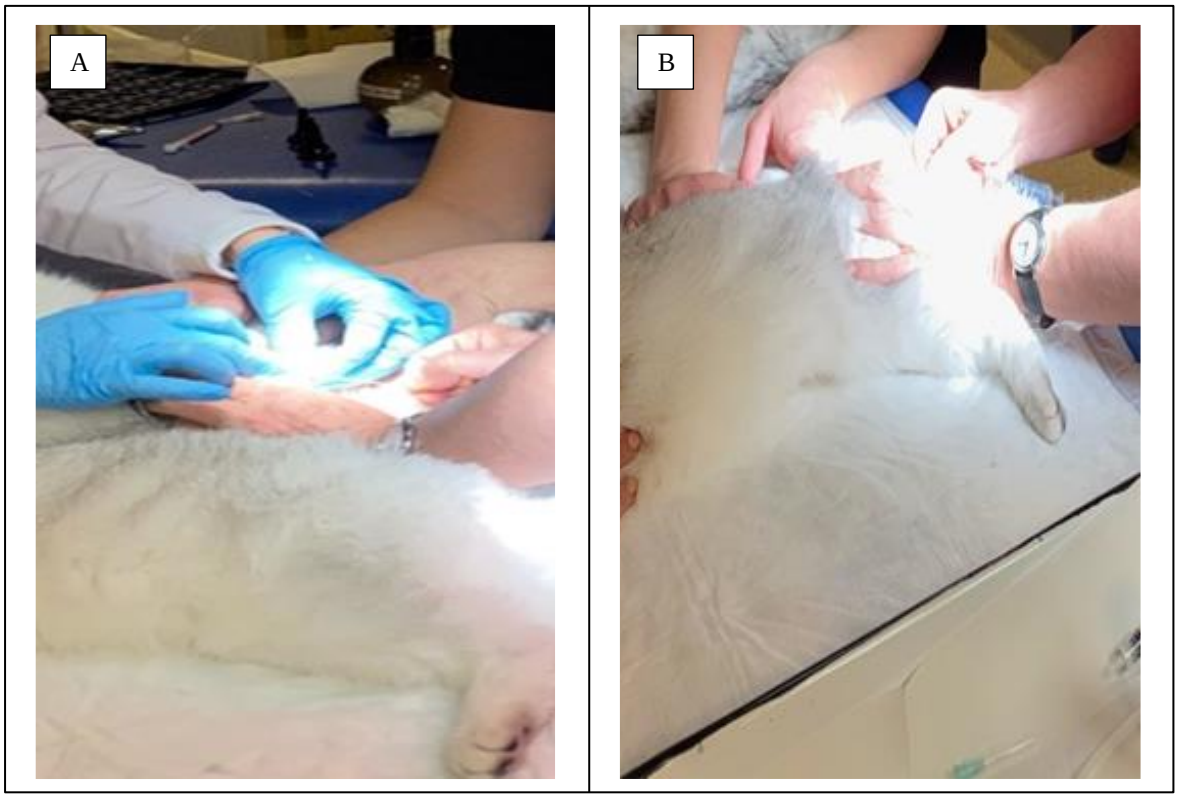

Fig 1. A. Semen collection by urethral catheterization from tomcat. **B.** Vaginal insemination in queen.

Two healthy kittens were born 62 days after the AI procedure.

AI for domestic cats is not a common clinical application as it is in dogs. However, AI studies in domestic cats will lead to the conservation of wild cat species and especially will bring new points into human medicine in the light of new studies (4, 5, 7, 12). There is only one study conducted on AI in domestic cats reported from Turkey (1). Although a wide range of researches and performances have been done in the previous study, they have reported only 19th day pregnancy diagnosis (1). The case report has high importance because it has reported the first successful parturition (two healthy kittens) obtained from AI in cats, in Turkey.

Researchers suggest that the AI in cats should be performed on the 2nd day of the onset of oestrus determined by behavioural inspection or cytological determination, and repeated 2 days later (2, 3, 7). In our case, AI was applied on the 2nd day after the onset of oestrus behaviours, however, second repetition did not be performed.

Although there are different types of anaesthesia protocols, Medetomidine+Propofol combination preferred for its fast recovery, less risky and giving option to use antisedatives for unexpected situations. Besides, medetomidine administration is obligatory in tomcats if urethral catheterisation technique is used. Also, medetomidine is known as the α2-adrenergic receptor stimulator and it allows the release of a small volume of highly concentrated sperm from the cauda epididymis into the urethra (7, 8, 11).

According to reported studies (3, 6, 7, 11, 12) fresh semen is more appropriate for intravaginal inseminations and intravaginal insemination with fresh semen is more suitable for clinical applications, because it must be rapid and unstressed. In the case, intravaginal AI by urethral catheter was applied. This is a practical approach in veterinary clinic conditions for performing intravaginal AI in cats.

Success of AI in domestic cats depends on good knowledge of the anatomical structure, determining the appropriate insemination period correctly, using appropriate equipment, depositing the semen in suitable conditions (frozen or fresh) and a suitable area of the vaginal tract (intrauterine, intravaginal). The case demonstrated that if the correct time for insemination is determined correctly with the appropriate methods, single insemination will be sufficient to produce a pregnancy and healthy parturition. The case is significant because it is the first AI performance in Turkey that resulted in parturition.

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Ethical Statement

This study does not present any ethical concerns.

Conflict of Interest

The authors declared that there is no conflict of interest.

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