

# **SURGICAL AND ANESTHETIC EVALUATION OF SPAYING IN RABBITS**



**A Clinical report submitted in partial of the requirement for the fulfilment of the  
degree of Doctor of Veterinary Medicine (DVM)**

A Clinical Report Submitted by

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**A Clinical report submitted as per approved styles and contents**

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The Author

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## **List of Abbreviations**

#: Percentage

@: At the rate of

°F: Degree Fahrenheit

bw: Body weight

CVASU: Chattogram Veterinary & Animal Sciences University

Inj.: Injection

kg: Kilogram

mg: Milligram

ml: Milliliter

SAQTVH: ShahidulAlam Quadary Teaching Veterinary Hospital

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## **Surgical and anesthetic evaluation of spaying in rabbits**

### **Abstract**

Rabbits are popular pets and can play an important role in biological and immunological research. In female rabbits, spaying is sometimes required to control demeanor and pregnancy, particularly when reared as pets. This case study was intended to address the efficacy of surgical outcomes and anesthetic protocol in rabbit spaying. Clinically healthy 2-month-old 2 female short-haired animals weighing 1.5 kg and 1.4 kg, respectively, were presented to a teaching veterinary hospital. Spaying was performed under aseptic conditions with xylazine and ketamine mixed in the same syringe of anesthesia at dose rates of 5 mg/kg and 30 mg/kg, respectively. The rabbit became unconscious within 5 minutes of intramuscular injection, and a 20-minute interval maintained the half doses of ketamine inserted. Animals were recovered after 60 minutes of injection. Postoperative treatment was maintained with antibiotics and painkillers for 5 days. After 15 days of operation, the wound began to heal. The case report suggests that rabbit spaying can be performed successfully with xylazine and ketamine anesthesia at recommended doses.

**Keywords:** Rabbit, Spaying, Anesthesia

## **Introduction**

The word "spaying" is often referred to as an "ovariohysterectomy". It is a surgical technique used to control rabbit population particularly under captive condition as a pet in which the ovaries and uterus are completely removed to sterilize female animals (Kirsan et al., 2013). Sexual maturity does occur at 4–8 months of age; it is affected by size and growth rate, with larger breeds attaining sexual maturity at a later age than small breeds (Quesenberry, 2011). Routine ovariohysterectomy is typically performed between 5–8 months of age, but it can also be performed at a later time. However, as they age, they accumulate significant amounts of fat in the mesometrium, which can complicate the surgical procedure as the vessels are embedded within the fatty broad ligament of the uterus (Perpinan, 2019).

Spaying is one of the most common major abdominal surgeries in veterinary practice (Freeman et al., 2017), with the procedure performed under proper general anesthesia and sterile operating technique in sexually matured animals (Pohl et al., 2012). It is an irreversible procedure that is usually performed through a small incision on left side but can also be performed underneath along her midline (Silva et al., 2012). Spaying is also used for the treatment and prevention of uterine pathologies such as adenocarcinoma, other uterine neoplasia, mammary neoplasia, endometrial venous aneurysms, uterine hyperplasia, pyometra, hydrometra, torsion, and rupture. Prevention of behavioral problems or unwanted behaviors like territorial aggression, sexual behavior, territorial marking, false pregnancy, fur pulling, and nest-making (Perpinan, 2019). Many studies show that the effects of different anesthetic drugs in rabbits (Orr et al., 2005) were investigated for injectable anesthesia in a clinical setting (Grint et al., 2008). The relatively long recovery from anesthesia in rabbits anesthetized with midazolam, fentanyl, or fluanisone may account for the current acceptance of ketamine-based combinations in rabbit anesthesia (Henke et al., 2005); however the recovery rate is not well studied. The aim of the present study was evaluation xylazine and ketamine anesthesia in rabbits undergoing using anesthetic induction for spaying.



### **Case history and description**

On July 7–2022, two female (short-haired) rabbits weighing 1.5 kg and 1.4 kg, aged about 9 months, were presented to the SAQ Teaching Veterinary Hospital of Chittagong Veterinary and Animal Sciences University (CVASU), Chittagong, Bangladesh, for spaying. Both rabbits were active and alert. The vital parameters, viz., temperature, respiration rate, and heart rate, were recorded as 102°F, 50 beats per minute, and 130 beats per minute, respectively (Case 1 and 2)

### **Restraining anesthesia:**

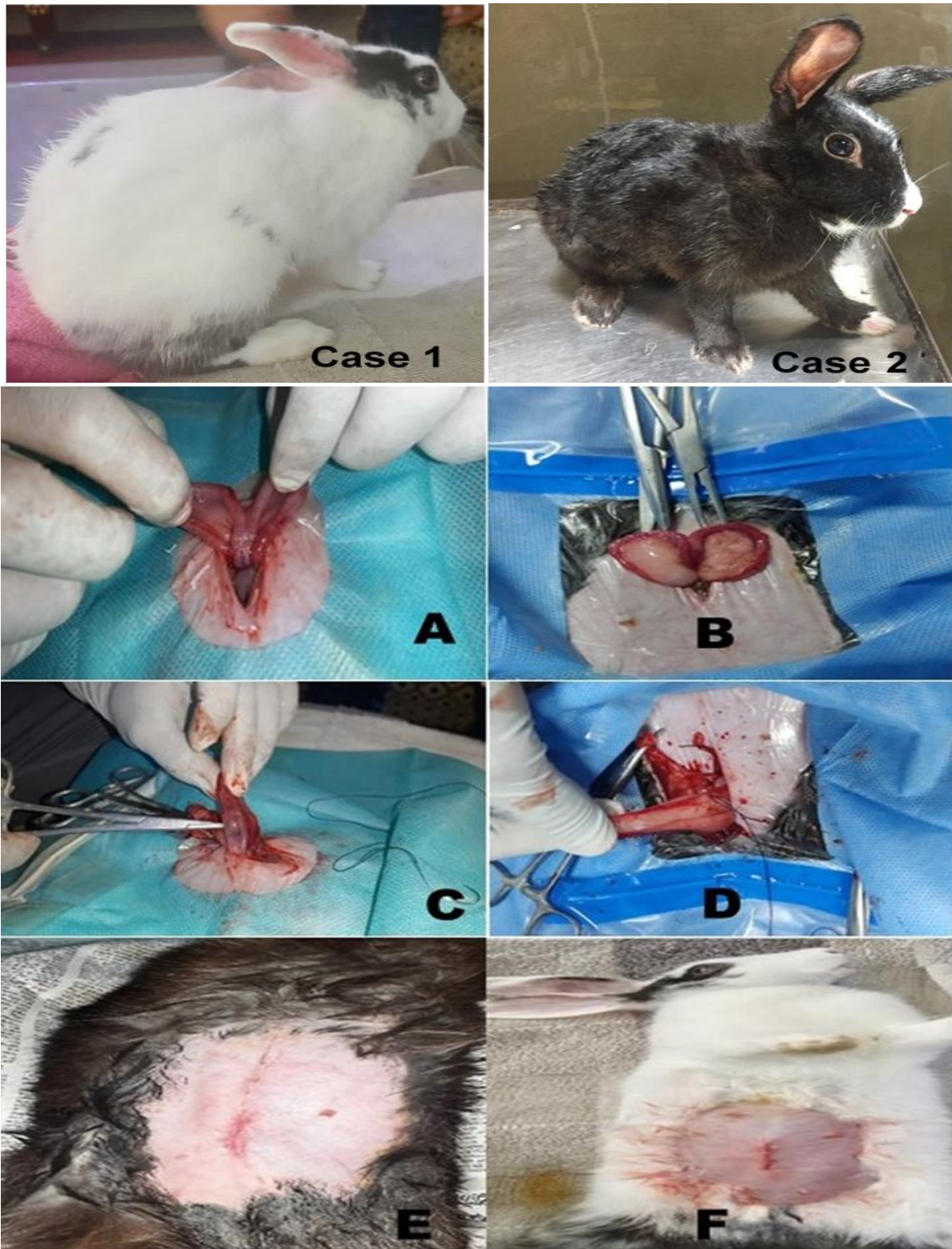
General anesthesia was achieved with and under close supervision by injecting xylazine hydrochloride @5 mg/kg body weight intramuscularly, followed by ketamine hydrochloride @30 mg/kg body weight. The maintenance does continue after a 20-minute break between half doses and first doses of ketamine only. Heart rate and eye reflexes were monitor throughout.

### **Surgical technique:**

For anesthesia, two injectable anesthetics were used. Xylazine was injected @5 mg/kg body weight with a total dose of 0.38 ml (Xylaxin®, 20 mg/mL, India Immunologicals Ltd., Hyderabad, India) and ketamine was used @30 mg/kg at a dose with a total dose of 0.9 ml (G-ketamine®, 30 mg/mL, Gonoshasthaya Pharmaceuticals Ltd., Mirzanagar Dhaka, Bangladesh) to anesthetize the rabbit. Both animals were unconscious within 5 minutes. The temperature, heart rate, and respiration are monitored throughout the procedure. The naval area (7-8 cm) was shaved and cleaned; the surgical area was scrubbed with a 7.5% povidone-iodine solution. This was repeated three times. Later, when the pet was shifted to the operation theater, the area was again sterilized twice, first with 7.5% surgical povidone-iodine solution and then with 70% surgical alcohol. The surgery was aseptically controlled under general anesthesia. A laparotomic midline incision 1 cm behind the umbilicus was performed. A 3 cm-long incision was made on the skin at first. The linea alba was identified, the abdominal muscles were elevated using forceps, and the bleeding was checked by applying gauge pressure and artery forceps. The uterine horn was identified by fingers (Figures A and B), and ovaries were found following the horn to their ends (Figures C and D). The broad ligament arteries were ligated just in front of the cervix, leaving the cervix as the natural barrier. The entire uterus and ovaries were then removed. The abdomen was checked for bleeding. The peritoneum and muscle layers were sutured in a simple continuous pattern with U-synth (2-0). The cosmetic suture was done with U-synth (2-0) (U-synth®, Suture India Pvt. Ltd., Bangalore, India) (Figures E and F). Both rabbits used shocks in the body to give protection from licking and hazards.

**Table 1.** Parameters of temperature, heart rate, and respiration rate of two rabbits under general anesthesia for spaying

<b>Stage of anesthesia</b>	<b>Heart rate (mean)</b>	<b>Respiration rate (mean)</b>	<b>Rectal temperature (mean)</b>
Before anesthesia	131 beats per minute	51 beats per minute	101.5°F
Stage 1 just after anesthesia	151 beats per minute	57.5 beats per minute	101.6°F
Stage 2 after 5 min	157 beats per minute	60.5 beats per minute	102°F
Stage 3 during surgery	120 beats per minute	42.5 beats per minute	100.5°F



**Figure 1.** Spaying procedure in two female rabbits under general anesthesia with ketamine and xylazine. The surgery was performed using laparotomy midline incision technique. Here A and B show the uterus, C and D show the ovary of cases 1 and 2, E and F show cosmetic surgery after surgery sequences of cases 1 and 2, respectively.

### **Postoperative treatment and care**

The owner was instructed to clean the surgical site and apply topical antibiotic ointment containing neomycin sulfate, bacitracin zinc, and polymyxin B sulfate (Nebanol Plus ointment®, Square Pharmaceuticals, Bangladesh) twice daily, and systemic antibiotics, including Ciprofloxacin @20 mg/Kg bodyweight (Inj. Ciprocin 100mg®, Square Pharmaceuticals, Bangladesh), were administered intramuscularly daily for 7 days. The NSAID meloxicam, at 0.2 mg/Kg body weight (Inj. Melvet®, Acme Laboratories Ltd., Bangladesh), was administered subcutaneously daily for 3 days. The patient was monitored and observed for 15 days under supervision. There were no complications noted, and the rabbit recovered uneventfully. On the 15th day, the shocks were removed, and it was noticed that the surgical site had healed completely.

### **Results and discussion**

Spaying is a tool of birth control that was performed in the present study, which was found safe and achieved our study goal. In female rabbits, the reproductive tract is exceptional as it lacks a uterine body and each uterine horn has its own cervix, which opens directly into the vagina (Quesenberry, 2011). Usually, feline ovariohysterectomy is performed either through a ventral midline approach or a lateral flank approach (Murugesan et al., 2020). The flank approach, as a substitute for the traditional ventral midline approach for spaying, is found to be preferred in the UK, and the midline approach is popular in the USA ( Kiani et al., 2014), but in rabbits, the ventral approach is the applied in veterinary sector, which fellow in the present study. It should be taken into consideration that the vagina fills with urine when the bladder is emptied (Varga, 2014), which the present study considers during surgery. Very tight sutures are contraindicated as they increase the risk of adhesions (Varga, 2014), which the present study considers during sutures. The skin is closed using a subcuticular technique in a continuous pattern with absorbable suture (Richardson and Flecknell, 2006). In the present study, there was no suture applied to the skin, which is considered cosmetic surgery. The use of Elizabethan collars is unsatisfactory and stressful in rabbits (Varga, 2014), therefore in the current study, shocks are used instead of Elizabethan collars, making rabbits more comfortable to move and walking. In the present study, we used ketamine @30 mg/kg BW intramuscularly and xylazine @5 mg/kg BW intramuscularly, as well as postoperative meloxicam @0.2 mg/kg BW intramuscularly with topical antibiotics. Overall, the use of ketamine and xylazine in two rabbits was found safe for spaying with recommended doses which is similar to a previous study for C-sections in rabbits (Yadav, 2018).

## Conclusions

Spaying under general anesthesia with ketamine and xylazine can be considered safe for spaying rabbits. The present findings and techniques will be helpful for field veterinarians to know how they can anaesthetize and perform surgery in rabbits.

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### **Biography**

I am MushfikaTabassum, daughter of Md. Osman Gani and Mahbuba Osman. In 2013, I received my Secondary School Certificate (SSC) from DrKhastagir Govt. Girls High School in Chattogram, and 2015, I received my Higher Secondary Certificate (HSC) from Govt. Hazi Mohammad Mohsin College in Chattogram. I enrolled for a Doctor of Veterinary Medicine (DVM) degree at Chattogram Veterinary and Animal Sciences University (CVASU), Bangladesh. In the future, I would like to work as a veterinary practitioner and do research on clinical animal diseases in Bangladesh.