

## Chapter 1 :Introduction

Rabbits, also known as bunnies or bunny rabbits, are small mammals in the family Leporidae (along with the hare) of the order Lagomorpha (along with the pika). *Oryctolagus cuniculus* includes the European rabbit species and its descendants, the world's 305 breeds of domestic rabbit. *Sylvilagus* includes 13 wild rabbit species, among them the seven types of cottontail. The European rabbit, which has been introduced on every continent except Antarctica, is familiar throughout the world as a wild prey animal and as a domesticated form of livestock and pet. With its widespread effect on ecologies and cultures, the rabbit is, in many areas of the world, a part of daily life—as food, clothing, a companion, and a source of artistic inspiration. Rabbits make great pets. In general rabbits need appropriate housing, exercise, socialisation and a specific diet for good welfare. Rabbits are very intelligent and active animals. They spend a huge amount of their time foraging for food, but they also need to dig, hide, run jump and stretch. Providing the right diet, companionship and environment are all essential to making sure that they can behave as normal. Rabbits generally live for 5 to 8 years depending on their environment and breed, but they can live for as long as 12 years. Rabbits are raised for meat, Angora wool, breeding stock, and sometimes, for laboratory use. They also are raised for their skin or hide. Although they are cute, rabbits are not good pets for children. They are prey animals who hate being picked up from the floor and cuddled. Rabbits do not have flexible spines like cats, so improper handling can cause serious or fatal injuries. Aggressiveness is one of the main problems in group housing of rabbit does. Male rabbits fight one another for different reasons than female rabbits; including dominancy. Two male rabbits from the same litter have the best chance of getting along. They must be neutered to prevent hormones from damaging their relationship. Never keep two unneutered male rabbits together, even if they're brothers.

Territorial aggression in order to maintain dominance among intact males occurs frequently (Bays et al., 2006). According to Harcourt-Brown (2002), male rabbits often attack another male's scrotum during fights and results in removal of one or both

testicles of the other rabbit. This behaviour is an attempt by the dominant buck to sterilise another potential male rival to maintain hierarchical dominance. Rabbits do not have a scrotum per se but have two hairless scrotal sacs (hemiscrotal sacs). The hemiscrotal sacs are separated and located in the inguinal area, ventral to the anus and cranial to the prepuce. A very important anatomical peculiarity of rabbit is that its inguinal canal remains open throughout life, and the elongated testicles move freely from the hemiscrotal sacs to the abdominal cavity (Lennox, 2008; Vella & Donnelly, 2012). However, the skin of the scrotal sac is thin compared with other exotic pet species such as dogs and cats, and therefore, it can be easily torn or ripped off (Lennox, 2008). Traumatic injuries in mammals are common and often results in varying degrees of superficial or deep wounds depending on the type of injury occurred (Kumar et al. 2016). The lanky skin of scrotal sac is prone to traumatic torsion. As a sequel of tear in scrotal skin, evisceration of the testicle occurs in the affected side (Nurhusien et al. 2015). In order to attain dominance among mates, leporids exhibit territorial aggression which often lead to trauma among the cage mates. Testicular evisceration can be either unilateral or bilateral in nature (Bradley et al. 2006). Rabbits have hairless scrotal sacs called as the hemiscrotal sacs. These sacs are separated and are located in the inguinal region, cranial to prepuce and ventral to anus. A characteristic anatomic feature in rabbit is that the inguinal canal remains open throughout life, so that the elongated testicles glide freely along the inguinal canal (Lennox, 2008). Following the torsion, reperfusion injuries develop, consequently damaging both ipsilateral and contralateral testicles due to the generation of reactive oxygen species (Anim et al. 2005). The present study aims to reports a case of testicular evisceration secondary to trauma in a rabbit and its successful surgical management by orchiectomy. Mammals are commonly encountered with traumatic injuries resulting in a variety of superficial and deep wounds. The more common open wounds divided in to abrasions, incision, laceration or punctured wound category based on their depth and mechanism of occurrence. Penetrating scrotal trauma is relatively rare. The location and structure of the scrotum serve to minimize any injury that occurs in many trauma scenarios.

## **Chapter 2: Materials and Methods**

### **2.1 History and clinical examination**

An eight-month old, intact male rabbit was presented to Teaching & Training Pet Hospital and Research Center (TTPHRC), Purbachal Express Hwy, Dhaka with history of eviscerated right testicle as a consequence of fighting between the cage mates that occurred a few hours before. On examination, the right testicle was found to be exposed, enlarged and hanging from scrotal sac without any bleeding. Left testicle was found to be intact and without any secondary damage. Upon physical examination, rabbit was found to be active and alert. All the physiological parameters were within normal range; such as body temperature 39°C, weight 1.8 kg, heart rate 160 beats/minute, respiration rate 40 breaths/minute. Based on history and physical findings, the case was diagnosed as unilateral traumatic evisceration of left testicle. It was decided to manage the case surgically by performing bilateral orchiectomy under general anesthesia.

### **2.2 Surgical management**

#### **2.2.1 Restraining and Anesthesia**

The rabbit was prepared for aseptic surgery. The wound on the eviscerated left testicle was cleaned using antiseptics, debrided, and prepared for surgery. Xylazine (Injection Xylazine® , Indian Immunologicals Ltd, India) was given at the rate of 5 mg/kg body weight intramuscularly as pre-anesthetic medication. After 10 minutes general anesthesia was induced using Ketamine hydrochloride (G-ketamine® , Gonoshasthaya Pharmaceuticals Ltd, Bangladesh) at the rate of 50 mg/kg body weight intramuscularly. The maintenance anesthetic dose was given @ half of the initial dose during the surgery. The animal was positioned in dorsal recumbency and the surgical area was prepared aseptically by clipping, shaving, applying povidone iodine and finally washing with 70% alcohol.

### **2.2.2 Surgical Procedure**

The patient was positioned on dorsal recumbency and a surgical drape was applied with both testicles and prepuce exposed in the surgical field. A small incision was made on the scrotal sac of the right testicle to exteriorise further the vaginal process for open castration. The exposed vaginal process was then clamped with a haemostatic forceps, and the testicle was removed by excising the vaginal process with a scalpel blade (Figure 1.). The stump of the vaginal process was then sutured with 4-0 Vicryl, using horizontal mattress suture pattern that also closed the inguinal ring. The ligated stump was checked for bleeding and inserted back into the scrotal sac. The incision on scrotal sac was also sutured with 4-0 Vicryl, horizontal mattress suture pattern. Similarly, about 2-cm long incision was made on the left hemiscrotum and the vaginal process was exteriorised. A 1-cm incision was done on the Tunica vaginalis and the left testicle exteriorised (Figure 2.). The spermatic fascia was broken and the spermatic cord was ligated and resected (Figure 3.), before the left testicle was removed. The vaginal tunic was then sutured with 4-0 Vicryl (Figure 4.), using horizontal mattress suture pattern to ensure that the inguinal ring was closed to prevent postoperative herniation, followed by closure of the hemiscrotal incision with 4-0 Vicryl using the same suture pattern.

### **2.2.3 Post Operative Care**

After surgery, antibiotic Ciprofloxacin @10mg/kg body weight (Susp. Ciprocin®250, Square Pharmaceuticals, Bangladesh), was administered orally daily for 7 days. In addition, Antihistaminic chlorpheniramine maleate @0.2-0.4mg/kg body weight (Syp. Histacin®, Jayson Pharmaceuticals Ltd., Bangladesh) was administered orally daily for 7 days. Analgesic Injection Meloxicam @ 0.3 mg/kg body weight (Injection Melvet®, Acme Laboratories Ltd., Bangladesh ) was administered subcutaneously daily for 5 days for pain management. The rabbit recovered well from the anaesthesia and was discharged a few hours after the surgery. The client was instructed to monitor and report

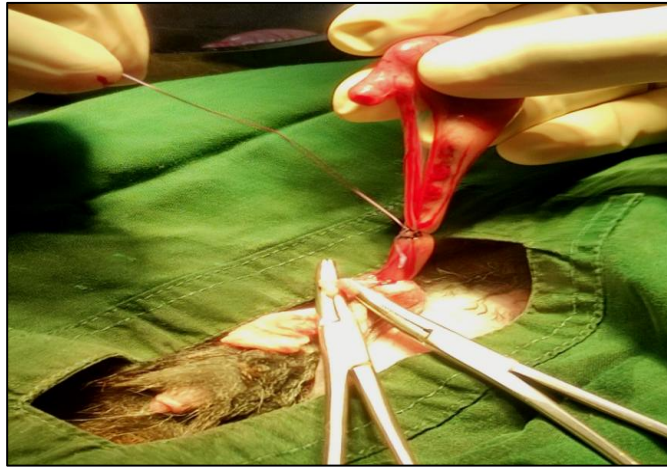
if the rabbit attempts to chew or gnaw at the incision site or bleeding and swelling occurs at the site. The client was also advised to keep the cage clean and return the rabbit to the hospital for re-examination if it did not eat for more than 24 hours.



**Figure 1.** Closed orchiectomy on the right testicle



**Figure 2.** Open orchiectomy on the left testicle of a rabbit showing exteriorization of left testicle through incision of vaginal tunic



**Figure 3.** Transfixation at left testicle



**Figure 4.** Closure of the left vaginal tunic with 4-0 vicryl, using horizontal mattress suture pattern and closure of the inguinal ring



**Figure 5.** Recovered testicles after 10 days

### **Chapter 3: Results and Discussion**

No complication occurred and complete recovery within 10 days was reported by the client (Figure 5.).

Some of the causes of aggression in rabbits include sexual maturity, dominance, pain and territorial behaviour. Rabbits reach sexual maturity at the age of four to six months (Bays et al., 2006; Vella & Donnelly, 2012). It is not advisable to keep two intact males together, because rabbits are known to fight for territory frequently, thus resulting in injuries (Land, 2004; Bays et al., 2006). Thus, the injuries described in this case report could have occurred as a result of attempts by both the intact male rabbits to fight for dominance and territory as the presence of other rabbit could have been considered as a threat. Orchiectomy, or castration, is the removal of the testicle, epididymis, and a portion of the vas deferens (Murray, 2006). Orchiectomy is an appropriate procedure for cases as described in this report and as a method to reduce inappropriate behaviours (Olson & Bruce, 1986; Harcourt-Brown, 2002; Vella & Donnelly, 2012). Rabbit testicles begin to descend into the scrotal sacs at 10 to 12 weeks of age, hence, castration can be performed from 4 to 5 months old (Vella & Donnelly, 2012). There are two techniques of castration available for rabbits; open and closed castration. In closed castration, the Tunica vaginalis is not incised and both spermatic cord and testicle are removed while they are still in the tunic. Whereas, in open castration, the vaginal tunic is incised, the spermatic cord ligated and the testicle removed (Murray, 2006). The open inguinal canal is breached during surgery, and must be closed in order to prevent open communication between the hemiscrotal sac and the abdominal cavity, and potential herniation of abdominal viscera (intestine, bladder) into the hemiscrotal sac. Other complications that result from castration, including scrotal swelling, oedema, haemorrhage, omental herniation, eventration, penile trauma, bacterial infection of the spermatic cord (also called scirrhus cord formation), incisional infections, hydrocele formation, and peritonitis. So, proper post surgical care and medications should be followed.



## **Chapter 4: Conclusion**

Severe injuries to the genitalia may result from aggressive behaviour among rabbits. Such injuries in male rabbits could require orchietomy, both as an immediate treatment as well as prevention in future behavioural problems and territorial aggression. A good understanding of the anatomy and physiology of rabbits will assist in prevention of these injuries and in giving the proper treatment if necessary.

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The Author

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## **Biography**

I am Jinnat Jahan Sonia. I have passed my Secondary School Certificate (SSC) examination in 2013 and Higher Secondary Certificate (HSC) examination in 2015. Then I have enrolled myself at Chattogram Veterinary and Animal Sciences University (CVASU) in the Faculty of Veterinary Medicine (FVM) in 2016. I have immense interest to work in the field of Pet Animal Medicine.