

Case Study

Electroejaculation in a Perineal Urethrostomy Goat

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ABSTRACT

This report describes semen collection by electroejaculation (EE) method from an urethrostomy goat. The buck used in this study underwent the urethrostomy four months before being incapacitated. The semen was collected by EE two times at 30 min apart. Generally, all the semen characteristics were very poor. The semen volume, concentration, motility and viability of the first ejaculate were higher than those of the second ejaculation. EE was useful for semen collection from a genetically superior goat, incapacitated due to urethrostomy.

Keywords: Electroejaculation, urethrostomy, goat

INTRODUCTION

Semen collection is an essential step for utilizing the artificial insemination technology in farm animals. In collecting

the semen from the males, there are several methods used for various situations, such as artificial vagina (AV), electroejaculation (EE) and epididymal spermatozoa recovery (from the dead animals) (Memon *et al.*, 1986; Ritar *et al.*, 1992; Datta *et al.*, 2009). Basically, the use of AV is considered as the best method for semen collection in domestic animals. However, the EE method has been employed successfully both in domestic and wildlife animals when

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the AV method is inapplicable. The EE method can be used for various purposes, such as in animals having problems with mounting due to musculoskeletal diseases or injury, animals outside their breeding season, or paralyzed animals due to spinal cord injury. This study reports a buck that was incapacitated and unable to serve the does after recovering from its perineal urethrostomy, despite having reasonably good libido. Therefore, the EE method was applied to collect the semen from this valuable buck.

CASE DESCRIPTION

Case History

A 30-month-old male Kalahali Red goat weighing 65 kg belonging to the Embryo Transfer Technology Research Centre, Department of Livestock Development, Nakhon Ratchasima, Thailand, was used in this study. It was fed with a commercial diet (16% protein, CP, Thailand) at approximately 600g/day and free access to dry Pangola grass, water and vitamin/mineral block. The goat semen was collected by using AV once a week to produce frozen semen and distributed to the farmers for 6 months. The post-thaw motility of frozen semen was at least 40%. During the last 4 months, the animal had developed a severe difficulty in urinating. After a complete physical examination, X-ray and ultrasonography, perineal urethrostomy without penile transection was performed at the Veterinary Teaching Hospital, the Faculty of Veterinary Medicine, Khon Kaen University, Thailand.

A new urethral opening was reconstructed at the perineal area of the animal.

Electroejaculation Procedure

After surgery, the buck urinated via the new urethral opening and had a good health. Although the buck regained its libido completely, semen collection with AV was not successful. Semen collection was conducted in February 2012, 4 months after the surgery. The buck was subjected to electroejaculation procedure as previously described by Sundararaman *et al.* (2007). Briefly, the buck was restrained in a lateral recumbency position, faeces were removed and the urethral opening was cleaned. A lubricated rectal probe (2.5 cm in diameter with three longitudinal electrodes) was inserted approximately 10 cm into the rectum with the electrodes facing down and then connected to an electro-ejaculator. By using the manual control knob of the instrument, the stimulation power was increased from 0 to 20 mA and held for 2 to 3 sec and brought to 0. This procedure was repeatedly performed after a short resting period, with increasing stimulation power by 20 mA in every attempt until ejaculation occurred. This buck was able to ejaculate when using the stimulation power at 40 mA. Semen was collected into a 15 ml sterile tube, which was immediately evaluated for appearance and volume. Equal volume of egg yolk tris (3.025 g tris (hydroxymethyl)-aminomethane, 1.7 g sodium citrate monohydrate, 1.25 g glucose, 100 mg benzylpenicillin, 100

mg dihydrostreptomycin sulphate, freshly collected egg yolk 20% (v/v) and distilled water into 100 ml) was added to the ejaculate and kept in a Styrofoam box to protect it from light and maintained at an ambient temperature of between 30-32°C. Then, the semen was adjusted into the final concentration of 500×10^6 cells/ml. The second ejaculation was later collected at approximately 30 min after the first ejaculation by using the same procedure. The semen samples were slowly cooled down to 5°C at the rate of -0.5°C/min using drop wise of small pieces of ice.

Semen Evaluation

The samples were sent to the laboratory within 3½ hrs. The motility of the diluted semen was evaluated using a light microscope (Howard, 1993). The total sperm per ejaculate was determined by multiplying the sperm concentration/ml with the undiluted ejaculate volume. Sperm viability was assessed using eosin-nigrosin staining (World Health Organization, 2010) and 200 spermatozoa per sample were examined. Sperm morphology was assessed at 1000x using a phase contrast microscope (Olympus, Tokyo, Japan) and 200 spermatozoa were evaluated per sample.

RESULTS AND DISCUSSION

The semen volumes of the first and second ejaculation were within the normal range for a goat (Oyeyemi *et al.*, 2001; Carter *et al.*, 1990). However, the concentration, total sperm and sperm motility were generally poor. Nonetheless, the semen characteristics

of the first ejaculation were found to resemble those from a paralysed goat (Sundararaman *et al.*, 2007). On the contrary, those from the second ejaculation were much lower. The low quality of semen might have been caused by the pathological change of urinary tract or less sperm production due to the prolong period of sexual inactivity. Pellati *et al.* (2008) suggested that spermatozoa can be affected by urogenital infections at different levels from the development to maturation and transport. The study of Levita *et al.* (2005) showed a significant decrease in the percentage of human sperm motility and normal morphology on days 11–14 of sexual abstinence. Typically, the semen collected by the EE method contains a greater amount of seminal plasma than the semen collected by the AV method. From the study of Memon *et al.* (1986), the characteristics of goat semen collected using AV were greater in concentration and mass motility than EE. Furthermore, the data of Ritar *et al.* (1992) showed that the frequent ejaculation within days in breeding season had an effect on the number of spermatozoa. Urethral epithelial cells, red blood cells and polymorphonuclear cells were also detected in the semen, indicating that a certain level of inflammation had remained in the urinary tract. However, EE did help to harvest a few more samples with a moderate quality. Unfortunately, the buck in this study gradually suffered from an unknown illness and died 1 month after semen collection. As a result, the semen could not be repeatedly collected to provide us with the complete data.

TABLE 1
Semen characteristics of the urethrostomy goat on electroejaculation

Parameters	1 st ejaculate	2 nd ejaculate
Volume (ml)	0.9	0.65
Concentration (x10 ⁶ spermatozoa/ml)	1,450	660
Total sperms (spermatozoa x10 ⁶ cells)	1,305	429
Motility (%)	20	5
Viability (%)	43	38
Morphology (%)		
Normal	54	62
Abnormal head	39	28
Abnormal midpiece	0	2
Abnormal tail	7	8

CONCLUSION

EE offers an alternative approach to collect semen from an incapacitated urethrostomy goat.

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