

Comparative Study of Two Rumenotomy Techniques in Goats

A.M. Geehan, O.B. Amel and H. Shnain

Department of Clinical Studies, College of Veterinary Medicine and Animal Production
Sudan University of Science and Technology, Sudan

Abstract: A comparative study of rumenotomy techniques in goats was made; by using the ordinary technique lateral recumbence with a new technique using a modified surgical table for rumenotomy in goats. The comparison include the comfort of both surgeon and animal, haematological tests (total white cell count and differential white cell count) for both groups to reveal if there were post-operative / surgical complications or not, and followed by the exploration of the operation site to determine the degree of adhesions between tissues. Both of these techniques were quite safe for animal, mortality rate was 0%. The technique by using the new modified table has less possibility for post-operative complications, less tissue adhesions and in addition it was more positioning comfortable for both the surgeon and the animal.

Key words: Goats, foreign bodies, rumenotomy

INTRODUCTION

Goats are common in most parts of the world due to their unique ability to adapt to harsh climates^[1]. Estimates of goat's population in Sudan in 2002 indicated that there are 41.485.000 million head^[2,3], therefore, Sudan possesses a high potential of goat products and plays an important role in Sudan national economy.

Goats in many towns in Sudan are raised as a source of milk^[4], but are left freely in the streets to feed on garbage and other harmful materials such as nylon sacks. Accumulation of these foreign indigestible materials cause intermingling of these substances in the rumen and due to churning of the rumen leads to precipitation of some of the ruminal contents and salts to form a hard mass occupying a large space in

the rumen and consequently impairs digestion, increases intra-ruminal pressure specially in pregnant ones and causes emaciation, poor condition and reduction in milk production^[5]. Hayder^[6] reported that rumenotomy constitutes about 94% of surgical operation performed in goats in Khartoum state.

Goats are sensitive to pain and fear from restraining which may lead to shock and death; accordingly goats should be tranquilized and operation performed in lateral laying position unlike the standing position, which is the standard technique in bovine. Also the possibility of getting peritoneal contamination during rumen evacuation in goats exists^[7]. It was a necessity to design a proper surgical table for rumenotomy in Caprine to provide a

comfortable position nearly similar to that for the standing position. The aim of this research was to compare the old lateral recumbence positioning for rumenotomy with that on the newly constructed table for the same operation.

MATERIALS AND METHODS

Seven, 3-6 years Nubian-crosses goats of body weight ranged between 17 to 30 kg suffering from foreign bodies.

Housing and management: After the operations, the goats were maintained in cages located inside the Veterinary Teaching Hospital, College of Veterinary Medicine and Animal Production, Sudan University of Science and Technology.

Feeding regime: No restriction for feeding was made and the animals were fed with suitable amount of roughages and concentrate after the operations.

Table 1: Operation data and techniques

| Lateral recumbency positioning table | | Age | Sex | Body weight (kg) | Foreign body weight (kg) |
|--------------------------------------|--|------|--------|------------------|--------------------------|
| 1- | | 4yrs | female | 17kg | 1.5kg |
| 2- | | 3yrs | female | 20kg | 2.0kg |
| 3- | | 4yrs | female | 20kg | 2.5kg |
| New standing positioning table | | | | | |
| 1- | | 6yrs | female | 24.5kg | 4.5kg |
| 2- | | 5yrs | female | 30kg | 2.0kg |
| 3- | | 5yrs | female | 27.5kg | 2.0kg |
| 4- | | 4yrs | female | 24kg | 4.0kg |

Table 2: The effect of the operation techniques on the respiratory rates / minute

| Time | | | | |
|--------------------------------------|---------------|----------------------|----------------------|----------------------|
| Operation techniques | Pre-operation | 24hrs post-operation | 48hrs post-operation | 72hrs post-operation |
| Lateral recumbency positioning table | 28.0±8.2 | 27.0±9.8 | 48.0±2.6 | 41.0±6.1 |
| New standing positioning table | 26.5±6.6 | 30.5±6.6 | 25.0±6.2 | 27.0±9.4 |
| Significance | NS | NS | ** | * |

NS = not significant; ** = significant at (p<0.01); * = significant at (p<0.05)

Table 3: The effect of the operation techniques on the pulse rates /minute

| Time | | | | |
|--------------------------------------|---------------|----------------------|----------------------|-----------------------|
| Operation techniques | Pre-operation | 24hrs post-operation | 48hrs post-operation | 72hrs post -operation |
| Lateral recumbency positioning table | 75.7±16.3 | 76.0±5.6 | 85.0±25.6 | 85.5±8.0 |
| New standing Positioning table | 83.3±17.3 | 78.5±10.0 | 88.8±6.7 | 82.0±7.2 |
| Significance | NS | NS | NS | NS |

NS= not significant

Table 4: The effect of the operation techniques rectal temperature degrees (C)

| Time | | | | |
|--------------------------------------|---------------|----------------------|----------------------|----------------------|
| Operation techniques | Pre-operation | 24hrs post-operation | 48hrs post-operation | 72hrs post-operation |
| Lateral recumbency positioning table | 39.2±0.5 | 38.9±0.8 | 39.5±1.2 | 39.5±0.9 |
| New standing positioning table | 38.9±0.2 | 39.2±0.5 | 38.8±0.6 | 38.9±0.5 |
| Significance | NS | NS | NS | NS |

NS= not significant

Table 5: The effect of the operation techniques on White Blood Cells (WBCs)

| Time | | | | |
|--------------------------------------|---------------|----------------------|----------------------|----------------------|
| Operation techniques | Pre-operation | 24hrs post-operation | 48hrs post-operation | 72hrs post-operation |
| Lateral recumbency positioning table | 8.1±2.3 | 16.5±9.0 | 15.7±3.5 | 13.3±2.7 |
| New standing positioning table | 9.4±2.7 | 15.3±2.9 | 11.6±0.7 | 13.1±6.5 |
| Significance | NS | NS | NS | NS |

NS= not significant

Table 6: The effect of the operation techniques on differential white blood cells WBCs %

A\ Lymphocytes:

| Time | | | |
|--------------------------------|----------------------|----------------------|----------------------|
| Operation techniques | 24hrs post-operation | 48hrs post-operation | 72hrs post-operation |
| Lateral recumbency positioning | 39.5±29.0 | 41.5±20.5 | 25.5±0.7 |
| New standing positioning table | 53.5±2.1 | 50.5±16.3 | 24.0±5.7 |
| Significance | NS | NS | NS |

NS= not significant

B\ Neutrophils

| Time | | | |
|--------------------------------------|----------------------|----------------------|-----------------------|
| Operation techniques | 24hrs post-operation | 48hrs post-operation | 72hrs post -operation |
| Lateral recumbency positioning table | 51.5±24.7 | 45.0±17.0 | 64.0±8.5 |
| New standing positioning table | 34.0±1.4 | 37.0±21.2 | 66.0±8.5 |
| Significance | NS | NS | NS |

NS= not significant

C\ Monocytes

| Time | | | |
|--------------------------------------|----------------------|----------------------|----------------------|
| Operation techniques | 24hrs post-operation | 48hrs post-operation | 72hrs post-operative |
| Lateral recumbency positioning table | 5.0±0.0 | 7.0±5.7 | 6.0±2.8 |
| New standing positioning table | 10.5±2.1 | 8.5±0.7 | 8.0±1.4 |
| Significance | NS | NS | NS |

NS= not significant

D\Esinophils

| Time | | | |
|--------------------------------------|----------------------|----------------------|-----------------------|
| Operation technique | 24hrs post-operation | 48hrs post-operation | 72hrs post -operation |
| Lateral recumbency positioning table | 4.0±4.2 | 5.5±0.7 | 4.5±4.9 |
| New standing positioning table | 2.0±1.4 | 4.0±4.2 | 2.0±1.4 |
| Significance | NS | NS | NS |

NS= not significant

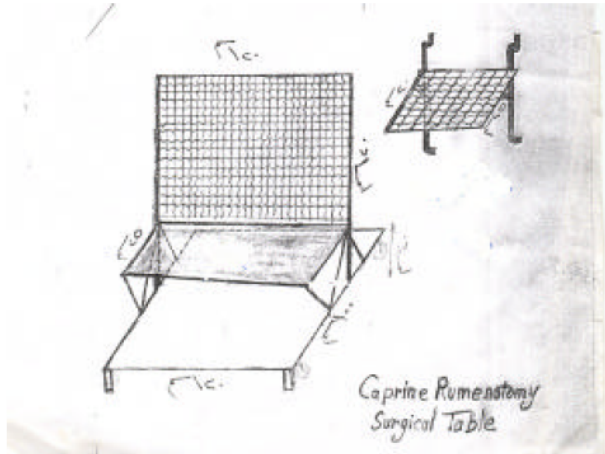


Fig. 1a: Diagram of the new rumenotomy table for goats



Animal was positioned on the table



Fig. 1b: The new rumenotomy table for goats



Table in perpendicular position

Caprine Rumenotomy Surgical Table: The table was designed by Professor Shnain (Fig 1a, b) and constructed in Khartoum North Industrial Area.

Using lateral recumbency positioning: Three goats (Nubian crosses), 3-6 years of age were operated on the usual surgical table at the lateral recumbency position.

Using new Caprine table for rumenotomy: Four Nubian-crosses goats, between 3-6 years of age were operated on the Caprine rumenotomy surgical table.

Post-operative care: The clinical parameters such as temperature, pulse rate, and respiratory rate were recorded before and after operation for four days. No systemic antibiotic was given to goats using new table while given



Protective gauze

for the lateral recumbency positioning. The stitches were removed within 10-14 days.

Statistical analysis: Statistical analysis was made by using the Student's T test according to Gomez and Gomez^[8].

RESULTS

The operation data and techniques are presented in (Table 1) showing the number of the cases which were operated by both techniques (7 animals, 3 goat operated by lateral recumbency positioning, 4 goats by new standing table). The foreign body weights were between 1 and 4.5 0kg.

Table 2 shows that the respiratory rate of goats which were operated by lateral recumbency positioning technique was significantly ($p < 0.05$) higher at 48 and 72 hours than those on the new table technique. The pulse rates and the rectal temperature of goats which were operated by both techniques showed insignificant differences Table 3 and Table 4.

Table 5 shows the white blood cells (WBCs) count. WBCs tended to be higher 24 and 48 h post-operation for the goats operated by the lateral laying positioning technique compared to those operated by the new standing table technique.

The exploration of the operation site to determine the degree of adhesions between tissues revealed that by using the new modified table; less possibility for tissue adhesions. Both of these techniques were quite safe for animal, mortality rate was 0%.

DISCUSSION

Rumenotomy in ruminants is performed through a left flank laparotomy and in standing position in cattle. Different rumenotomy techniques; skin suture fixation, Weingrath's ring, stay suture, and skin clamp fixation were compared in cattle^[9]. The authors' results indicated that skin suture fixation was superior to Weingrath's ring and the stay suture techniques. Skin clamp fixation was comparable with the skin suturing and required a shorter operative time. Rumenotomy using the stay suture techniques was followed by post operative inflammatory complication, as indicated by significant increases in mean body temperature and total white blood cell counts on the fourth day. Therefore, rumenotomy using the skin clamp fixation technique could be considered as an alternative to the more commonly used skin suture fixation technique.

In Khartoum Veterinary Clinics, foreign bodies in goats are treated by left flank laparotomy^[6]. In most cases, the goat can be restrained in lateral recumbency, on a padded operating table with the legs, thorax and head secured by ropes. Postoperative therapy usually includes tetanus prophylaxis, if sepsis and/or prolonged surgical duration are problems, then procaine penicillin is administered systemically^[6].

Standing positioning table the new technique was found superior to lateral recumbency positioning table that it required shorter operative time. This similar to skin clamp fixation method used in cattle^[9].

The use of postoperative antibiotic in old recumbency technique was to prevent/avoid post surgical complications. These post surgical complications were found to be due to poor health status of goats, broken asepsis during surgery, wrong use of instrument, poor surgical technique and dirty pens in which they were kept after surgery^[6,10].

It was found that rumenotomy in Angus steers, receiving antibiotic therapy had significantly greater postoperative feed intake, lower rectal temperatures and few abscesses at the surgical site than those receiving no antibiotics.

The increase in the white blood cells 24 and 48 h post-operation for the goats operated by lateral recumbency positioning might be due to the increase in the neutrophils percentages. This is similar to the results revealed by^[11] that after exploratory laparotomy in Iranian cross-bred male goats, the number of white blood cells and the percentage and absolute number of neutrophils and band neutrophils significantly increases within 24-96 hours post operation.

The significant higher respiratory rate of goats which were operated by lateral recumbency positioning technique may be due to the stress on recumbency table and the pressure of the ruminal fluids after standing. Rumenotomy using the lateral recumbency technique was followed by postoperative inflammatory complications, as indicated by significant increases in total white blood cell count.

We conclude that rumenotomy using the standing positioning table and technique was found to be comfortable towards the surgeon and the animal, easy to use, and it has no post surgical complications.

REFERENCES

1. Haenlein, G.F.W., 1992. All about goats. University of Delaware, Newark, A-2, USA.

2. Federal Ministry of Animal Resources and Fisheries 2003. Administration of Planning and Economics, Khartoum, Sudan.
3. Abu Azaim, M.M., 2003. The Animal Wealth and Animal Production in the Sudan. 2nd Ed. (in Arabic) U of K pp: 73- 90.
4. Food and Agriculture Organization, FAO. 1999. Production Year Book, volume 52, Rome, Italy.
5. Misk, N.A., M.A. Semieka and S. Ali, M. El, 2001. Varieties and Sequellae of Ingested Foreign Bodies in Buffaloes and Cattle. Assiut. Vet. Med. J., pp: 46-91.
6. Hayder, M.A.I., 2003. Survey Study of Foreign Body in Caprine Rumen in Khartoum State. M V Sc, Thesis. Sudan University of Science and Technology
7. Wallace, C.A., 1982. Technique for Performing Caesarean Section in Goats, Vet. Met/S A Clin., pp: 791.
8. Gomez, K.A and A.A. Gomez, 1984. Statistical Procedures for Agricultural Research 2nd Edi. Wiley and Sons, Inc.
9. Dehghani, S.N. and A.M. Ghadedani, 1995. Bovine rumenotomy: Comparison of four surgical techniques. Can Vet J., 36: 693-697.
10. Sanni, B.D., E.O. Olainipekun, A.K. Sackey, S.T. Fadason and E.O. Gyang, 2000. Post surgical complications from students' large animal surgical exercise, Nigerian Veterian J., pp: 23-2.
11. Dehghani, S.N., S. Nazifi and M.R. Barzegar, 2000. Evaluation of cellular and biochemical parameters of blood and peritoneal fluid following exploratory laparotomy in the goat. J. Vet. Met. A Physiol. Pathol. Clin. Met., 47: 143.