

A Case Report on Tube Cystostomy of a Goat for Management of Obstructive Urolithiasis



A clinical report submitted in partial satisfaction of the requirement for the Degree of Doctor of Veterinary Medicine (DVM)

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Abstract

Tube cystostomy is considered a reliable surgical method for management of obstructive urolithiasis. The present case report describes a surgical approach for tube cystostomy of a goat. The case was recorded in the Upozilla Livestock office and Veterinary Hospital, Sirajganj Sadar, Sirajganj during internship placement. A 4-month-old Jamnapari male goat weighing 15 kg was brought into the hospital. There was painful micturition of the goat for 2 days due to obstruction in urinary tract. The decision of tube cystostomy surgery by the consent of the owner was taken due to its previous history, clinical sign of anuria, stranguria, increase bladder size etc. The operation was performed under sedation and local anesthesia with following the standard open surgical method. As a part of post-operative care systemic antibiotic, pain killer were administered. In addition, it was recommended that an antibiotic ointment containing povidone-iodine be used on the wound until complete healing. Following surgery, the owner was requested to keep the animal in clean, cool and to restrict the movement. No complications were noted and the goat had an uneventful recovery.

Keywords: Goat, Tube cystostomy, Urolithiasis.

Introduction

Urolithiasis is the term used to describe the concretion of urinary calculi or organic compounds, which can occur anywhere in the urinary system but most usually does so in ruminants at the distal end of the sigmoid flexure and subsequently obstructs urine flow (Radostitis *et al.*, 2000). Due to the anatomical structure of the urethral canal, male ruminants exhibit urolithiasis substantially more frequently than females(Kushwaha *et al.*, 2011). In contrast to the male, who has a long, narrow, and tortuous urethra, females have a short, wide, and straight urethra, making them more susceptible to urethral obstruction, particularly at the distal portion of the sigmoid flexure in cattle and the urethral process in sheep and goats. Early castration of male animals may be one of the causes because it results in hypoplasia of the urethra and reduces the bore size of the urethra. Obstructive urolithiasis is mostly caused by a narrowed urethral opening. Additionally, the development of calculi typically happens as a result of a confluence of dietary, physiological, geographic, seasonal, age, sex, and management factors (Pond *et al.*, 2005).

Medical therapy has been used to treat ruminant obstructive urolithiasis, but the outcome has been disappointing. Once the obstruction is fully formed, surgical intervention is used to treat obstructive urolithiasis. Calculi can be removed either directly or indirectly by avoiding the impediment(Ewoldt, 2008). The most popular form of treatment for obstructive urolithiasis in animals over the long term is surgical tube cystotomy, which may also be the best choice for animals used for breeding. The urine is diverted through a catheter that is inserted from the bladder and leaves through the abdominal wall. After one month of recovery, the success rate of this procedure has been reported to be 80% (Fazili, 2012). The simplicity of the procedure, the technique's high field applicability, the anesthesia's short duration, and the speed with which the entire urethral patency is achieved are its benefits.

The first description of tube cystostomy for urine diversion in ruminants was made in 1965 as a remedy for steers with burst bladders (Hasting, 1965). Since then, numerous animal species, particularly small ruminants, have adopted it as a therapy for obstructive urolithiasis. Perineal urethrotomy (PU) and urethrostomy techniques have a poor long-term outcome (Haven *et al.*, 1993; Van Weeren *et al.*, 1987) due to stricture formation at the urethrotomy/urethrostomy site, which results in repeat urethral obstruction. Tube cystostomy offers an alternative surgical

treatment. Due to the lack of urethral patency, urinary diversion methods like antepubic urethrostomy (PU) are inappropriate for animals used for breeding. According to (Stone *et al.*, 1997), bladder marsupialization has been linked to severe scalding issues with the urine, stoma stricture, and bladder prolapse through the location of the fistula. Nearly all domestic animals exhibit urolithiasis as a prevalent clinical illness, however bovine and caprine have greater incidences (Radostits *et al.*, 2007a). When calculi develop in the urinary tract, they might lodge anywhere along the tract. The prevalence of urethral blockage in ruminant species has been well documented (Smith *et al.*, 1989), and it is a prevalent issue in male sheep, goats, and cattle (Winter *et al.*, 1987). Among the bovine species, buffalo calves suffered more commonly (81.25%) than cow calves (9.82%), bullocks (8.92%), and goat calves (8.92%). The urinary bladder is where calculi are most commonly discovered, however they can also develop in the renal pelvis and urethra. The bladder calculi that become dislodged can become lodged in the preputial aperture, the sigmoid flexure, or the male urethra. Cystitis can also result in urinary blockage. Bangladesh has found an overall incidence of 20.8% in cattle and 44.4% in goats.

According to (Smith, 1989), mineralization of nidus or an abnormally high concentration of insoluble complexes in the urine are thought to be the causes of urinary calculi. However, the development of calculi in animals is influenced by a variety of variables. The precise cause of goat urolithiasis could not be determined based on the literature that was accessible. The treatment of urolithiasis is challenging. The animals are frequently shown in various circumstances and stages of obstructive urolithiasis. Due to the resulting uremia, animals with chronic blockage are always regarded as poor surgical risk patients.

The present study was therefore planned to develop certain surgical techniques for the management of the case of urinary obstruction/urolithiasis in goat by surgical tube cystostomy to determine efficacy and postsurgical complications.

Case description

A 4-month-old male jamnapari goat with 15 kg body weight was brought to Upozilla Livestock office and Veterinary Hospital, Sirajganj Sadar, Sirajganj. The clinical history was difficulty in urination, painful micturition for 2 days. Clinical sign was the bladder was full with urine but could not pass out from penis through obstruction, also previous history of same case of this goat. So tube cystostomy was the effective solution in that time. Other physical examination was carried out on that time, temperature was little high than normal it was 104°F other parameters like respiration, dehydration level by skin fold test, mucus membrane was normal. No blood test or ultrasonography was carried out.

Restraining and anesthesia

Both physical and chemical methods were used to restrain the goat. The goat was pre-medicated with diazepam @1.0 mg/kg body weight intravenously for sedation. After sedation of the animal the necessary trimming and shaving, the surgical site was cleaned and sterilized for the operation (Fig-1). Then anesthetic protocol consisted of intradermal infiltration of lidocaine@4 mg per kg body weight for local anesthesia of the operation area circularly. After 5-10 minute of administration the onset of action begins and its duration is 60-120 minutes. Fluid therapy was instituted with normal saline administered intravenously.

Surgical procedure

The patient was lying on his right side, recumbent. A 1 to 2 inch paramedian approach was made 2-4 cm laterally to the prepuce, halfway between the base of the scrotum and the preputial orifice, following clipping and aseptic preparation of the ventral abdomen. Active suction was used to slowly aspirate any free abdominal fluid. With the aid of the index finger, the bladder was located. A Foley's catheter, sized for the animal, was then inserted with the aid of a stylet, and the catheter balloon was filled with saline. The catheter was routed through a subcutaneous tunnel created anterior to the incision before being inserted into the bladder. Flushing either retrogradely or normally wasn't tried. If the bladder bursts, the abdomen was lavaged with warmed sterile saline that was aspirated using active suction. The rupture was then closed with two inverted layers of 0 or 2-0 catgut. Urine and debris were then evacuated from the bladder via the rupture. Any animal did not require a partial cystectomy. Before the 3-layer celiotomy closure, the abdomen was lavaged with warmed sterile saline and aspirated. After surgery, there was no attempt to occlude the open end of Foley's catheter outside the body. Because the catheter was too long in certain instances, an abdominal bandage was applied, and the catheter was slightly coiled to keep the end close to the abdominal wall.

Post operative care

Postoperatively the animal were kept on ceftriaxone (@ 20 mg/kg body weight IM for 7 days), meloxicam (@ 0.3 mg/kg body weight IM for 5 days) and ammonium chloride (@ 200 mg/kg body weight for 15 days). It was recommended that the patient apply a povidone-iodine-infused local antiseptic dressing in wound area until healing approximately for a week. The catheter was allowed to drain freely for 4 days (or until regular urine returned) then In order to measure the urethral patency, the catheter was clamped on every alternate day with an infusion set flow controlling clamp. The goat was brought back to our hospital to have the catheter removed if regular urine via the urethra can be resumed.

Figures



Fig-1: Preparation of Surgical Site and incision on it.



Fig-2: Foley's catheter inserted into the bladder.



Fig-3: Suturing and catheter secured in abdominal skin with stay suture and free flow of urine through catheter.



Fig-4: After healing time to expel out catheter as urine passes through penis.

Discussion

Due to loss of animal and treatment costs, obstructive urolithiasis causes economic loss to the farmer. Obstructive urolithiasis has an extremely high mortality rate, which is mostly brought on by bladder or urethral rupture. Because urolithiasis occurs more frequently in both winter and summer, seasonal fluctuation may be one of the root causes. This could be connected to how the animals' water balances change throughout the winter, when they drink less and generate more concentrated urine. In contrast, due to greater water loss from the body during the summer heat, urine may be more concentrated. In this study the patient come in the month May which is summer season in Bangladesh. A mineral intake imbalance in feed may contribute to the occurrence of urolithiasis. More grains and concentrated feeds were given to more animals as they grew and fattened. These diets have higher levels of phosphate and magnesium and lower levels of the conditions-prone calcium and potassium. In addition to feeding ammonium chloride, it was typically advised to stop or significantly reduce feeding grains, boost grazing, switch from green grass to grass hay at discharge, and increase grazing. According to (Rakestraw *et al.*, 1995) uroliths in ruminants typically lodge in the distal sigmoid flexure or the urethral process.

It might be considerably simpler to diagnose urethral blockage problems than it is to choose a treatment strategy. Surgical management and medicinal dissolution of calculi are available as treatments. In most circumstances, less severe illnesses may be treated medically. According to some reports, medical care merely offers short-term alleviation and is not long-term beneficial. Surgery is the sole solution in situations when the obstruction is more severe. The most effective treatment for obstructive urolithiasis in small ruminants used as breeding animals is surgical tube cystostomy. In successful circumstances, the very straightforward surgery restores complete urethral patency and only needs a short period of anesthesia.

When the urethral process is removed from small ruminants, urine flow can be restored; however, this is frequently only a temporary solution, and blockage usually returns (Haven *et al.*, 1993). After a tube cystostomy, the mean time it took for urine to return to normal was comparable to Rakestraw *et al.*'s (1995) 11.5-day estimate. The length of time until urination was discovered to be impacted by the catheter's infrequent clamping within seven days after implantation. Even with an open Foley's catheter in situ, some animals were still able to flow a regular stream of urine, most likely due to the catheter's location inside the bladder, as all catheters were patent and

dripping. There are a variety of reasons why urine can freely flow through the external urethral aperture. Anti-inflammatory medications, for example, relieve urethral spasm and inflammation. Calculolytic agents, such as ammonium chloride and sodium chloride mixed with water, decreased urine pH, and facilitated calculi dissolution. Bypassing urine through a Foley's catheter may result in smaller calculi. Frequent catheter occlusion with a clamp may result in urethral patency by clearing the urethra of all debris and calculus material. Catheter occlusion started early if normal urination occurred earlier than 7 days. Although it was not shown in this investigation, (Rakestraw *et al.*, 1995) hypothesized that early removal may lead to urine leaking from the bladder defect. Unexpectedly, there was no correlation between result and urine time, contrary to expectations that animals that urinated more slowly would perform worse. This implies that tube care should be continued in the hopes of urethral clearance at some point. The restoration of normal urine flow in goats with obstructive urolithiasis appears to be made possible by tube cystostomy without urethral flushing, according to the data.

Tube cystostomy complications include infection, urethral rupture, tube dislodgment, and blockage of the tube with blood or tissue debris. For obstructive urolithiasis, there are a variety of surgical options, each with unique benefits and drawbacks. The surgery known as a tube cystostomy offers alternatives to such procedures. Depending on where the calculi are lodged, perineal urethrotomy (PU) and urethrostomy have been utilized to relieve blockage on post scrotal or post ischial. (Ewoldt *et al.*, 2006) The creation of strictures, however, is a surgical complication that is linked to poor long-term results and recurring blockage. Another surgical alternative is bladder marsupialization; however the quality and length of postoperative life may be compromised by issues such urine scald, urinary tract infection, stricture, and bladder mucosa prolapse. Only partial obstruction—not total obstruction—requires the use of diuretics. The loop diuretic effect of frusemide causes an increase in urine output. Complete blockage increased the amount of urine produced due to the diuretic's effect, which may have caused the bladder to rupture. This could be one of the main causes of bladder rupture in ruminants in our instances. This provides comfort in cases of urinary bladder rupture for two days. After then, the animal may have acute uremia and uoperitonium, which may lead to severe anorexia, despair, and dehydration. For such burst instances, cystorrhaphy and tube cystostomy should be performed (Parrah, 2010).

In this case there was no post operative complication rather it become cure within 7 days as following aseptic surgery, proper medication, hygiene maintains, post operative care by the owner.

Some data collected from publications regarding surgical management(Tube cystostomy) of obstructive urolithiasis cases are given below:

Place	Time	Total cases	Recovered	Complications
Chattogram veterinary and animal sciences university, Chattogram, Bangladesh	January 2015- December 2016	84(61 goat, 23 calves)	80	04

These data are collected from Surgical Management of Obstructive Urolithiasis in Small Ruminants by Tube Cystostomy in Chittagong, Bangladesh (Sutradhar *et al.*, 2018)

Place	Total cases	Recovered	Complications
Division of Surgery and Radiology, Referral Veterinary Polyclinic, Indian Veterinary Research Institute, Izatnagar, India	58 (35 buffalo calves, 23 goats)	48	10

These data are from Tube cystostomy for management of obstructive urolithiasis in ruminants (Tamilman P *et al.*, 2014)

In this case report data are collected from Upozilla Livestock office and Veterinary Hospital, Sirajganj Sadar, Sirajganj.

Place	Time	Total cases	Recovered	Complications
Upozilla Livestock office and Veterinary Hospital, Sirajganj Sadar, Sirajganj.	16.04.2023- 25.05.2023	11 goats	09	02

Conclusion

Tube cystostomy surgery is introducing most frequently and successfully than previous. Implementation of this surgical operation increased due to its effectiveness and success rate. The management of obstructive urolithiasis in ruminants may be accomplished quickly, practically, in the field, and reliably using tube cystostomy, according to this findings. Owners may be urged to take preventative measures if surgical surgery is combined with medicinal care to give improved treatment choices for obstructive urolithiasis.

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Biography

The author is Md. Anamul Haque, son of Late S.M. Rustom Ali and Mst. Moriom Khatun. He is the dweller of Soyadhangara, Sirajganj. He completed S.S.C in 2014 from B.L. Govt. High School, Sirajganj and H.S.C in 2016 from Sirajganj Govt. College, Sirajganj. He got admitted to Chattogram Veterinary and Animal Sciences University for the degree of Doctor of Veterinary Medicine course in the 2017-2018 sessions. He is currently an intern student at the Faculty of Veterinary Medicine. He is very enthusiastic to be a researcher and is eager to be a skilled veterinarian in the future.