

Surgical management of obstructive urolithiasis in a male calf: A case study



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Table of content

Sl. No.	CONTENTS	PAGE NO.
1	Abstract	1
2	Chapter -I: Introduction	2
3	Chapter -II: Case history : Clinical observation : Restraining and anesthesia : Surgical procedure : Postoperative care	3
4	Chapter -III: Result	7
5	Chapter -IV: Discussion	8
6	Chapter-V: Conclusion	9
7	Limitation	9
8	References	10
9	Acknowledgment	12
10	Biography	13

List of Figures

Sl. No.	contents	Page No.
1	Observation and diagnosis of urolithiasis	5
2	Collect urine through needle puncture for confirming the diagnosis.	5
3	Shaving of the surgical site.	5
4	Aseptic preparation of the surgical site.	5
5	Incision of skin and muscle, insertion of the catheter in the urinary bladder and suturing of muscle.	5
6	Suturing of skin	6
7	Check urine outflow via back pressure and deposit urine in a water bag.	6
8	Complete healing of surgical site and cutting of the skin suture.	6
9	Animal was in complete recovery within 7 days.	6

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Abstract

Obstructive urolithiasis is considered a major health problem in livestock animals mainly in young males due to the anatomical conformation of their urinary tract. This study was conducted on a six-month-old calf that suffered urethral obstruction for 7 days. The animal owners call for doctors at upazilla veterinary hospital. After clinical history and physical examination, it was diagnosed as having urethral obstruction and considered for emergency surgery to avoid possible rupture of the urinary bladder. The most effective method for treating small ruminants with obstructive urolithiasis was tube cystostomy with a Foley catheter. Following surgery, broad-spectrum antibiotics, anti-inflammatories, and calculolytic medications like ammonium chloride were given to the patient. There was no found complication during surgery or postoperative time. The animal completely recovered within 7 days. For the treatment of urolithiasis in ruminants, tube cystostomy is an easy, affordable, and highly effective procedure in field conditions.

Keywords: Calf, Foley's catheter, Tube cystotomy, Urolithiasis

Chapter-I

Introduction

Urolithiasis is a disorder of the urinary tract in which protein-containing concretions of insoluble minerals and salts form around the nidus within the bladder or urethra (Belknap et al., 2002). Obstructive urolithiasis affects domestic animals globally and is a serious economic disease condition. It was identified to be the fifth most common reason for mortality in feedlots animals (Singh et al., 1981). Due to structural differences in their urinary systems, male calves suffer urolithiasis more commonly than female calves (Tamilmahan et al., 2014). In cattle, urethral blockage often develops at the sigmoid flexure. The disease is predisposed by diet, age, sex, breed, season, soil, water, hormone levels, minerals, infections etc. (Udall et al., 1996). Surgical manipulation is efficient in treating most cases (Larson and B.L., 1996). Different surgical procedures such as tube cystostomy (Williams and White, 1991) and urethrostomy (Stone et al., 1997), bladder marsupialization (May et al., 1998), penile catheterization, and penile amputation (Winter et al., 1987) could treat urolithiasis and are on record in the literature. Obstructive urolithiasis has an extremely high mortality rate in suffering animals because it causes the urethra or urinary bladder to rupture (Gasthuys et al., 1993). The current study documents a typical case of obstructive urolithiasis in cow calves and how it was surgically treated.

Chapter -II

Case History

On 01 March 2022, a marginal farmer at Bancharampur Upazila in Brahmanbaria complained with his six-month-old male calf stopped urination for up to 7 days. The animal became off-feed, not had rumination, the animal was depressed, Animal displayed discomfort and abdominal pain by straining, kicking at the stomach, twitching the penis, and repeatedly attempting to urinate.

Clinical observation

The animal had an arched-backed appearance, normal body temperature, and increased heart rate and respiration rate; the Urinary bladder was found distended per rectal examination. The animal showed abdominal distension and dehydration. A needle was inserted into the urinary bladder and aspirated urine to check urine deposition (Fig. 2). Finally, confirmed diagnosed to be obstructive urolithiasis and it was decided to perform a post-scrotal cystotomy.

Restraining and anesthesia

To keep the calf under control, both physical and chemical approaches were adopted. To restrict the movement of the animal during surgery legs were tied with rope. The animal was sedated with diazepam at 0.5 mg/kg (injection G -Diazepam®, Gonoshasthaya Pharmaceuticals Ltd.) and ketamine at 4 mg/kg (injection Ketalar®, popular Pharmaceuticals Ltd). Anesthesia was obtained by line infiltration of 2% lidocaine hydrochloride solution (Injection Jasocaine®, Jayson Pharmaceuticals Ltd. Bangladesh) at the surgical site.

Surgical procedure

The animal was placed in a right lateral recumbency position. The rudimentary teat region on the left side of the abdomen was shaved and cleaned with an antiseptic solution (Fig. 3 and fig 4). After aseptic preparation, a blunt incision about 7-8 cm long through skin and subcutis was made almost anterior to the rudimentary teat, and the bladder was found after the muscles and subcutaneous tissue was separated. A needle was punctured to confirm the urinary bladder, then Foley's catheter 12 sizes was inserted from the outside into the abdomen along with the needle with mild pressure and then connected directly to the bladder (Fig. 5). A syringe of normal saline and air was pushed from outside to inside the bladder through the catheter. Urine

came out from the bladder through the catheter by back pressure (Fig. 9). The Foley's catheter was sutured on the ventral abdomen to keep it in position. Muscles and subcutaneous tissue was sutured with a No. 2 size catgut in a continuous suture pattern. The skin was sutured with a horizontal mattress with silk No. 1(Fig.6)

Post-operative care

Postoperatively the animal owner was advised to give antibiotics ceftriaxone at 25mg/kg body weight (Inj.Eracef®-500mg popular pharmaceuticals Ltd) for 5 days two times per day. Analgesic, inj. Meloxicam 0.5mg/kg body weight (Ing. Melvet® ACME pharmaceuticals Ltd) for 3 days. Inj. Anti-allergic Diphenhydramine hydrochloride at 0.25 mg/kg body weight (Inj. Phenadryl® vet ACME pharmaceuticals Ltd) for 5 days. Application of local antiseptic and dressing with povidone ointment and the povidone-iodine solution respectively was recommended. Urine was allowed to drain freely through the catheter for 4 days or until start normal urination.



Fig.1 Observation and diagnosis of urolithiasis.



Fig. 2 Collect urine through needle puncture for confirming the



Fig. 3 shaving of the surgical site.



Fig. 4 Aseptic preparation of incision site



Fig. 5 Incision of skin, insertion of the catheter in the urinary bladder and suturing of muscle.



Fig. 6 suturing of skin

Fig. 7 Check urine outflow via back pressure and deposit urine in a water bag.



Fig. 8 Completed healing of surgical site and cutting skin suture.



Fig. 9 Animal was complete recovery within 7 days.

Chapter-III

Result

The operation was done smoothly because the animal recovered quickly from anesthesia and there were no difficulties. There was no more bleeding occurred. After recovering from anesthesia and providing a prescription giving treatment with systemic antibiotics for the next five days, the skin suture was removed 7 days later, and the calf was completely recovered.

Chapter-IV

Discussion

Urolithiasis is a ruminant disease that causes economic loss to farmers due to animal losses and treatment costs. The ruptured urethra or urinary bladder caused a high mortality rate (Kalim *et al.*, 2011). The affected calf age in this study was 5 months. This finding was in line with other studies (Khurma *et al.*, 2017).

Other authors observed similar results on urethral obstruction in bovine calves (Ggjoo *et al.*, 2013, Kushwaha *et al.*, 2014). Urolithiasis may be prevalent due to an imbalance in mineral intake in feed. The affected calf in this study also had a history of receiving more cereals and concentrated feedings. Many animals were fed more cereals and concentrated feeds while fattening/growing. These feeds contain higher levels of phosphorus and magnesium and lower levels of calcium and potassium, which are predisposed to this condition (Singh *et al.*, 2017). The diagnosis of urethral blockage situations is considerably easier; however, choosing treatment methods is much more challenging. Treatment options include medication to dissolve calculi and surgical treatment. In general, less severe cases can be treated with medication. According to some reports, medicinal treatment is not long-term success (Ewoldt *et al.*, 2006). In this study, tube cystostomy was found to be the most effective treatment for obstructive urolithiasis in small ruminants. It was carried out in a very simple and effective manner with minimal anesthesia time, leading to the restoration of full urethral patency. Similar findings were also described in the study of (Ewoldt *et al.*, 2008) and (Fortier *et al.*, 2004).

Chapter-V

Conclusion

According to these findings, tube cystostomy is a rapid, practicable, and field-applicable treatment option for calves suffering from obstructive urolithiasis.

Limitations

We were not able to perform the surgery under completely aseptic conditions. As this surgery was done in field conditions and emergency situations. A surgical draper and apron have been taken into consideration for this surgery. But we tried to maximize safety by using antiseptics and cleaning instruments.

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Finally, the author extended his appreciation to his parents, all patient owners, and all good wishes.

Biography

I am Md. Shaparan, son of Md. Ali-Akber and Hosnagar Begum. I passed the Secondary School Certificate examination in 2013 from Ruposdi B. B. High School, Brahmanbaria, followed by the Higher Secondary Certificate examination in 2015 from Dr. Roushan Alam College, Brahmanbaria. I am an intern veterinarian under the Faculty of Veterinary Medicine at Chattogram Veterinary and Animal Sciences University. In the future, I would like to work as a veterinary practitioner and research zoonotic diseases and public health significance in Bangladesh.