

## Case Report

# Surgical management of the urogenital problem in male cattle

Melkamu Birhanu Meharu\*

Wollega University, Ethiopia

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\***Corresponding author:** Melkamu Birhanu Meharu, Wollega University, Ethiopia, Tel: 251945371569; Email: melkamubrihanu45@gmail.com

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## Abstract

Obstructive urolithiasis is urine retention due to the calculi lodgment in the urinary tract. Thus, treatment of urolithiasis is basically to establish normal urinary passage, which can be accomplished in various ways depending on the severity of the condition. This case report describes surgical management of urolithiasis through penile amputation in a five-year-old local breed bull that was brought to the Veterinary Teaching Hospital of the Addis Ababa University, Bishoftu Ethiopia with a complaint of difficulty in passing urine that had developed certain days before presentations. Upon presentation, the animal was found to be dull and depressed, and tail wringing, stamping the feet, kicking at the abdomen, and stretching were observed. On clinical examination per rectal palpation, the urinary bladder was distended. Based on the history and rigorous clinical examination the case was tentatively diagnosed as obstructive urolithiasis. Then penile amputation was performed through a post-scrotal approach after aseptic preparation and controlling of the animal in the appropriate position. Fortunately, after surgery, the animal was urinated continuously and postoperative follow-up and complications were recorded. Finally, the bull was uneventfully recovered and the skin suture was removed on the 15<sup>th</sup> day of the operation.

## Introduction

Obstructive urolithiasis is urine retention due to the calculi lodgment in the urinary tract [1]. It is a metabolic disease of male ruminants. In these animals, the cause of obstructive urolithiasis may involve both anatomic and dietary factors. Anatomically, the distal part of the sigmoid flexure and vermiform appendage (urethral process) are areas of frequent urolith lodgements in large and small male ruminants respectively [2]. Because of narrowed urethral diameter, urethral calculi at these locations can result in partial or complete rupture of the urethra and bladder [3,4]. This is the reason why urolithiasis is more common in male cattle than in females [5]. On the other hand, it commonly occurs in young animals that are castrated earlier than sexual maturity, due to the hormonal effect which is required for the penis to reach full size [6].

Urolithiasis occurs when uroliths usually comprised of phosphate salts, accumulate in the urinary tract, and consequently, this blocks the passage of urine [7]. The most

prevalent uroliths observed in bovine urolithiasis were magnesium ammonium phosphate, calcium phosphate, calcium carbonate, calcium oxalate, hippuric acid, tyrosine, and uric acid [8]. These can be prevented by dietary mineral supplementation so that it maintains the calcium-phosphorus balance in the animal body [9]. Urolithiasis becomes a common problem and affects 5% - 15% of the population in the world and recurrence rates are close to 50% [10].

Urolithiasis can be easily diagnosed but the selection of treatment modality may be a challenging issue. Treatment of urolithiasis mainly depends on the types of obstruction. For instance, medical dissolution of urolith is possible in case of mild or partial obstructions and occasionally, it may give temporary relief [11]. However, complete urethral obstruction needs emergency surgical intervention [5,12]. Treatment of urolithiasis is basically to establish normal urinary passage, which can be accomplished in various ways depending on the severity of the condition. The use of muscle relaxants, amputation of the urethral process, urethrostomy, and tube cystotomy is among the techniques to establish a patent urinary

tract [13]. Alternatively, tube cystotomy can help in the passage of urine and consequently giving urinary acidifiers through it can dissolve the stone in the urethra [14]. However, surgical management of obstructive urolithiasis has been associated with postoperative complications such as; recurrence of urolithiasis, damage to the urethra, atonic bladder, and severe cystitis [15]. In a present case report, penile amputations using post scrotal approach were done.

## Case history and clinical examination

A five-year-old local breed intact bull was brought to VTH, of the Addis Ababa University Bishoftu Ethiopia with a history of difficulty in passing urine for the past six days (Figure 1A). Upon presentation, the animal was found to be dull, depressed, and tail wringing; stamping the feet, kicking at the abdomen, and stretching were observed. On clinical examinations, body parameters such as rectal temperature, heart, and respiratory rate were 38.9°C, 74 beats/minute, and 44 breaths/minute respectively with a little variation from the normal. Per-rectal examination revealed the presence of a distended urinary bladder. External digital palpation of the urethra was tried to locate the site of obstruction but failed to identify any urolith through it. Then rigid urinary catheter was passed to identify the site of obstruction. However, with continuous effort (Retropropulsion) to pass the catheter, it wasn't passing beyond a particular length indicating the presence of urethral obstruction. Hence the condition was tentatively diagnosed as urethral obstruction (rupture of the urethra) due to calculi lodgment and was decided to perform a penile amputation.

## Preoperative preparation

Before undergoing surgery, *cystocentesis* was performed by placing a wide catheter into the urinary bladder through a rectal approach to keep it empty so as that prevent rupture of the urinary bladder during the restraining of the animal for the next surgical procedure. Then the site proposed for surgery (the area between the scrotum and ischial arch) was washed with water and soap thoroughly after restraining the animals in the appropriate position. Thence the hair surrounding the surgical sites was aseptically prepared by clipping, shaving, scrubbing, and washing with water and chlorhexidine solution (salvon) (Figure 1B).

## Anesthesia and animal control

The caudal epidural anesthesia was administered with 2% lidocaine hydrochloride (2% lidocaine hydrochloride by jeil pharma. co.Ltd. Korea) at a dosage rate of 0.22 mg/kg using the 16G needle as indicated by [16,17]. Following this, additional anesthesia was achieved through local infiltration of 3 ml - 4 ml ml of 2% lignocaine hydrochloride subcutaneously and into deep muscles before giving a nick incision at the site after restraining the animals in lateral recumbency by rope-assisted personnel.

## Surgical procedure and treatment performed

After aseptic preparation and controlling of the animals in appropriate positions, a sterile surgical drape was fixed with

the four towel clamps on the surgical site. Then adequate vertical skin incisions using a sterile scalpel blade were made between the base of the scrotum and ischial arch to exteriorize the penis easily through post scrotal approach (Figure 1C). Then blunt dissection was performed on the penis to separate it from the surrounding tissues and pulled caudally and dorsally in a smooth manner. A large carmalt (straight forceps) was inserted between the penis and pelvis to help with the retraction of the penis during dissection. After careful dissection and ligation of the dorsal artery, the penis was pulled out from the perpetual cavity and examined for calculi lodgment at the site (Figure 1D) because the distal part of the sigmoid flexure is the most commonplace in bovine for calculi lodgment [2]. Then tourniquets were applied using sterile gauze at the base of the penis which was assumed to be amputated in both cases. Penile amputations were performed after retracting and measuring the penis adequately enough to anchor with the skin (Figure 1E). For identification of any obstruction in the urethra, the catheter was passed to the bladder from the site of amputation. Then the stump of the penis was anchored to the muscles below with vicryl 2.0 and the first and second muscle layers were closed with a simple continuous and interrupted suture pattern using vicryl 1.0 and 2.0 respectively. Lastly, the skin was closed with an interrupted suture pattern using silk 2.0 for both cases. The animals urinated continuously (Figure 1F). The urethra was slit for 2 inches in length and was anchored with



**Figure 1:** Urolithiasis and penile amputation in bull.

(A) Clinical presentation (B) Local infiltration of 2% lidocaine (C) Surgical site scrubbing (D) Incision in progress (E) Exteriorization of the penis through the incision (F) While cutting the penis distal to the tourniquet (G) Urination in progress (H) The bull presentation after a week of surgery.



skin by interrupted vicryl 2.0 sutures. A cut-part catheter was placed in the urethra and it was anchored to the skin.

### Postoperative complications and outcome

At the end of the procedures, the animal was administered penicillin (24 mg/kg) and dihydrostreptomycin sulfate (30 mg/kg) (Pen & Strep® Norbrook UK) I.M. for five consecutive days. In addition to that *Diclofenac sodium* was also administered at a dose rate of (2.5 mg/kg) I.M for two consecutive days. The suture lines were dressed with a weak iodine solution every day. Moreover, the owner was also advised to inspect any discomforts associated with urination and suture patterns and to provide well feeding. Finally, uneventfully recovered from the condition and the skin suture was removed on the 15<sup>th</sup> day of the operation.

### Discussion

Urolithiasis is the most common urogenital problem in male animals, because of various factors such as metabolic imbalance, nutritional status, infection, and environmental factors [18]. Nutritional status may include feeding of heavy concentrate with low roughage diets, water deprivation, dehydration, alkalinity of the urine, mineralized water, alkaline water supplies, and an excess amount of sodium bicarbonate in diet, vitamin imbalance, and high proteins ration are among the numerous factors which contribute in the development of urinary calculi in domestic animals [1]. It can be diagnosed based on history, clinical findings, ultrasound, and radiographic examinations [19].

Obstructive urolithiasis can be treated by both conservative and surgical means in all species of domestic animals [20]. However, the success of the treatment relay on the duration of the clinical course so early detection and management are very important [21]. Surgical treatment of obstructive urolithiasis is a primary choice [22]. Surgical manipulation of urolithiasis along with fluid, anti-inflammatory drugs, systemic antibiotics, and acidifying therapies will result in better outcomes. Selection of the surgical procedures and approaches may rely on the characteristics of the individual case, which include the site of obstruction and rupture and the value of the animal [3]. The most common complications associated with surgical treatments of obstructive urolithiasis are recurrent urolithiasis, calculi at multiple sites, badly damaged urethra, atonic bladder, or severe cystitis [15].

Kushwaha [23] evaluated surgical techniques like tube cystostomy, urethrotomy, and medical dissolution as the treatment for the correction of urolithiasis in buffalo calves and stated that tube cystostomy was found to be the most preferable technique. However, in this case, the bull was managed through penile amputation and it recovered uneventfully until the owner decided to prefer the slaughterhouse. Urolith formation with obstruction of the urethra is more common in steers, breeding and castrated rams, and goats [19]. This is not in agreement with this case, where obstructive urolithiasis was observed in the bull. Urolithiasis is not uncommon in cattle which results in secondary obstruction of the urinary tract. Thus, obstruction due to urolithiasis should be taken into consideration as an

emergency and must be managed immediately to prevent mortality associated with it [1]. Generally, surgical penile amputation in an aseptic manner followed by postoperative administration of antibiotics and anti-inflammatory drugs and continuous dressing of the wound was found to be effective because the owners have got the opportunity to fatten and sell their animals for the slaughterhouse.

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