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Bovine Urethral Obstruction and its treatment: A Review

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Abstract

Obstructive urolithiasis is the formation of calculi in the urinary tract with subsequent urinary blockage by uroliths. It appears in both sexes, but urinary blockage is a major problem in males. Urinary calculi formation usually results from a combination of physiologic, nutritional and management factors. It is mainly attributed to excessive or imbalanced intake of minerals. The clinical signs and physiological parameters of urolithiasis may vary with the degree of urethral obstruction, its duration, age, sex of the animals, status of urinary bladder and urethra. Obstruction of the urethra is characterized by anuria or dribbling, swishing of the tail, abdominal pain with kicking at the abdomen or stamping the feet and a progressively worsening condition. Non obstructive urolithiasis may be confused with pyelonephritis or cystitis and penile hematoma. Fatality rate of urolithiasis in male cattle due to rupture of the urethra or urinary bladder and the economic impact of this condition has been extensively reported in field and slaughterhouse studies. Obstructive urolithiasis in ruminants has been corrected with medical treatment but the result is not sufficiently successful. Treatment of obstructive urolithiasisis is definitely surgical. Recurrent urolithiasis, calculi at multiple sites, badly damaged urethra, atonic bladder or severe cystitis leads to failure of surgical repair in obstructive urolithiasis. The preventive measures focus on reduction of urinary concentration of calculogenic crystalloids; the diet can be adjusted to reduce urinary concentration of causative minerals.

Keywords: Bovine, *Calculi, Urethral catheterization, Urethral obstruction, Urolithiasis*

1. Introduction

Urethral obstruction is partial or complete blockage of the urethral lumen and it is a serious condition which often results in rupture of the bladder or extra-pelvic urethra in bovines and it occurs almost exclusively in the male ruminants compared to females due to their anatomical conformation of the urethral tract (Smith and Sherman, 1994). The urethra in male ruminants is a long tube extends from the bladder to the glans penis. It passes caudal on the floor of the pelvis, turns around the ischial arch, forming a sharp bend and passes cranial as a part of the penis, enclosed in the corpuscavernsum urethra. Just caudal to the scrotum the penis and penile urethra forms s-shaped curve, the sigmoid flexure. Its terminal part projects commonly about 3-4cm beyond the glans penis forming some twisted processes urethrae (Budras *et al*., 2011). The incidence among male calves is enormously as high as 12% (Makhdoomi and Sheikh, 2008).

Calculi formation usually results from a combination of physiologic, nutritional and management factors. It is mainly attributed to excessive or imbalanced intake of minerals.A calcium-phosphorus imbalance results in high urinary phosphate excretion which is an important factor in the formation of phosphate calculi (Hesse *et al.*, 2009).

Urethral obstruction is characterized clinically by complete retention of urine, frequent -unsuccessful attempts to urinate and distension of the bladder.

Urolithiasis is common as a subclinical disorder among bovines raised in management systems where the ration is composed primarily of grain or where animals graze certain types of pasture. In these situations, 40-60 % of animals may form calculi in their Urinary tract. Urolithiasis becomes an important clinical disease of castrated male bovine when calculi cause urinary tract obstruction, usually obstruction of the urethra (Radostits *et al*., 2007).

Early castration of male animals might be the one of the reason because it causes hypoplasia of urethra and leading to reduction in bore size of urethra. The decreased urethral orifice is a major predisposing factor for obstructive urolithiasis (Smith and Sherman, 1994). Fatality rate of urolithiasis in male cattle due to rupture of the urethra or urinary bladder and the economic impact of this condition has been extensively reported in field and slaughterhouse studies developed in many countries (Radostits *et al*. 2000).

Obstructive urolithiasis in ruminants has been corrected with medical treatment but the result is unrewarding. Treatment of obstructive urolithiasisis definitely surgical, once the obstruction is complete. Removal of calculi may be by direct or indirectly by passing the obstruction (Ewoldt *et al*., 2008). Therefore, the objectives of this seminar paper are: to review the etiology, epidemiology and clinical manifestations of urethral obstruction in bovines and to discuss about bovine urethral obstruction, its treatment and prevention.

2. Bovine urethral obstruction

2.1. Anatomy of urogenital organs of a bull

The reproductive tract of the bull consists of the testicles, secondary sex organs, and three accessory sex glands. The secondary sex organs are the epididymis, vas deferens and penis. The three accessory sex glands include the seminal vesicles, prostate and bulbourethral gland (Cowper's gland). Urethra in the male serves as a common pass way for semen from the reproductive tract and urine from the urinary tract. Sigmoid flexure is an anatomical structure that provides a means by which the penis is held inside the sheath except during time of service. Strong retractor muscles hold the penis in the "S" shaped configuration (Jake, 1993).

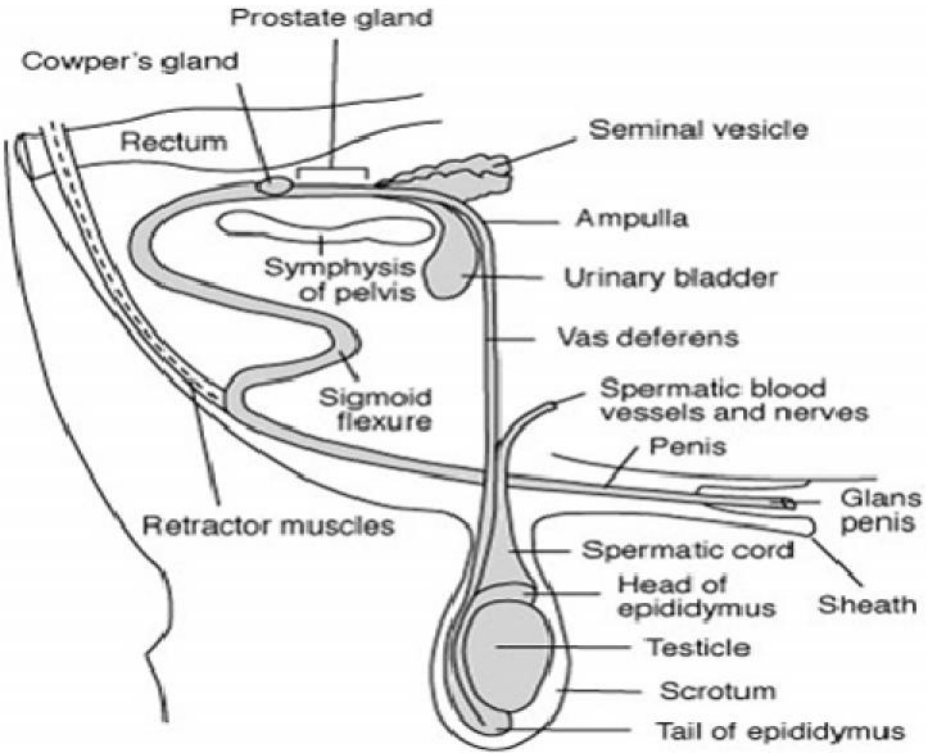

Figure 1: Urogenital organs of a bull.
Sourse: Jake (1993)

2.2. Location of calculi

The calculi may be lodged in any part of the urinary tract starting from renal pelvis to glans penis. However, the lodgment of the urolith in the bladder neck and urethra may lead to complete obstruction to urine flow thereby enhancing the acuteness and severity of the condition. The length of urethra, presence of sigmoid flexure and urethral process make the urethra more prone to the lodgment of calculi as compared to other parts of the urinary tract in the ruminants. Bovine urinary calculi are irregular size, diameter and mostly found at the insertion of retractor penis muscle in the distal sigmoid flexure. The diameter of urethral lumen at the sites of distal sigmoid flexure and urethral process are the narrowest, thus calculi can be easily trapped at these sites (Tiruneh, 2000).

2.3. Etiology

The etiology is complex and multifactorial. Although urolithiasis is known to have numerous predisposing factors but the exact mechanism of stone formation and growth is not yet fully known (Radostitis *et al*., 2005). The two most common causes of urethral obstruction are uroliths and external trauma (Roman, 2000). Urinary calculi formation usually results from combination of various physiological, nutritional and managemental factors. It may occur due to excessive or imbalanced intake of minerals in feedlots while fattening cattle receive rations high in cereal grain and oil meals (Hesse, *et al*., 2009). These feedstuffs have high levels of phosphorous and magnesium but relatively low level of calcium and potassium which predisposes to disease condition (Radostits *et al*., 2007). A calcium phosphorous imbalance results in high urinary phosphate excretion which is an important factor in the formation of phosphate calculi (Unmack, 2011).

External trauma is stated to be the other cause of urethral obstruction that occurs due to faulty burddizo castration, maltreatment by animal attendants and trauma of unknown causes through traumatization of the penis (Roman, 2000).

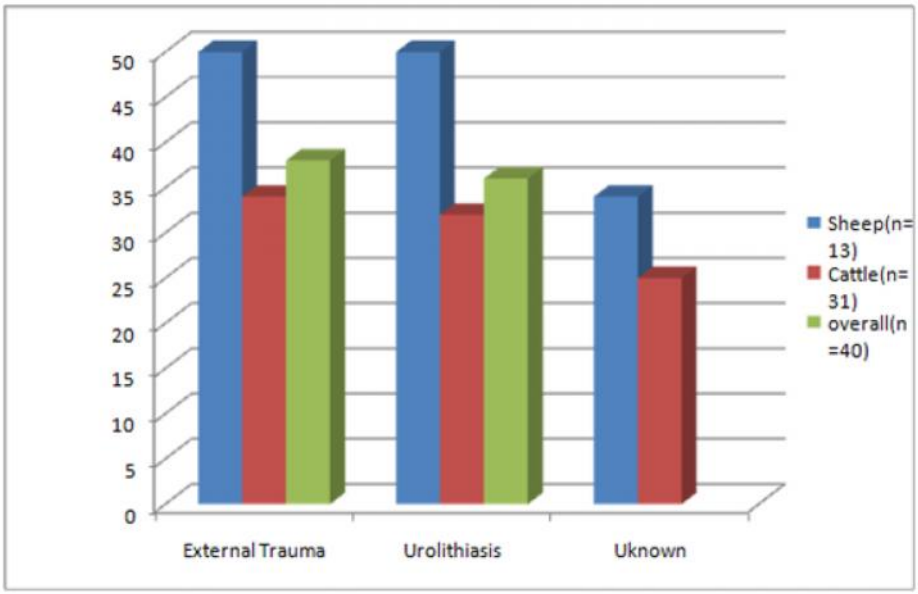

Figure 2: Descriptions of urethral obstruction causes in Debre Zeit area.
Source: Roman (2000)

2.3. Epidemiology

The distributions of urethral obstruction caused by uroliths vary based on range of geographic area and temperature. These ranges are associated with the presence of pasture plants containing large quantities of oxalate, estrogens, or silica. When cattle graze pasture containing plants with high levels of silica, uroliths occur in animals of all ages and sexes. The prevalence of uroliths is about the samein cows, heifers and bulls grazing on the same pasture and they may even occur in newborn calves. Females and bulls usually pass the calculi and obstructive urolithiasis is primarily a problem in castrated male animals (Radostits *et al*., 2007).

2.3.1. Risk factors

Several risk factors contribute for the formation of uroliths in ruminants; among these, concentrates play a significant role which is reported to be associated with uroliths formation in ruminants (Jones *et al*., 2009). The size of individual calculi and the amount of calculus material are both important in the development of urethral obstruction in bovines (Matthews, 2009). Once calculi form, the most important factor contributing to the occurrence of obstruction is the diameter of the urethra. Steers (castrated cattle) are most commonly affected because of the relatively small diameter of the urethra in these animals. Castration has a significant impact on the diameter of the urethra in steers. Bulls can usually pass calculi that are 44% larger than those that could be passed by an early castrated steers (Jones *et al.,* 2009).

Struvite (magnesium phosphate) and apatite (calcium phosphate) uroliths are commonly seen in animals fed high-grain diets, whereas animals consuming legumes are predisposed to calcium carbonate uroliths (Hay, 1991). Silicate stones are observed in animals grazing silicaceous plants and soils. Calcium oxalate stones may be associated with oxalate containing plants.

A significant factor in the availability of urolith components and their binding ability is urine Ph (Van-Metre and Diver, 2002). Struvite, apatite, and calcium carbonate uroliths are known to precipitate in alkaline urine with aph of 8–10, Struvite crystallization occurs only at a ph range of 7.2 to 8.4 whereas apatite stones develop at a urine pH of 6.5 to 7.5. Urine pH may have little or no effect on silicate or calcium oxalate uroliths (Pugh, 2002).

2.3.2. Occurrence

The incidence of bovine urolithiasis has decreased worldwide in recent years because of improvement in the management of cattle. Although the occurrence of obstructive urolithiasis is usually sporadic, outbreaks affecting a large number of animals have been recorded (Smith, 2002). Repeated attacks of obstructive urolithiasis are common in steers and at necropsy up to 200 calculi may be found in various parts of the tract of one animal. However, a single calculus causes obstruction in cattle whereas multiple calculi are common in sheep (Radostits *et al*., 2007). In Ethiopia, 34% of major surgical cases of urethral obstruction in cattle and sheep were mentioned due to urolithiasis (Roman, 2000).

2.4. Pathophysiology

The process of calculi formation and development of urolithiasis is complex and occurs in a series of phases which starts from the formation of nidus, then the concentration of urine and lastly the precipitation of various salts from urine (Vengai *et al.,* 2010). Continued obstruction leads to perforation of the penile urethra and rupture of the urinary bladder. Complete blockage of the urinary flow from a kidney decreases glomerular filtration rate. If it persists for more than 48 hours, may cause irreversible renal damage. Until perforation or rupture, the animal may not show signs of discomfort any more (Buchholz *et al*., 2010).

Rupture of the urinary bladder secondary to complete urethral obstruction by uroliths with leakage of urine into the abdominal cavity causes gradual accumulation of fluid from uroperitoneum resulting in a severely distended abdomen. Osmotic pressure from hypertonic urine together with acute fibrinous peritonitis promotes rapid movement of large amounts of extracellular water into the peritoneal cavity resulting in abdominal distension and dehydration. Chemical peritonitis associated with uroperitoneum and cardiovascular disturbances caused by the abnormally high thoracic pressure induced by the abrupt release of large quantities of urine to the abdomen could also have contributed to some extent to the death of the animals (Radostits *et al*., 2000).

2.5. Clinical Signs

The clinical manifestations vary depending on the duration and site of obstruction (Jake, *et al*., 2009).Obstruction of the urethra causes a characteristic syndrome of abdominal pain manifested by kicking at the belly, repeatedly lying down and rising, rolling, falling and moaning, swishing of the tail, twisting of the penis, strenuous efforts to urinate, treading with rear limbs (Singh, 2005).

A heavy precipitation of crystals is often visible on the preputial hair or on the inside of the thigh. Animals with chronic partial urethral obstruction are termed as“dribblers” because of their characteristic slow or intermittent urine flow during voiding (Radostits *et al*., 2000). In case of urethral rupture urine escapes into the tissues surrounding penisand edematous type of swelling occurs on abdominal floor (Singh, 2005).

Generally, Animals with complete urethral obstruction exhibit tenesmus, tail twitching, weight shifting, and signs consistent with colic. In appetence, bloat, depression, and rectal prolapse may also be seen in ruptured urinary bladder form. Affected steers may elevate the tail and show urethral pulsations just ventral to the rectum (Cynthia *et al*., 2005).

2.6. Clinical Pathology

Laboratory examination is useful in the diagnosis of the disease in its early stages when the calculi are present in the kidney, urethra or bladder. The urine usually contains erythrocytes or higher PCV and epithelial cells than normal number of crystals. Sometimes accompanied by larger aggregations are described as sand or sabulous deposit. Bacteria may also be present if secondary invasion of the traumatic cystitis and pyelonephritis has occurred. Blood urea will be increased before either urethral or bladder rupture occurs and increases even further afterwards (Radiosits *et al*., 2007). The most prominent and descriptive measure of uremia due to urolithiasis is blood urine nitrogen (BUN) that can be used as index of uremia (Radostitis *et al*., 2005).

2.7. Diagnostic Techniques

Obstructive urolithiasis is often difficult to detect until it is in a sever stage because the clinical signs can be quite variable depending upon duration, extent (partial or complete) and location of obstructing urolith. The condition is thus diagnosed by history of anuria coupled with other clinical manifestations like urine analysis abdominocentesis besides to clinical, physical and haematobiochemical examination (Loretti *et al*., 2003). Imaging techniques as plain and contrast radiography are usually used in evaluatin of the urinary tract lesions in small and large ruminants (Misk and Samika, 2003). Radiography is not consistently successful in diagnosis of urolithiasis in cattle. However, ultrasonography can be successfully used as a diagnostic aid together with radiography in diagnosis of cases of urine retention due to obstructive lesion (Magda, 2006). Urethral endoscopy has been found useful in evaluating urethral patency, examining urethral mucosa following relief of urethral obstruction to assess the long term prognosis for urethral strictures and helping in conducting laser lithotripsy for the management of urolithiasis by providing a route (Halland *et al*., 2002).

2.8. Necropsy Finding

Urethral rupture is characterized by the subcutaneous accumulation of urine in the inguinal area, prepuce and ventral abdomen. In bladder rupture, the abdominal cavity is filled with a large volume of straw colored, possibly blood tinged fluid (smith *et al*., 1996). Hydronephrosis and hydroureter and bladder wall hypertrophy are found in cases of chronic partial urethral obstruction. When urethra is opened along the sagittal plane gross and microscopic changes are seen after the rupture of bladder and urethra (Aldridge and Garry, 1996).

2.9. Differential Diagnosis

Differential diagnoses include pathological perineal, retro flexion and hernia of the urinary bladder, rupture of the urethra and pathological urethral diverticulum or dilatation (Weaver *et al*., 1992). The condition is usually associated with urethritis and or cystitis as a result of accumulation of urine in the swelling for a prolonged period (Parsons *et al*., 1998). Non obstructive urolithiasis may be confused with pyelonephritis or cystitis, penile hematoma, and differentiation may be possible only by rectal examination in the case of vesical calculi or by aspiration of swelling part. Subsequent development of hydronephritis may enable a diagnosis to be made in cattle (Radostits *et al*., 2007).

3. Types of treatments

Different methods can be applied as treatment modalities, both medical and surgical for the management of urolithiasis has been developed in almost all the species (Jake *et al*., 2009).

3.1. Medical Treatment

In early stages of the disease or in cases of incomplete obstruction, treatment with smooth muscle relaxants such as phenothiazine derivatives (Aminopromazine, 0.7 mg/kg of BWt) has been tried to relax the urethral muscle and permit passage of the obstructing calculus. In mild cases, the animals can be treated by using tranquilizers and antispasmodics (Gasthuys *et al*., 1993). Since there is hyperkalemia, hyponatremia and hypocalcaemia, therefore stabilization of metabolic derangements often involves administration of intravenous fluids for several hours, with repeated assessment of hydration, acid-base balance and serum electrolyte concentrations. Non-steroidal anti-inflammatory drugs (NSAIDs) like (filunixine-meglumine

1.1mg/kg, BWt.IV) associated with hydrotherapy for the first 5 days (Pawed *et al*., 1992).

In general, the following drugs are used: 1) pushing and dislodge the stone under gravity by the accumulated urine in the bladder. 2) Diuretics and fluid therapy can be used to help pushing of the stone, however, if the fluid therapy couldn't push the stone; rupture of the bladder or urethra will ensue. Once the animal is rehydrated, fluid therapy may be continued to encourage diuresis. 3) Parasympathomimitics: like neostigmine or a caprine were tried also and they will induce severe contraction of the bladder and this method either will push the stone or will use rupture of the bladder or urethra.4) Parasympatholytics: Atropine has been used by many veterinarians to prevent contraction of the bladder and the subsequent rupture, and the aim of its use is thepushing of the stone by the accumulated urine under gravity. 5) Tranquilizers or sedatives: Tranquilizers and sedatives likexylazine HCl are used to induce relaxation of the penis that may help pushing the stone from sigmoid flexure (Gasthuys *et al*., 1993).

3.2. Surgical Treatment

Treatment of obstructive urolithiasis is definitely surgical (House *et al.*, 1996). Preoperatively the dehydrated animals are given dextrose saline as per the dehydration status (Radostitis *et al.*, 2000). Surgical techniques used include penile transaction with urethral fistulation (Misk, 2003), cystic catheterization, pelvic urethrotomy (Ravi Kumar, 2003), percutaneous tube cystostomy and bladder marsupialization with various complications (Streeter *et al*., 2002). Recurrent urolithiasis calculi at multiple sites, badly damaged urethra, atonic bladder or severe cystitis are the common complications that may ensue in failure of surgical management of obstructive urolithiasis (May *et al*., 1998).

Surgical intervention described for ruptured urinary bladder cases by is ischial urethrotomy with placement of an indwelling catheter and draining of urinefrom the abdominal cavity by paracentesis (Jennings, 1984). On the other hand, Bohkre and others treated urinary bladder rupture cases by cystography and placement of an indwelling catheter through bladder into the urethra to drain urine from the ventral portion of the bladder. In both surgical interventions, the purpose of placing an indwelling catheter is to drain urine that accumulated in the ventral portion of the bladder as tears are common in the dorsal aspect, and this prevent further spillage into the abdominal cavity and allows the bladder to heal (Bhokre *et al*., 1985).

3.2.1. Urethrotomy

Urethrotomy is an operation which involves incision of the urethra, especially for relief of a stricture. Removal of uroliths by urethrotomy is the first line of treatment in many practices but should be the last resort as the complications of the urethrotomy are serious and most animals with urethral calculi have vesicle stones too. It is therefore preferable, to use retrograde hydropropulsion to return urethral calculi to the bladder and then to remove all calculi via a cystotomy or attempt dissolution in situ. The success is less than 9% for the first or subsequent urethrotomies. Most patients will be expected to experience failure with longer follow-up and the expected long-term success rate from any urethrotomy approach is 0% (Santucci and Eisenberg, 2010).

Urethral stricture formation is a common side effect of urethrotomy, but the simplicity of the procedure makes it popular in breeding animals where the penis must remain intact. The urethrotomy incision may be allowed to heal without suturing because suturing may increase the likelihood of stricture formation. Some surgeons, however, recommend suture closure of the urethrotomy as soon as possible to prevent stricture formation (Van- Metre, 2004).

Post scrotal urethrotomy procedure

Anesthesia: local infiltration on mid line behind scrotum for a distance of 5-6 inches. Post-scrotal urethrotomy is performed. The penis is exteriorized and checked for the presence of calculi behind the sigmoid flexure in the urethra. Making incision on the urethra and avoiding the calculi. Then catheter is passed towards the ischial urethra and one end of the catheter is taken out from the prepuce. Then the urethra is sutured with 3/0 cut gut in to layers by continuous pattern. The overlying subcutaneous tissue is apposed after sprinkling antibiotic powder and the skin is sutured with interrupted nylon. Then the catheter is anchored at the prepuce (Bhokre *et al*., 2011).

3.2.2. Urethrostomy

Urethrostomy by definition means creating an opening in the urethra. This opening may be made as a temporary measure or it may be permanent. It is usually done to provide a new opening, through which

the animal can urinate. Perineal urethrostomy is a surgical operation for the treatment of urethral obstruction; it consists of making a permanent opening in the urethra, the lining mucous membrane and the skin being joined by sutures (Jennifer *et al*., 2008). Urinary diversion techniques, such as anti-pubic urethrostomy and perineal urethrostomy, are unsuitable for breeding animals because of loss of urethral patency (Stone *et al*., 1997).

When permanent diversion of urine flow proximal to an obstructed, severely damaged, or diseased urethra is required, urethrostomy is performed. Urethrostomy is also performed to diminish the risk of urethral obstruction due to recurrent urinary calculi. Urethrostomy, either per-scrotal or per-ischial as the site of calculi lodgment is widely recommended and practiced to relieve the obstruction. This technique is used primarily to bypass the diverticulum and allow introduction of a catheter into the urinary bladder to provide urine egress. It is also utilized to divert urine from the distal urethra when attempting surgical repair of urethral fistulae in bulls. Its primary limitations involve stricture of the stoma and or recurrent obstruction with additional calculi (Wolfe, 1998).

3.2.3. Penile amputation

Amputation of penis involves creation of a permanent perineal urethrostomy from the proximal part of the transected penis. The distal penis is resected and it is a salvage operation (Misk, 2003). Amputation of the penis is indicated following urethral rupture in steers, bulls, rams and bucks. This can be performed if urine has leaked into the tissues of the abdomen through a rupture of the distal urethra. The penis is then transected at a point which will leave a stump of about 2.5 cm protruding from the incision. The dorsal artery of the penis (which will lie on the ventral aspect of the stump) should be identified and ligated. Blood will ooze from the corpus cavernosum penis but this should not lead to significant blood loss. The skin incision is then closed, leaving the stump of the penis protruding from the incision (Hindson, 2002). Because of urine contamination of per penile elastic tissue at the site of urethral rupture, these animals are allowed to continue for several weeks to become acceptable for slaughter. One potential complication with this procedure is stenosis of the urethral opening in the penile stump (Wolfe, 1998).

Surgical procedure:

Administer epidural anesthesia and prepare an area on the posterior midline from the perineum to the scrotum for aseptic surgery. Make a 12-cm skin incision on the midline. Deepen the incision through the subcutaneous tissue and the very dense connective tissue between the semi-membranous muscles to expose the paired retractor penis muscles. Continue the dissection deep between the retractor penis muscles to locate the penis. Grasp the penis firmly and apply traction caudally and dorsally to bluntly dissect the penis from the surrounding tissue. If there is advanced necrosis of the elastic tissue the penis will separate from the prepuce and the entire penis can be pulled caudally through the incision. Once the penis is exteriorized, ligate and transect the retractor penis muscles as far proximally as possible, and ligate the dorsal vessels of the penis proximal to the point of amputation. Using a scalpel transect the penis 5 cm distal to the dorsal apex of the skin incision and open the urethra with scissors proximal to the incision apex (Jening, 1984).

3.3. Post-Operative Complications

3.3.1. Catheter dislodgement and loss

In some patients the catheter may be lost after some days of the operation or it can be retrieved back in to the abdominal cavity trough subcutaneous tunnel. In some others the catheter can be dislodged. Sometimes the patient can be in difficulty due to either the catheter is out of the external urethral orifice or indwelling urethral catheter dislodges from the urinary bladder and its proximal end reaches ischial area of urethra (Braun *et al*., 2006).

3.3.2. Urine leakage from the urethrotomy sites

Leakage of urine from this site is observed in patients following initial partial and compete blockage of urethral catheter after some days of operation. This can be probably of due to kinking of the catheter as it cannot be cleared by flushing, makes the urine to flow around the outside of the catheter and also around the repaired urethrotomy site and leads to the leakage of urine (Van- Metre, 2004).

3.3.3. Requirement of second surgical intervention

This can be performed when there is complete dislodgement of tube cystotomy catheter, following corrective flushing refractory urethral catheter blockage (urethral kinking). The reason for choosing

second tube cystotomy procedure is to maintain the diversion of urine (Pearce*et al., 2003*).

3.3.4. Urethral rupture

Urethral rupture is characterized by subcutaneous accumulation of urine on ventral abdomen. The blockade of catheter can cause the accumulation of urine in urinary bladder and creates pressure over the lodged calculi. This pressure dislodges the calculi but sometimes cause the perforation in weak and necrosed urethra. Rupture of urethra has also been reported as one of the complications of tube cystostomy in small ruminants (Fortier *et al*., 2004).

3.3.5. Catheter blockade

The blockades relieve by flushing with normal saline except in urethral catheter. The blockade may occur by urinary sludge, blood clots, sandy material left in urinary bladder, and mucosal shreds. Blockade of Foley's catheter with blood has been recorded by (Rackstraw *et al.*, 1995). Failure to remove the blockade in the urethral catheter by flushing can be due to its kinking, as blockade and kinking of urethral catheter has also been reported by (Van- Metre, 2004).

3.4. Post-operative Cares

Unless the animal is destined for immediate slaughter, antibiotics should be administered. Other supportive measurement, such as intravenous fluids, diuretics, and general therapy for shock, may also be indicated. The animal should be sent to slaughter as soon as it is judged the carcass would be acceptable. Broad spectrum long acting antibiotics should be given at the time of surgery. The surgery site must be cleaned daily, delay wound closure and minimize the effects of urine (Hay, 1990).

4. Prevention and control

The aim of preventive measures should be reduction of urinary concentration of calculogenic crystalloids; the diet can be adjusted to reduce urinary concentration of causative minerals (smith *et al*., 1996). Mineral components of uroliths come primarily from the diet, making control of the mineral content of rations particularly important in prevention. In general, phosphorus should never comprise greater than 0.6% of the total ration, and the calcium/phosphorus ratio should be maintained at 2.5:1 or 2:1, achieved by the use of calcium salts (Hay, 1991).

Proper use of the instrument during castration and education of animal attendants about the danger of hitting a male animal in the perineal region are needed to prevent traumatic cause of urethral obstruction. Provision of clean water in multiple sites and intentional salting moistened grass hay, induction of diuresis and maintenance of dilute urine would help a long way keeping urolithiasis in check (Pathak *et al*., 2009). Mineral components of uroliths come primarily from the diet, making control of the mineral content of rations is particularly important in prevention. In general, phosphorus should never comprise greater than 0.6% of the total ration and the calcium/phosphorus ratio should be maintained at 2.5:1 or 2:1, which can be achieved by the use of calcium salts, if necessary (Van-Metre *et al*., 2002).

High phosphorus levels are present in grains, particularly sorghum, wheat, corn, milo, and oats (Gill *et al*., 2004). Phosphorus excretion into the urine may be decreased by the feeding of more roughage and the avoidance of pelleted rations, to encourage salivary excretion of phosphorus. Magnesium control is important even in prevention of uroliths, which do not contain magnesium in their primary structure. It is recommended that magnesium never comprise greater than 0.6% of the total ration and, because the magnesium in roughage diets is less available than that from concentrates, roughage-based diets are preferable (Hay, 1991).

5. Conclusions and recommendations

Urethral obstruction is partial or complete blockage of the urethral lumen. It occurs almost exclusively in the male and this causes economic loss due to urinous carcass condemnation. Obstructive urolithiasis occurs under specific managemental conditions like heavy concentrate feeding with inadequate supply of water. Urethral obstruction may occur at any site but it is most common at the sigmoid flexure in steers. Urethral obstruction mostly occurred due to uroliths and trauma and this becomes an important clinical disease of castrated male bovine. Mineralized water, deficiency of vitamin A and lack of water intake are the most risk factor for urethral obstruction occurrence. In early stages of the disease or in cases of incomplete obstruction, treatment with smooth muscle relaxants such as phenothiazine derivatives, tranquilizers and sedatives are used. If the urethral obstruction is complete, surgical treatment is necessary. These surgeries include: urethrostomy, urethrotomy and penile amputation. The disease can be prevented to a large

extent by modifying the prevailing managemental practices. The patient needs special care following operation.Based on the above conclusion; the following recommendations are forwarded: during ration formulation the ratio of calcium and phosphorus should be balanced; roper amount of water and salt should be supplied to the animals; trauma due to faulty burddizo castration and maltreatment should be avoided; earlier calf castration should be avoided and ntibiotics should be administered as post-operative care.

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