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Surgical management of urolithiasis in a crossbreed calf

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Abstract

A six-month-old cross bred male calf was presented to University Veterinary Hospital, Mannuthy with the history of distended abdomen and urinary obstruction.A diagnosis of urinary obstruction and subsequent uroperitoneum due to cystorrhexis was made from history, clinical signs, physical examination and ultrasonographic evaluation. Tube cystostomy was performed under general anaesthesia. Postoperatively the patient was maintained on antibiotics and other supportive medication. Normal voiding of urine was restored from 14thpostoperative day onwards.

Keywords: *Cattle, uroperitoneum, urolithiasis*

Urolithiasis denotes the presence of liths or stones in the urinary system and in animals this condition becomes life threatening when liths develops in the lower urinary system and obstruct the normal urine outflow. The development of urolithiasis in animals is multi-factorial and infact it occurs as a result of interplay between several factors like physiological, nutritional, genetic derangements and management factors. Although uroliths develop in both males and females, its progression into obstructive urolithasis is common in males due to their anatomical peculiarities (Yohannes and Tesfay, 2024). Understanding the aetiology, identifying the early clinical signs, diagnosing and relieving the obstruction to ensure normal urine outflow can help the farmers to provide a quality life to the affected animals (Amarpal *et al*., 2013).The present report documents the successful management ofobstructive urolithiasis, diagnosed based on the clinical signs, ulltrasonographic findings, haematological and serum biochemical evaluation.

A six-month-oldcross bred male calfweighing 54 kg was presented to University Veterinary Hospital, Mannuthy with the history of anorexia, distended abdomen and absence of urinationfor the past 10 days. On clinical examination, the animal was found dull with bilaterally distended abdomenand considerable respiratory discomfort(Fig.1). Physical examination revealed fluid thrill in the abdomen. Clear, watery, odourless fluid having pH 6.5 was aspirated through abdominocentesis.The creatinine content of aspirated fluid was estimated as 19.6 mg/dL while that of serum creatinine was 5.646 mg/dL. The ratio of the peritoneum to serum creatinine value was greater than two, which inturn was suggestive for uroperitoneum.On haematological examination,granulocytosisand erythrocytosiswere observed, which were probably due to the stress and haemoconcentration, respectively. On ultrasonographic examination, majority of the abdominal

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cavity was found to be filled with hypoechoic fluid with mild cellularity. Ultrasonographic examination of urinary bladder revealed disruption of the integrity of urinary bladder wall with urine spillage into the abdomen confirmed the condition to be cystorrhexis due to urinary obstruction.Based on the history, clinical symptoms, haematological evaluation and ultrasonographic examination, the condition was diagnosed as a case of cystorrhexis and uroperitoneum as a complication of obstructive urolithiasis.

The calf was stabilised with antibiotics and fluidson the day of presentation and some amount of fluid was tapped through abdominocentesis to relieve respiratory distress. Preoperatively Inj. Ceftriaxone was administered at a dose rate of 10 mg/kg bodyweight intravenously and Inj. meloxicam at a dose rate of 0.2 mg/kg bodyweight intramuscularly. Inverted L block was also done at the surgical site. The para rectal site was prepared aseptically. Animal was sedated with inj. butorphanol and inj. Diazepam,both at a dose rate of 0.1 mg/kg intravenously. A five-centimeterlong pararectal incision was made into the abdominal cavity. The urine present in the abdominal cavity was suctioned out to exteriorise the flaccid bladder from the abdomen. The rupture in the bladder was identifiedat the region ventral trigone (Fig.2). The defect in the bladder was extended and through this numerous round white calculi were removed (Fig.4). The defect on the bladder wall was sutured using catgut size 2-0 in Cushing's followed by Lembert's pattern. In-order to place the Foleys catheter, a small skin incision was made 5cm away from laparotomy wound to create a subcutaneous tunnel. A stab incision was made on the dorsal bladder wall, through which a three-way Foleys catheter was inserted and inflated the balloon. The catheter was secured in position by means of purse string sutures using catgut size 1-0.The laparotomy wound was closed with simple continuous suture pattern using polyglactin 910 size 1 and the skin was apposed using nylon in simple interrupted manner (Fig.3). Post operatively animal was treated with inj. ceftriaxone at a dose rate of 10 mg/kg bodyweight intravenously and Inj. meloxicam at a dose rate of 0.2 mg/kg bodyweight intramuscularly. Ammonium chloride was administered orally at the dose rate of 200mg/kg. The urolith retrieved was identified as calcium phosphate penta hydrate carbonate through Fourier transform infrared (FTIR)spectroscopic identification (Fig.5).Animal started voiding urine normally by fourteenth postoperative day. The pH of the urine voided and serum creatinine value reduced to 5.5 and 0.9 mg/dL respectively. Recurrence of the condition was noticed one month later, prompting the owner to cull the animal.

The overall incidenceof animals affected with urolithiasis in India is about 5.04% out of which, 32.87% occurrence is reported to be in cattle(Makdhoomi and Gazi, 2013). Amarpal *et al.* (2013) reported that among the

Fig.1. Animal with uroperitonuem

Fig.2. Ruptured urinary bladder

Fig.3. Animal after tube cystostomy

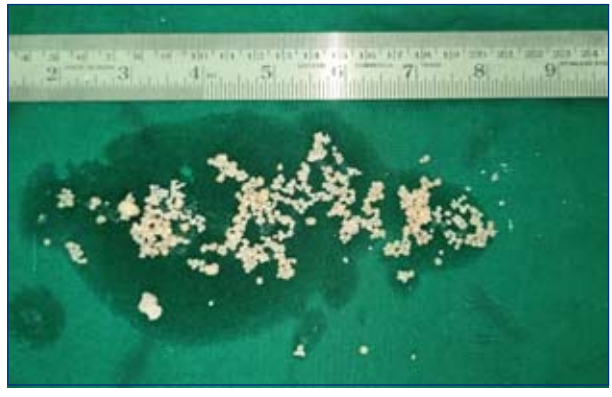

Fig.4. Uroliths removed from urinary bladder

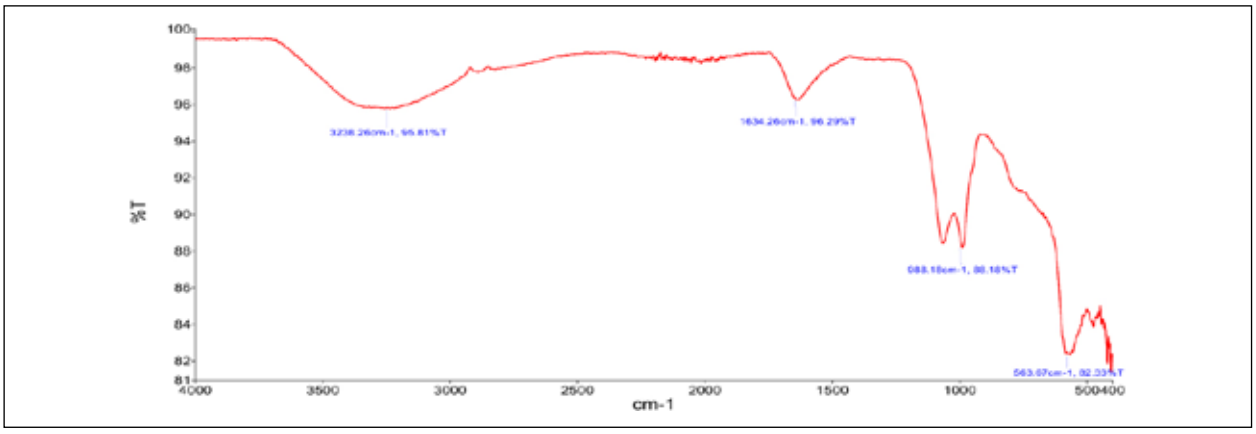

Fig.5. Infrared spectrum of bovine showing calcium phosphate Penta hydrate carbonate bands at 3238.26, 1634.26, 988.18, 563.67

cattle population affected with urolithiasis, majority of the animals were crossbreed cattle belonging to the age up to six months and they found that the cattle develop only partial obstruction due to the well-defined shape of calculi,in comparison with goat which have calculi in pasty form. According to Bhatt *et al.* (1973) the main cause of urolithiasis in adult cattle was attributed to narrowing of penile urethra due to early castration while that in young calves was poor management practices like feeding large amount of concentrate diet or rearing in soil containing large amount of phosphate. Urine alkalinity, imbalance in vitamins, high concentrate diet, low roughage diet, reduced water intake *etc*. were the main causes of urolithiasis in bovines(Hesse *et al*., 2009).The present case also highlights the importance of proper feeding management, as the animal was maintained on non-formulated concentrate feed instead of scientifically formulated feed which might have attributed to excessive or imbalanced intake of minerals (Yohannes and Tesfay, 2024) and that predisposed to the formation of uroliths. The pathophysiology according to Kushwaha *et al.* (2023) was the settling down of crystals formed due to supersaturation of the urine by magnesium, phosphorus and calcium salts, while,Radostits*et al.* (2000) opined that infective agents, transitional epithelial cells and foreign bodies will act as nidus for the formation of urinary stones. Stranguria or anuria, severe anorexia or inappetence and unwillingness to move were the typical symptoms of blockage when the bladder is intact. Bilateral ventral distension of the abdomen was frequently seen in situations of bladder rupture (Sutradhar *et al*., 2018). Urokinase, a plasminogen activator found in urine, tends to prevent the formation of peritoneal adhesions, but it can also encourage persistent leakage by impeding the formation of a fibrin barrier (Fubini, 2004). According to Makhdoomi andGazi (2013) diagnostic imaging techniques like radiography and ultrasonography played an important role in diagnosing urolithiasis. Sonography helped to find out the integrity of bladder wall and intraluminal defects. According to Rakestraw *et al.* (1995), struvite, calcium carbonate and calcium oxalate were the most common type of uroliths present in ruminants. Fourier transform infrared spectroscopy was used for finding out elemental content, microstructure and characteristics of the crystals (Bindhuand Thambi, 2012). Both the crystalline or amorphous nature of the crystals could be identified with a small amount of sample using FTIR (Sofia*et al.,* 2010). Treatment of urolithiasis involved theurethral process amputation in goats, tube cystostomy, intraperitoneal tube siphoning of urine, perineal urethrostomy, vesico-preputial anastomosis, bladder marsupialisation, modified proximal perineal urethrostomy (MPPU) andmodified proximal perineal urethrostomy (MPPU) using direct guided urethral catheterisation technique (Nair*et al.,* 2022). Obstructive urolithiasis could be effectively prevented by some management practices like reducing phosphate content of the diet, increasing the amount of roughages and reducing the grain content in the ration, providing *adlibitum* water, vitamin A supplements, avoiding early castration, maintaining the urine pH by providing sodium chloride and calcium chloride (Nair*et al.,* 2022).

Summary

Uroperitoneum is one of the most common sequelae that can be seen in patients with obstructive urolithiasis. A six months old male cross bred cattle presented with distended abdomen and anorexia, was diagnosed as uroperitoneum due to cystorrhexis following obstructive urolithiasis, based on the clinical signs, ulltrasonographic findings, haematological and serum biochemical evaluation. The condition was managed surgically by tube cystostomy and the animal had an uneventful recovery by 14th post operative day. Retrieved uroliths were identified as calcium phosphate penta hydrate carbonate through Fourier transform infrared (FTIR) spectroscopic identification.

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Conflict of interest

The authors declare that they have no conflict of interest.

References

Amarpal, K.P., Aithal, H.P., Pawde, A.M., Pratap, K. and Gugjoo, M.B. 2013. A retrospective study on the prevalence of obstructive urolithiasis in domestic animals during a period of 10 years. *Adv. Anim. Vet. Sci*. **1**: 88-92.

Bhatt, G.A., Ahmed, S.A. and Prasad, B. 1973. Studies on incidence and physiological chemistry of urinary calculi in bovines. *Indian Vet. J*. **70**: 459 - 464.

Bindhu, B. and Thambi, T.A. 2012. Formation and microanalysis of struvite urinary calculi. Int. *J. Eng. Res. Appl*. **2**: 1480-1485.

Fubini, S.L. 2004. Surgery of the urinary bladder and ureter. In: Fubini, S. L. and Ducharme, N.G, W.B. *Farm Animal Surgery*. Saunders, New York, pp. 422-427.

Hesse, A.T., Tiselius, H.G. and Siener, R. 2009. *Urinary Stones, Diagnosis, Treatment and Prevention of Recurrence*. (3rd Ed.). Karger Medical and Scientific Publishers, Switzerland, 232p.

Kushwaha, R.B., Dwivedi, D.K. and Sawhney, A. 2023. Obstructive urolithiasis and its surgical management in ruminants.In: *Compendium,Training Program on Clinical Diagnosis and Management of Common Systemic Diseases of Ruminants*, 23rd to 28th January, 2023, VCC, FVSc& AH, SKUAST-J and AHD-Jammu. pp. 28-32.

Makhdoomi, D.M. and Gazi, M.A. 2013. Obstructive urolithiasis in ruminants – A review. *Vet. World.* **6**: 233-238.

Nair, S. S., Jennes, D., Hansoge, A., Ramankutty, S., Sainulabdeen, A. and Martin, K. 2022. Caprine Obstructive Urolithiasis – A Review. *Int. J. Livest. Res.***12**: 1- 11.

Radostits, O.M., Blood, D.C., Gay, C.C. and Hinchcliff, K.W. 2000. *Veterinary Medicine: A textbook of the diseases of cattle, sheep, pigs, goats and horse*. (11th Ed.). Bailliere Tindall, London,1877p.

Rakestraw, P. C., Fubini, S. L., Gilbert, R. O. and Ward, J. O. 1995. Tube cystostomy for treatment of obstructive urolithiasis in small ruminants. *Vet Surg*. **24**: 498-505.

Sofia, P., Ionescu, I., Rodica, G. and Anisoara, P. 2010. The use of infrared spectroscopy in the investigation of urolithiasis. *Rev. Rom. Med. Lab*. **18**: 67-77.

Sutradhar, B. C., Dey, T., Yadav, S. K. and Bostami, M. B. 2018. Surgical management of obstructive urolithiasis in small ruminants by tube cystostomy in Chittagong, Bangladesh. *J. Agri. Sci. Tech*.**8**: 89-98.

Yohannes, G. and Tesfay, S. 2024. Review on Surgical Managements of Urolithiasis in Ruminants. *J. Surg*. **7**:1-9

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