Haryana Vet. (March, 2020) **59(SI),** 90-92

Short Communication

OBSTRUCTIVE UROLITHIASIS IN BUFFALO CALVES IN HARYANA: A REVIEW OF 143 CASES

SANDEEP SAHARAN, RIBU VARGHESE MATHEW[1]* and V.K. JAIN
Department of Veterinary Clinical Complex, [1]Department of Veterinary Surgery and Radiology,
College of Veterinary Sciences
Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar-125004, India

Received: 03.10.2018; Accepted: 14.01.2019

SUMMARY

The present study was conducted in Veterinary Clinical Complex, College of Veterinary Sciences, LUVAS over a period of 1 year from August 2017 to July 2018. The incidence, age, sex, duration, feeding and managemental practices and area wise occurrence of urolithiasis in buffalo calves of Haryana were analyzed during the study period. A total of 343 buffalo calves were brought to hospital during the study period put of which 143 cases were found to be suffering from obstructive urolithiasis forming 41.69% incidence among buffalo calves. Male intact calves were found to be more affected than females. Two to four months old calves had a higher incidence (57.3%) when compared to other age groups. Most cases of urolithiasis were presented during the winter months from November to February. All male calves and few female calves were treated surgically by tube cystotomy using Foley's catheter whereas remaining female calves were catheterized with infant feeding tube. Surgical treatment in conjugation with per oral feeding of ammonium chloride had favourable prognosis.

Keywords: Buffalo Calves, Cystotomy, Foley's Catheter, Urolithiasis

Urolithiasis is the formation of uroliths which may lodge anywhere in the urinary system but most frequently at the distal end of sigmoid flexure in ruminants leading to obstruction in urine flow (Radostits *et al.*, 2000). Obstructive urolithiasis is frequently encountered surgical condition in all species of animals but most commonly in cattle, buffalo and sheep (Mangotra *et al.*, 2017). The condition results in a series of abnormalities that arise from a failure of excretory process and accumulation of waste products in the body with fluid and electrolyte disturbances (Bayoumi and Attia, 2017). Both males and females are affected; however, urinary blockage is an important problem only in males because of the anatomical confirmation of their urinary tract (Larson, 1996).

Major predisposing factors leading to urolith formation include increased urinary salt concentration, decreased urinary protective colloids, urinary tract infection, hypovitaminosis A, hypervitaminosis D, decreased water intake, increased insensible water losses, sulphonamide precipitation in urine, changes in urine pH and early age castration (Gutierrez *et al.*, 2000). The calculi may be lodged in any part of the urinary tract starting from renal pelvis to glans penis but the lodgement 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 (Parrah, 2009). The present study was conducted to give an insight into the occurrence of obstructive urolithiasis on the basis of age, sex, season, managemental practices and influence of geographical factors on its incidence in different districts of Haryana.

The present study was conducted for a period of one year from August 2017 to July 2018 on buffalo calves brought to Veterinary Clinical Complex, LUVAS, Hisar suffering from retention of urine due to obstructive urolithiasis, The diagnosis of the condition was made based on history and clinical signs like anuria/dysuria, bilateral distended abdomen, unsuccessful attempts at urination, frequent lying and rising up, pulsation of urethra, pain on abdominal palpation, kicking at belly and fluid thrill on abdominal ballottement. A complete history regarding the age and sex of the animal, duration of illness, managemental practices, feeding habits of the animal and early signs of the disease were recorded. Clinical examination was performed to assess the degree of dehydration and the status of the urinary bladder and urethra. Physiological parameters were examined before the surgical intervention. All the cases were surgically treated by tube cystostomy using Foleys catheter in combination with urinary alkaliser Ammonium chloride @ 500mg per kg body weight orally for a period of 2-3 weeks.

During the period of August 2017 to July 2018, 343 buffalo calves were presented to surgery section of Veterinary Clinical Complex for treatment among which 143 cases were found to be suffering from obstructive urolithiasis. Thus, the hospital incidence of obstructive urolithiasis in buffalo calves accounted to about 41.69%. Most of the buffalo calves brought with the complaint of obstructive urolithiasis had ruptured urinary bladder characterised by bilaterally distended abdomen and signs of dehydration and few cases had urethral rupture characterised by oedematous swelling around the preputial area. All the cases irrespective of the status of urinary bladder and urethra were treated surgically by tube cystostomy. Large defects in the bladder were repaired using absorbable

*Corresponding author: drribusurgeryvet@gmail.com

suture material during intraoperative procedure.

Among the 143 cases presented for surgical treatment of obstructive urolithiasis, higher incidence was observed among males (121, 84.61%) in comparison to females (22, 5.38%). This is attributed to the anatomical conformation of the urinary tract which is long and tortuous in males (Gasthuys *et al.*, 1993) in comparison to females having shorter and wider urethra allowing the urolith to pass easily (Matthews, 1999).

Among the buffalo calves, a higher incidence was noticed in the age group of 2-4 months (82, 57.3%) followed by 0-2 months (44, 30.7%) (Table 1). Similar results were also observed by Kushwaha *et al.* (2009) who reported a higher incidence in age groups of 2-4 months. Fazili and Ansari (2007) have also reported an incidence of 89% in the age group of 2-6 months in bovines. Feeding of concentrates for rapid weight gain and change over from pre-ruminant to ruminant stage could be the predisposing cause for higher incidence (Kushwaha *et al.*, 2009). As the urethral diameter and strength of urethralis muscle are controlled by testosterone hormone which is lower in younger males, the younger males are unable to expel even the small calculi from the urethra leading to urethral obstruction (Radostits *et al.*, 2000).

Season also tends to have an influence on the occurrence of urolithiasis in bovine calves. A higher incidence was observed during winter period from November to February (63.93%) with maximum incidence in January. Previous studies by Kushwaha *et al.*, (2009) and Parrah (2009) also reported a higher incidence of obstructive urolithiasis during winter months. Reduced water consumption, lack of green fodder causing hypovitaminosis A and increased feeding of concentrates are considered to be the major contributors of urolithiasis during winter months. Vitamin A deficiency led to epithelial cell desquamation and establishment of nidus for urolith formation (Radostits *et al.*, 2000). Feeding of concentrates at frequent intervals during winter months induces the release of ADH hormone which causes a marked but transient decline in urine output and an increase in urine concentration (Bailey, 1981). In addition feeding of concentrates like wheat bran and rice bran which are rich in phosphorus caused an increased excretion of phosphates in urine which along with decreased urine pH and increased urine concentration and concurrent hypovitaminosis A trigger surolith particularly struvite crystal formation.

Table 1

Incidence of obstructive urolithiasis in different age groups

Age Group	Number of animals affected	Percentage (%)
0-2 months	44	30.7
2-4 months	82	57.3
4-6 months	8	5.59
6-8 months	5	3.49
8-10 months	2	1.39
10-12 months	0	0
1-1.5 years	2	1.39

The duration of obstruction for clinical presentation of buffalo calves varied from 1 day to 10 days with maximum number of cases presented within 1-2 days (63, 44.05%) followed by 3-4 days (57, 39.86%) (Table 2). The delayed presentation might be due to the initial treatment given by the local veterinarian under field conditions, lack of awareness about the condition and economic factors associated with transport and treatment cost. Rupture of urinary bladder provided relief to the animal and the animal became asymptomatic for 1-2 days (Monghan and Boy, 1990).

Most of the buffalo calves presented with obstructive urolithiasis had ruptured urinary bladder. Rupture of urinary bladder is more likely to occur with complete obstruction of the urethra (Radostits *et al.*, 2000). The high occurrence of urinary bladder rupture can be attributed to the lack of awareness about the condition, delayed diagnosis and delayed presentation to the hospital. Use of diuretic injection (Frusemide) in field conditions with the misconception to increase urine output have also increased the occurrence.

In this study, a relationship between occurrence of urolithiasis and geographical pattern of distribution in the districts of Haryana and neighbouring states based on soil and water mineral profiles was made relying on published data (Table 3). Cases of obstructive urolithiasis was presented from 11 districts of Haryana, 2 districts of Rajasthan and one district of Punjab with a higher incidence observed from Hisar (58, 40.55%) followed from Bhiwani (29, 20.27%) and Jind (17, 11.88%). The high incidence from Hisar district may be due to the high calcium content of the fodder (1.30%) than the critical level (<0.30%) (Mann *et al.*,

Table 2

Duration of clinical presentation of buffalo calves with obstructive urolithiasis

Duration of illness	Number of animals	Males	Females
1-2 Days	63	57	6
3-4 Days	57	47	10
5-6 Days	18	15	3
7-8 Days	3	2	1
9-10 Days	2	1	1

2003) which might lead to increased chances of urolith formation. The increased hospital incidence can also be attributed to the proximity of the clinic as well. According to data published by Department ff Soil Science, Haryana, majority of the soils were under high status (60%) of available phosphorus (Gyawali *et al.*, 2016). It is observed that the farmers of Haryana do integrated cultivation combining fodder production and calf rearing. Cultivation in this phosphorus rich soil can lead to its accumulation in fodder as well. This aspect can be directly correlated to the increased occurrence of obstructive urolithiasis of phosphate origin in buffalo calves of Haryana. Reduced incidence from other districts may be either due to their lower soil and water mineral profile or due to surgical intervention at the field level itself. With respect to mineral profile in water of Haryana a higher level of total dissolved solids (132-552) than the critical level (<500) and medium level of hardness (Calcium Carbonate 50-180) within the critical limit (<300) in the ground water source was observed during the study. Most of the owners mainly depend on ground water sources directly or indirectly through a tap water to meet the water requirement of the animals. Based on this study it can be assumed that high TDS and Calcium carbonate level might act as a predisposing factor for urolithiasis.

Treatment of obstructive urolithiasis is primarily surgical and has been found to vary depending upon clinical status of the animal and duration of obstruction (Larson, 1996). The different surgical interventions employed for the management of obstructive urolithiasis in bovines are aimed either at urolith removal for normal urine flow establishment or for urinary diversion to allow the time for the urinary tract to restore patency (Parrah, 2009) in conjugation with supportive treatments like peritoneal lavage, urinary acidifiers and urinary antiseptics. Irrespective of the status of urinary bladder and urethra, all the cases of obstructive urolithiasis were surgically treated by tube cystostomy using Foleys catheter.Advantages of tube cystostomy include lower recurrence, preservation of reproductive function of the animal, an opportunity for the removal of cystic calculi and simplicity of technique. Tube cystotomy is simple, less time consuming, helps in early return of disturbed haemato-biochemical parameters, appropriate procedure for male animals intended for breeding and is associated with lesser complications (Mangotra *et al.*, 2017).

Table 3

Distribution pattern of cases of urolithiasis in different districts

Districts	Number of Animals with obstructive urolithiasis	Percentage (%)
Hisar	58	40.55
Bhiwani	29	20.27
Jind	17	11.88
Fatehabad	14	9.79
Churu (Rajasthan)	6	4.19
Kaithal	6	4.19
Jhunjhunu (Rajasthan)	4	2.79
Sonipat	2	1.3
Rohtak	1	0.69
Mahendragarh	2	1.3
Rewari	1	0.69
Charkhi Dadri	1	0.69
Sirsa	1	0.69
Sangrur (Punjab)	1	0.69

REFERENCES

Bailey, C.B. (1981). Silica metabolism and silica urolithiasis in ruminants: a review. *Canadian J. Anim. Sci.* **61**: 219-235.

Bayoumi, Y.H. and Attia, N.E. (2017). Comparative study of obstructive urolithiasis and its sequlae in buffalo calves. *Vet. World.* **10**(2): 156-162.

Fazili, M.R. and Ansari, M.M. (2007). Prevalence of bovine obstructive urolithiasis in Kashmir valley. *Indian Vet. J.* **84**: 540-541.

Gasthuys, F., Steenhaut, M., Moor, A. de, Sercu, K. and DeMoor, A. (1993). Surgical treatment of urethral obstruction due to urolithiasis in male cattle: a review of 85 cases. *Vet. Rec.* **133**(21): 522-526.

Gutierrez, C., Escolar, E., Juste, M. C., Palacios, M.P. and Corbera, J.A. (2000). Severe urolithiasis due to trimagnesiu morthrophosphate calculi in a goat. *Vet. Rec.* **18**: 534.

Gyawali, C., Dahiya, D.S., Devaraj, Bhat, M.A. and Bhandari, R.R. (2016). Spatial distribution of physico-chemical properties and macronutrients in rice growing soils of Haryana. *The Ecoscan*. **10**(3&4): 365-370.

Kushwaha, R.B., Amarpal, Aithal, H.P., Kinjavdekar, P. and Pawde, A.M. (2014). Clinical appraisal of 48 cases of obstructive urolithiasis in buffalo calves treated with tube cystostomy and urethrotomy. *Adv. in Anim. and Vet. Sci.* **2**(2): 106-110.

Larson, B.L. (1996). Identifying, treating and preventing bovine urolithiasis. *Vet. Med.* **91**: 366-377.

Mangotra, V., Singh, K and Proch, A. (2017). Tube cystostomy in male buffalo calves (*Bubalis bubalis*) suffering from retention of urine. *J. Anim. Res.* **7**(2): 279-291.

Mann, M.E., Rutherford, S., Bradley, R.S., Hughes, M.K. and Keimig, F.T. (2003). Optimal surface temperature reconstructions using terrestrial borehole data. *J. Geophysical Res.* **108**(D7): 25-32.

Matthews, J. (1999). Diseases of the Goat. (2nd Edn.) Blackwell Science, London.

Monoghan, M.L. and Boy, M.G. (1990). Ruminants Renal System: Diseases of the Renal System. In: Large Animal Internal Medicine. B.P. Smith, (Edt.) C.V. Mosby Company, Philadelphia. Toronto. pp. 888-890.

Parrah, J.D. (2009). Clinical Studies on obstructive urolithiasis in Cattle. M.V.Sc. thesis submitted to Sher-e-Kashmir University of Agricultural Sciences &Technology of Kashmir, India.

Radostits, O.M., Blood, D.C., Gay, C.C. and Hinchcliff, K.W. (2000). Veterinary Medicine In: Large Animal Internal Medicine. B.P. Smith, (Edt.) C.V. Mosby Company, Philadelphia. Toronto. pp. 888-890.