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POPULAR ARTICLE

Retention Of Urine In Bovine Calves

Amit Kumar¹, Pallavi Khajuria², and Anavil Bhardwaz³¹Assistant Professor, Department of Veterinary Surgery and Radiology,²Assistant Professor, Department of Veterinary Physiology and Biochemistry,³Assistant Professor, Department of Veterinary Gynaecology and Obstetrics,

College of Veterinary Science, Rampura Phul -151103, Bathinda, GADVASU, Punjab, India

***Corresponding Author:** amitdhartrwal@gmail.com**DOI:** <https://doi.org/10.5281/zenodo.16661953>**Received:** July 30, 2025**Published:** July 31, 2025© All rights are reserved by **Amit Kumar**

Introduction:

Urolithiasis is a diseased condition that occurs due to the formation of uroliths as a consequence of pathophysiological processes which may be congenital and/or acquired, that results in an increased concentration of less soluble crystalloids in urine (Osborne and Kruger, 1984). Possible repercussions of urolithiasis comprise urethra blockage, urethral or urinary bladder rupture, and consequent uremia. Obstructive urolithiasis is a frequently observed clinical illness across every species of animal, particularly in cattle, buffalo, and sheep. In ruminants, obstructive urolithiasis is a life-threatening condition that requires immediate attention and can cause potential economic losses. It affects both male and female animals but males are more affected (Makhdoomi and Gazi, 2013) due to long and narrow urethra. Early-aged castrated males are more prone to urolithiasis because castration causes narrowing of urethral diameter and thus predisposes the animal to calculus obstruction. The testosterone hormone is necessary for the normal development of the urethra and also for the secretion of protective colloids in the urine of male animals.

Urethral obstruction is caused mainly by to lodgement of calculi in the urethral passage. Various factors which are considered to play a role in its etiology to a varying degree are sex, age, breed, season, hormonal imbalance, feed, minerals, infection; skin texture, genetic makeup, soil, location, vitamins, and water intake. Although the location of urolith lodgement in cows can be located throughout the urinary system, from particular kidney locations to the glans penis, the distal portion of the sigmoid flexure and the glans penis are the most frequently obstructed areas (Sharma and Singh, 2001). Singh and Singh (1990) stated that the chemical composition of urinary calculi varies and depends largely on the dietary composition of individual elements, the geographical location, and local management practices. A high phosphorus diet and an imbalance in the calcium to phosphorus ratio make ruminants more susceptible

to phosphate calculi. Uroliths like struvites are the main component of urinary calculi in water buffaloes fed with high levels of cotton seed meal. Urine must be supersaturated with magnesium ammonium phosphate crystals for the formation of struvite uroliths. Factors like heavy concentrate – low roughage diets, deprived or limited intake of water, dehydration, urine alkalinity, mineralized artesian water, alkaline water excess of sodium bicarbonate in diet, vitamin imbalance (hypovitaminosis or hypervitaminosis), high protein rations are significant causes for the formation of phosphate calculi (Samal *et al.*, 2011).

Urethral obstruction due to uroliths/calculi or concretions results in the retention of urine in the bladder and causes its overdistention. If treatment is not provided at an early stage then rupture of either the urinary bladder or urethra may occur, which will rapidly deteriorate the overall condition of the animal.

Clinical Signs:

Clinical signs in animals with intact urinary bladder are anuria, inappetence to anorexia, reluctance to walk, respiratory distress, prolonged recumbency, normal alert to depressed and dull appearance, sunken eyes, dry to moist muzzle, engorged urethra, twitching of penis, straining for urination, maintaining urinary posture for prolonged periods, tail lifting, frequent attempt to urinate, prolapse of rectum and pain on palpation of penis/urethra. The hallmark clinical manifestation of urinary bladder rupture is a pear-shaped abdomen. Obstructive urolithiasis causes a characteristic syndrome of abdominal pain with kicking at the belly.

Laboratory Findings:

Hematological changes in cases of urine retention in bovines are not of any diagnostic or prognostic value. The extent of dehydration is indicated by changes in values of hemoglobin and packed cell volume. Elevated levels of total leucocyte count could be due to dehydration along with the pain and stress resulting from urethral obstruction and peritonitis in the uraemic animals. Leucocytosis might be induced by pain and stressful conditions. Blood urea nitrogen and Creatinine levels are increased due to dehydration and increased resorption of creatinine from the urinary bladder due to prolonged stasis of urine in an intact urinary bladder and renal damage due to hydronephrosis. All domestic animals have the yellow color of urine normally. The color of urine samples of affected animals varies from dark yellow to brown depending upon the duration of illness and concentration of urochromes whose output is relatively constant. As a result of the consumption of cereal diets or primarily forages, the pH of urine in ruminants is neutral or mildly alkaline. Alkaline pH could be due to decomposition of urea to ammonia and/or urinary tract infection. Microscopic examination of urine samples has diagnostic importance because different types of crystals have different shapes.

Diagnosis:

Diagnosis is done based on history, symptoms, and ultrasonography. Ultrasound offers a non-invasive method for diagnosis of urolithiasis, localization of urethral calculi, as well as diagnosis of dilated urethra, cystitis, urethritis, and rupture of the urethra or the urinary bladder. The ultrasonographic examination helps in the diagnosis of the integrity of the urinary bladder, cystitis, uroperitoneum, and concretions/sludge. Ultrasonography shows an oval to pear-shaped bladder with an anechoic lumen filled with urine and a hyperechoic cystic wall. A highly thickened hyperechoic cystic wall is recorded in case of cystitis.

Treatment:

Treatment of obstructive urolithiasis is aimed at removing the obstruction, re-establishing urine flow, correcting fluid and electrolyte imbalances, and preventing recurrences. Tube cystostomy is a technique of urinary diversion or urethral bypass in which a Foley's catheter is placed into the urinary bladder lumen via a laparotomy. Tube cystostomy maintains decompression of the urinary bladder while urethral inflammation subsides and healing occurs and the tube provides the avenue for flushing the urinary bladder or dissolving calculi. In order to prevent further growth and facilitate the dissolution of uroliths, the primary goal of medical intervention must be achieved. Ammonium chloride @ 200-500 mg/kg body weight is prescribed in drinking water for 15-20 days for dissolution of calculi.

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