

Obstructive Urolithiasis (Bladder Stones) in Cattle

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INTRODUCTION

In cattle, the tubes that carry urine from the kidneys to the bladder (the ureters), or from the bladder to the penis (the urethra), can become blocked by stones (uroliths or calculi) produced in either the kidneys or the bladder. This prevents the animal from passing urine and produces the condition known as obstructive urolithiasis. Uroliths are usually mineral stones formed by the precipitation or crystallisation of mineral salts in the urine.

Most reported cases occur in steers. Heifers and cows can also produce stones, but because their urethras are shorter and wider they can usually pass the stones in the urine making obstructions less common. Bulls are also less affected because their urethra is more developed and wider than those in steers.

The condition can cause significant economic losses due to urethral obstruction; rupture of the urethra or bladder; or death from the build up of toxic substances that are usually removed through the urine. The number of affected animals is usually low but can be as high as 10% annually in exceptional circumstances. The condition occurs more frequently in feedlot situations.



Figure 1. Gross swelling in perineal area



Figure 2. Swollen perineum and extruded anal area

CAUSE

The different types of uroliths are identified by their mineral composition. A close relationship exists between the composition of uroliths and diet.

Possible predisposing factors include:

- Excessive mineral intake, which can occur from highly mineralised artesian water or from high concentrate diets.
- Ingestion of certain plants containing high levels of oxalate, oestrogens or silica.
- Diets high in magnesium.
- Increased presence of mucoprotein in the diet caused by feeding high concentrate low roughage rations, pelleted rations, or rations high in phosphate.
- Concentrated urine, which is produced when there is no drinking water available or when water is of poor quality. Water deprivation can be exacerbated by heavy fluid loss from in hot conditions.
- An imbalance in the calcium to phosphorus ratio of the diet.

SIGNS AND SYMPTOMS

Partial obstruction

Animals will probably be off feed, uncomfortable, stretching, and straining to urinate; but will only pass small amounts of urine or dribble urine which may be blood-tinged.

Total obstruction

Symptoms are as above but more painful; animals may strain to urinate but are not able to pass any urine; and may have a 'stretched out' stance or go down.

Rupture of the urethra

The animal may seem more comfortable again for a while but will develop swelling under the skin of the belly; the sheath; under the tail; and will gradually deteriorate over a couple of days.

Rupture of the bladder (water belly)

The animal may seem more comfortable initially, but one to two days after the rupture its belly will start to fill up with urine and the animal will become depressed and weak; then it will go down and die fairly quickly.

If there is an obstruction and it is not relieved, a bladder or urethral rupture will occur usually within 48 hours.

DIAGNOSIS

A presumptive diagnosis can be made based on history and physical examination. A definitive diagnosis is generally based on post-mortem findings when uroliths are found obstructing the urethra or ureters. In steers, uroliths are typically lodged in the urethra where it narrows before it goes into the penis. Numerous additional uroliths are frequently found in the bladder. Sometimes uroliths are not found and more samples are required to confirm the diagnosis. Uroliths need to be sent to a veterinary laboratory to determine their mineral composition to assist with options of treatment and prevention in future. If urolithiasis is diagnosed in one animal in a mob, all animals in that mob are at risk. Animals at risk should be managed appropriately to prevent more clinical cases.

TREATMENT

Surgical treatment may be considered in valuable animals. However, most affected cattle showing clinical signs will need to be humanely destroyed.



Figure 3. Uroliths in the kidney

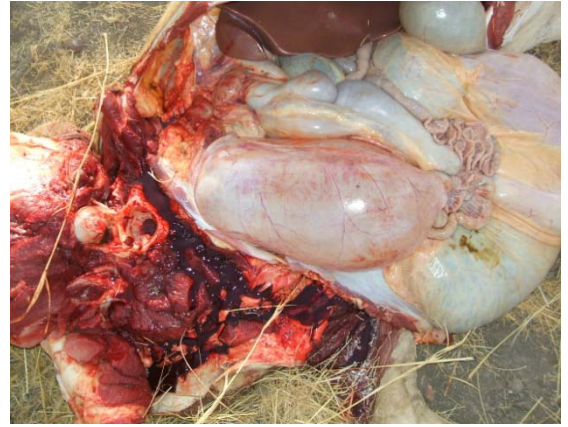


Figure 4. Grossly enlarged bladder

PREVENTION

When dealing with cases of urolithiasis, consult a veterinarian to ensure that the most appropriate preventative strategies are adopted. Possible strategies may include:

- Ensuring the calcium:phosphorus ratio in the diet is balanced. It should be between 1.5:1 and 2:1.
- Increasing water intake by adding salt to the ration:
 - For a 300 kg steer, 50 g/day of salt will not prevent uroliths; 200 g/day will significantly reduce their formation, while 300 g/day will almost eliminate some types of uroliths. This should increase water intake to above 200 g/kg body weight per day. Ensure a consistent supply of good quality water is available to prevent salt toxicity.
- Ensuring adequate intake of vitamin A, especially during drought periods.
- Acidifying the urine (i.e. decreasing urine pH) by adding ammonium chloride to the diet. However, the type of urolith present should be determined first because some types of uroliths will actually form in acidic urine. Also, care needs to be taken when adding ammonium chloride to the diet as too much of it will cause acidosis.
- Removing cattle, especially steers, from paddocks containing plants which predispose cattle to uroliths formation.

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