

“Sludge” Disease in Rabbits Jason Hutcheson, DVM

Ever wonder why rabbits have opaque or cloudy urine sometimes? The answer is because of a combination of diet and physiology. All the good foodstuffs that keep bunnies healthy are usually very high in calcium. Rabbits have an uncanny ability to absorb tremendous amounts of calcium from their diet thru their intestinal tract. All of the unneeded and excess calcium is then dumped out of the rabbit's body via the kidneys in the urine. The excreted calcium combines with carbonate in the rabbit's high pH urine to form calcium carbonate. In small amounts this is normal and is what accounts for the milky or cloudy urine. In some rabbits, the calcium carbonate collects in the bladder in unusually high amounts and becomes very thick. Sometimes the thick, sandy material can even fill up the entire bladder. The technical term for this condition is hypercalciuria, but many owners know it better by the term “sludge” disease.

“Sludgy” bunnies often present to a veterinarian because the owner notices that the rabbit is hunched up like he is straining to urinate, is making frequent trips to the litter box, has been urinating outside the litter box, or is dribbling urine on himself and keeping his bottom constantly wet and scalded. Sometimes owners even see the sludge in the litter box or stuck to the bunny's fur around the genital area. Sludge appears as a thick, off-white to pinkish, toothpaste-like substance. It may even contain small blood clots. Bladder inflammation and irritation from this rough substance can lead to urinary tract infections and possible permanent urinary incontinence.

The cause of all this sludge accumulation is urine retention within the bladder. When a rabbit does not completely void his bladder or goes for extended periods of time without urinating, the calcium carbonate material settles out at the bottom. The build-up of only a small amount of sludge then makes the bladder “bottom-heavy”, meaning it takes more effort for the bunny to contract his bladder and empty it fully. This increases the rate at which sludge will settle out. Pretty soon the whole bladder can become full of sludge and urine just dribbles out of the urethra on its own. In extreme cases, the bunny's urine flow may become totally obstructed which puts the bunny's life in danger.

So, now that we know that urine retention can lead to sludge disease, what are some of the reasons that a rabbit would retain urine? The answer is any condition that makes a rabbit reluctant to assume the proper urinating posture. Arthritis in the hips or back, often found in older rabbits, can make it difficult or painful for a bunny to posture properly. Sore hock is another painful condition that may make it hard to posture properly. A painful bunny may postpone urinating for as long as possible, allowing the calcium carbonate to begin settling out in the bottom of the bladder, starting the whole sludge cycle. Obesity also can play a role in sludge disease. A fat bunny may be too heavy to lift his own weight enough to allow for proper urination. Then there are neurological conditions that can affect the bladder's ability to empty properly. Trauma to the lower back or hip area may interrupt nerve conduction to the bladder, making it less efficient at contracting properly. Even *E. cuniculi* (a protozoal parasite that attacks nerve tissue) infections have been known to cause urinary incontinence in rabbits. Less frequently, a urinary tract infection is the primary cause of sludge disease. More often, a UTI happens secondary to retained, irritating sludge.

Treatment of sludge disease is not a single step. The first goal is to get the sludge out of the bladder. Severe cases may require surgery if the sludge has become extremely thick or it fills the entire bladder. Fortunately, most rabbits can have the sludge removed without surgery. Often a night in the hospital is required for the veterinarian to flush the sludge out of the bladder. After giving pain medications and perhaps some mild sedation, some of the sludge can be gently expressed out of the bladder. This should only be done by experienced persons and on rabbits that are not completely obstructed, to avoid rupturing the bladder. After expressing what is possible and what the rabbit will tolerate, fluids should be given intravenously or under the skin to make the rabbit urinate more. The more urine in the bladder, the more dilute the remaining sludge becomes and the easier it comes out when expressing the bladder. The cycle of giving fluids, waiting for urine to be made and expressing the bladder may have to be done several times to remove all of the accumulated sludge. The rabbit should be placed on anti-inflammatory medication and antibiotics when first diagnosed and these should be continued for 7-10 days thereafter.

If the primary reason for urine retention can be identified, then treatment should be initiated for that specific problem. Rabbits with arthritis may do well if continuously given anti-inflammatory medication. If the bunny has sore hocks or showing signs of other infections, they should be treated as well. Fat, sedentary bunnies should have their diet and activity changed to promote healthy weight loss.

However, some sludgy bunnies just do not appear to have an underlying reason for urinary retention. These rabbits may have decreased instances for sludge accumulation if placed on a lower calcium diet. Most commercial pelleted rabbit food is made from alfalfa. Alfalfa is both high in calcium and high in calories. Changing the bunny to all timothy based pellet then has the affect of lowering the amount of calcium in the rabbit's diet (and therefore less calcium should be excreted in the urine). A timothy based pelleted diet may also help those fat bunnies shed some ounces. Lower calcium greens such as lettuce, cabbage, and celery should be given instead of high calcium greens like turnips, collard, parsley, or kale. Dandelion greens may be an exception. They have moderate amounts of calcium but have been reputed to have a diuretic affect that may help increase urination and keep the calcium carbonate levels in the bladder down. Increase water intake should be encouraged as well for the same effect. Flavoring a bunny's water with diluted fruit juice is one easy way to increase water intake.

Sadly, despite treating the primary cause of urine retention, expressing the accumulated sludge from the bladder, and changing to a lower calcium diet, some cases of sludge disease tend to reoccur. The reaccumulation can be seen in as little as a couple of weeks or may not appear again for several months. In cases of reoccurrence, the sludge is again flushed from the bladder as before, medications are given if needed, and the diet and exercise changes are reviewed and modified if needed. Until more research is done on rabbits and calcium metabolism, the precise means by which this happens may never be known.