HOW I TREAT... CECOTROPHY-RELATED DISORDERS IN RABBITS.

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INTRODUCTION

The term cecotrophy refers to a normal behaviour in healthy rabbits that consists of eating soft faeces, called cecotropes. These special faeces are originated in the caecum are grouped in clusters and covered with mucus. The cecotropes constitute an important source of nutrients for the rabbit, including amino acids, volatile fatty acids, vitamins and enzymes.

Disorders affecting the formation and the intake of cecotropes are common in rabbits kept as pets. It is essential to establish a precise diagnosis of the predisposing causes for a proper treatment.

PHYSIOLOGY AND FORMATION OF THE CECOTROPES

Rabbits are strict herbivores, and their digestive system is designed for the ingestion of foods that rich in fibre. The digestion in the stomach and small intestine is similar to that of monogastric species. The large intestine receives mainly non-digestible fibre that is separated in the proximal colon according to the size of the particles. Coarse particles of undigested fibre move distally and are excreted in dry, relatively hard and fibrous faeces. On the other hand, small fibre particles are moved backward to the caecum, where they undergo bacterial fermentation. Such fermentation allows the synthesis of amino acids, volatile fatty acids and water-soluble vitamins. Some of these nutrients are absorbed through the wall of the caecum, and the remaining material forms a soft paste rich in bacteria, amino acids, vitamins, enzymes, minerals, and volatile fatty acids.

During most of the time, the colon of the rabbit is doing this separation of digested particles. At certain times, the motility of the proximal colon is modified; the pasty content of the caecum is fast-forwarded through the colon without causing the separation of liquid and solid elements, and is expelled in the form of cecotropes (soft faeces). The process of formation of the cecotropes is mainly governed by the activity of the fusus coli, a highly vascular and innervated section of the ascending colon. It works as a pacemaker for colonic motility; it is controlled by the autonomic nervous system and hormones such as aldosterone and prostaglandins. In the fusus coli, mushy contents are squeezed and divided into small portions that are covered with mucus before being excreted as cecotropes.

The production of cecotropes follows a circadian rhythm, and in most of the rabbits they are excreted during the morning and the evening (when the rabbit is calm), approximately 4 hours after the intake of food. Cecotropes are ingested directly from the anus, under the modulation of rectal mechanoreceptors, the perception of specific odours (volatile fatty acids) and blood concentrations of various metabolites and hormones. When food is scarce, rabbits consume all of the produced cecotropes. When they are fed ad libitum, the contents of protein and fibre influence the amount of ingested cecotropes. The increase of fibre levels increases the cecotrophy, while elevated levels of protein reduce it.

Healthy rabbits eating large amounts of fibre consume all their cecotropes, while those who consume grain mixtures and other low-fibre foods tend to ingest only part of them. The type of food can affect the smell and consistency of cecotropes, making them less attractive to the rabbit. There are many conditions and diseases that can alter cecotrophy, either by altering the consistency of cecotropes or interfering with its intake from the anus. Rabbits not ingesting cecotropes may suffer deficiencies of certain vitamins and amino acids synthesized by the microflora.
HOW TO DISTINGUISH DIARRHEA FROM NON-INGESTED CECOTROPES

One of the main reasons for presentation of rabbits is the "diarrhoea" or "loose stools". Many of the owners of rabbits that take them to the clinic are unaware of the existence of the cecotropes and the importance they have for the rabbit. Under normal conditions, cecotropes must be entirely ingested, so they may go unnoticed by the owner. When they are not ingested, and because of their soft consistency, they appear in the cage or the resting place and stuck in the extremities and around the anus. It is interesting to complete the history as much as possible in order to determine the origin of this "diarrhoea or loose stools".

Most rabbits with alterations in cecotrophy have had the problem for weeks, months or even years since, a priori, it is not a lethal problem. Sometimes the cause of presentation is totally different, and the veterinarian detects it as a secondary problem. Episodes of loose or non-ingested faeces tend to be observed every 12-48 hours, or even only several times a week; normal hard stools are observed between these bouts, sometimes mingled with the non-ingested cecotropes. Rabbits not ingesting cecotropes often do eat normally.

Diarrhoea is usually a serious condition in rabbits because of the significant water losses and the electrolyte disturbances. These rabbits have enteritis and do not produce normal hard stools. In addition, they are often in a bad overall state, with dehydration, as well as hiporexia/anorexia.

CONDITIONS THAT ALTER CECOTROPHY

There are a number of conditions that can alter the normal behaviour of cecotrophy, such as those associated to pain, inability to reach the anus or a reduction in appetite. In fact, it is frequent to detect more than one predisposing factor in an animal since inappropriate handling or feeding may lead to various chronic diseases (e.g., dental disease and stress). In order to establish all possible causes, a medical history, anamnesis and physical examination must be completed.

Rabbits under constant stress or fear, e.g. by the presence of other pets perceived as predators or continuous comings and goings of people, often do not ingest the cecotropes.

Conditions affecting the perineum often produce severe pain that prevents the rabbit ingesting the cecotropes and grooming. Moist dermatitis secondary to urinary problems or bathing is common. In addition, when the cecotropes remain attached and not ingested, they increase the irritation of the area due to volatile fatty acids. This may predispose the emergence of myiasis, especially during the warmer months.

Rabbits with a silky and long hair in the hindquarters tend to have difficulties both for grooming and the ingestion of cecotropes. It is common to find Angora rabbits, teddy bear or similar breeds with a dirty perineal area and tangled hair that is impossible to brush. In these situations, it is essential to remove as much hair as possible (carefully, avoiding damage to the skin).

Many rabbits do not ingest the cecotropes simply because they can't. The position to perform cecotrophy requires the flexion of the body to reach the anus; any condition that causes pain or does not allow a correct position will prevent the ingestion. Obese rabbits or those with a large abdominal volume (e.g. uterine contents or abdominal masses) cannot reach the anus to ingest cecotropes or grooming. Those with large dewlap folds or those where a Elizabethan collar has been erroneously placed suffer the same problem.

Alterations of the spine such as spondylodysesthesia, malformations, or spondylolisthesis prevent a correct position for the cecotrophy. The same happens in rabbits that have pain in the extremities, such as those caused by pododermatitis, scabs or arthritis/osteoarthritis. Rabbits with dental disease not ingest correctly the cecotropes due to pain (molars spicules, chronic pain due to root alterations) or physical disability (incisor malocclusion). In addition to these specific conditions, any disease leading to hiporexia or anorexia such as renal, hepatic or neurological, diseases among others will reduce the intake of cecotropes.
As said early, the food is very important for the ingestion of cecotropes. Rabbits that eat large amounts of low-fibre foods do not usually ingest the cecotropes and are more prone to obesity. Cecotropes' consistency is an important factor for rabbit deciding to ingest them. Although they are soft faeces, they must have a suitable consistency, with the characteristic bunch shape and mucous lining. Pasty cecotropes are usually less palatable and get stuck in the hair more easily. The volume and consistency of the cecotropes depends mainly on the dietary fibre content, in particular the digestible fibre going to the caecum. Increased fibre dietary content encourages the formation of more compact cecotropes. The introduction of new foods rich in water can produce changes in the consistency of soft faeces due to changes in the microflora and the digestive transit.

**TREATMENT**

The treatment of the cecotrophy disorders must be set individually, after establishing the predisposing cause (or causes). The treatment of specific diseases, such as incisor overgrowth, requires specific treatments. Those patients suffering irritation of the perineal area and stuck cecotropes require proper cleaning, and clipping the area to allow a proper drying should be recommended. This is especially important in rabbits with large hair knots or retained shed hair complicating the ingestion of cecotropes.

Analgesics are necessary for all those conditions where there is (or it is presumed) pain (arthritis, spinal conditions, dental disease ...) and / or inflammation (e.g. moist dermatitis). Nonsteroidal anti-inflammatory drugs (NSAIDs) such as meloxicam or carprofen reduce the production of cecotropes by inhibition of the synthesis of endogenous prostaglandins. This may be interesting in rabbits with severe perineal alterations. Systemic antibiotics do not alter the consistency of the cecotropes and are only warranted for the treatment of secondary pathologies (e.g., deep dermatitis or abscesses).

Modification of dietary habits is perhaps one of the most important measures. Changes must always be progressive and tailored to the habits of the rabbit. The most high-quality hay must be offered. Greener hays are more palatable and rabbits accept them better. A good choice is fresh grass, provided that its origin is known and has not been treated with herbicides, because they have greater palatability and contain both digestible and indigestible fibre. The content of high-energy foods and grains has to be reduced. This will modify the consistency of the cecotropes and increase the appetite of the rabbit. Rabbits fed with seed mixtures should be progressively switched to high-quality grain-free and high-fibre feeds. High-fibre and leafy vegetables are beneficial, but juicy fruits and other foods that reduce the ingestion of cecotropes should be avoided.

**REFERENCES**