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ACUTE ABDOMEN SYNDROME IN LAGOMORPHS

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Abstract: Gastrointestinal stasis (GI) is a disease in which there is a decrease in the motility of the stomach and intestines, if not diagnosed and treated early, it will consequently lead to death. It is rarely a primary disease, one must simultaneously perform the diagnosis to detect its primary etiology. The objective of this bibliographic review was to understand the acute abdomen syndrome, correlate the possible symptoms that can be confused with another disease and thus make the diagnosis difficult.
Keywords: Acute abdomen syndrome in lagomorphs. Wild animals. Lagomorphs. Gastrointestinal stasis.

THE DOMESTIC RABBIT

The domestic rabbit is a descendant of the European wild rabbit, and is therefore considered to be of the same species, Oryctolagus cuniculus (Harcourt-Brown, 2002). This animal belongs to the Lagomorpha Order, which includes two families: the Leporidae (consisting of 11 genera and more than 50 species of rabbits and hares) (Crowell-Davis, 2007) and the Ochotonidae (which contains 14 species) (Crossley, 2003). Until the mid-twentieth century, lagomorphs were considered a Suborder of Rodentia (Harcourt-Brown, 2002; Crossley, 2003), but nowadays, it is known that these two Orders do not share relevant similarities, being more similar to the Order Artiodactyla (mammals ungulates), as there are fundamental differences in dentition and chewing patterns (Harcourt-Brown, 2002; Crossley, 2003).

The European rabbit (Oryctolagus cuniculus), native to the Iberian Peninsula, is the only recognized ancestor of domestic rabbits. As it is a crepuscular animal, it is most active in the morning and late afternoon (Bradley, 2001). Due to the deep bonds created between humans and rabbits in so many homes, it is essential that the veterinarian has a good knowledge of the species, such as its anatomy, physiology, management and behavior (Bradley, 2001).

BEHAVIOR

Lagomorphs are strict herbivorous animals, their digestive tract must always be in constant movement, after feeding successively they defecate, if they go without food for long periods they can develop gastrointestinal ulcers. In nature, rabbits are prey, so their behavior becomes suspicious (Meredith, 2006). As a means of survival for their ancestors who depended on their constant alertness and speed in response, being fearful of changes in the environment and new situations (Bradley, 2000; Bradley, 2001). They have very keen senses, such as smell, hearing and vision, they are easily startled, such as a higher pitched voice, a very fast approach, or even very loud noises. Thus, the approach to the animal must occur smoothly and always be at the animal's eye level. In general, rabbits are sociable, pointing out complex social structures, which are very evident in their relationships with other rabbits, tutors and other animal species (Bradley, 2000; Meredith & Crossley, 2006).

Unneutered male rabbits defecate strong-smelling feces in several places to mark territory, even castrated ones mark territory, but to a lesser extent (Harcourt-Brown, 2002). They are animals that do not show pain, fear or happiness, unlike domestic animals that show their mood more easily. Therefore, rabbits transmit information about their physical and mental state through visual, auditory and olfactory postural signals, changes in behavior and mood. An indicator that the animal is not well is the low production of feces, decrease in size or even absence; aggression in animals that are generally docile; lethargy; pressing the abdomen to the floor; ataxia; reluctance to move and increased or decreased self-

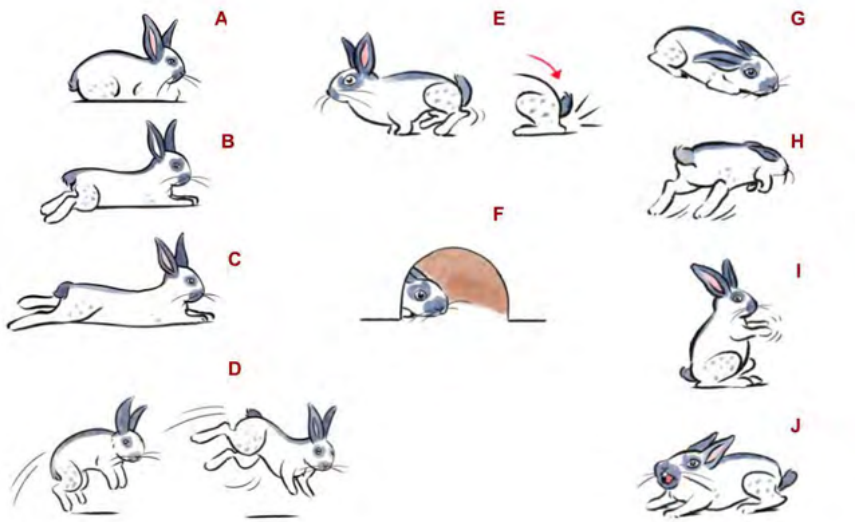
hygiene. When rabbits are in a state of alert, the ears are positioned erect, with the ear opening region rotated forward, as in image 1 (Bradley, 2001; Bradley, 2004; Crowell-Davis, 2007; Fisher, 2005). When they are calm and relaxed, the ears are semi-erect and with the opening region of the ears directed laterally, when they are fully relaxed, they position the hind limbs at the side of the body (Bradbury, g. 2020).

Pain control in lagomorphs is of utmost importance (Bradley, 2000). The physiological changes that accompany the pain are triggered by secondary problems, such as inhibition of the response to treatment and, consequently, the death of the patient. Changes such as gastrointestinal stasis are included, in which there is a decrease in the motility of the stomach and intestines (Reusch, 2005; Fisher, 2005), which, if not detected early and treated, could result in the death of the animal (Krempels, 2005), gastric ulcers, and low body temperature (Bradley, 2000; Bradley, 2001; Harcourt-Brown, 2002).

GASTROINTESTINAL STASIS

Lichtenberger, (2004) said that there are two diseases at the level of the gastrointestinal system, which occur frequently in lagomorphs and are considered urgent, namely gastrointestinal stasis and gastrointestinal obstruction. Gastrointestinal stasis being the most frequent in the wild clinic, where there is a decrease in gastrointestinal motility, or interruption of feces excretion. It is a disease in which the peristalsis of the stomach and intestines is reduced, where the intestinal microbiota of the animal will be altered (dysbiosis). The most observed clinical signs are secondary to any disease that can promote changes in fluids (dehydration/shock) altering gastrointestinal motility.

Gastrointestinal (GI) stasis involves clinical signs such as: anorexia, abdominal pain, dehydration, inappetence, gastric bloat, apathy, gas accumulation, fever, mandibular trismus, neoplasms, reduction in the quantity and size of fecal boluses or absence of



Picture 1: Relaxation postures (A-D), tension and fear (E-J). A) Compact posture. B) Lying posture, with the front legs extended forward and the hind legs projected laterally. C) Lying posture with the body fully extended and relaxed. D) Binky; E) Beat. F) Frightened or anxious rabbits can hide. G) Freezing posture. H) Escape. I) Fight. J) Attack.

Source: RSPCA, 2021.

defecation, among others. others. It can also be caused by the accumulation of content in the gastrointestinal system, due to changes in motility. (Harcourt-Brown, 2002; Davies, 2003; Reusch, 2005; Lichtenberger & Lennox, 2010). The animal can die quickly, within 24 to 48 hours (Graham, 2006).

The most frequent causes for the occurrence of the syndrome include: anorexia, inadequate diet (high carbohydrates/low fiber in the diet), sudden changes in the diet, dehydration, administration of drugs (antibiotics, NSAIDs, opioids), post-surgical adhesions, lack of exercise/obesity, dysautonomia, ingestion of foreign bodies and toxins (Reusch, 2005; Lichtenberger & Lennox, 2008; Fisher, 2005; Lichtenberger & Lennox, 2010). Any process that involves anorexia has the potential to develop gastrointestinal stasis (Harcourt-Brown, 2002; Lichtenberger & Lennox, 2008).

Other possible etiologies are the presence of pain caused by fracture, systemic disease, local infection, uterine disease, dental problems, urinary tract infection, surgery, and environmental factors that can be a source of stress, such as proximity to predators or a dominant rabbit, changes in group hierarchy, loss of a mate, change in housing, routine, changes in diet, transport, extreme temperatures and high humidity locations (Krempels, 2005; Reusch, 2005).

It must be taken into account that it is an extremely serious disease and clinical signs must be treated promptly while investigating the primary etiology (Bradley, 2000). Clinical signs of pain are difficult to notice and any change in behavior can be the first indicator of an abnormality (Bradley, 2000; Crowell-Davis, 2007). Rabbits become hostile and aggressive when they feel scared or in pain, show aggression through vocalization and attack. In general, the sequence follows: grunt-attack-bite (Bradley, 2000; Meredith & Redrobe, 2002).

Gastrointestinal stasis is a sudden onset, acute and rapidly progressing disease. The animals present with the abdomen dilated and the stomach tympanized with a high amount of saliva, because, as they do not have the capacity to vomit, it accumulates in the stomach, causing dilation and rupture (Harcourt-Brown, 2002; Lichtenberger, 2005; Oglesbee, 2006).

DIFFERENTIAL DIAGNOSIS OF GASTROINTESTINAL STASIS

Lichtenberger, (2005) mentioned that when there is an emergency with wild animals such as rabbits, we must always differentiate as quickly as possible between a surgical or medical emergency, assessing the need for immediate hospitalization. One of the differences that we must make is obstruction, for example, in obstruction, the treatment must be surgical, while in stasis it must be treated mainly with the use of drugs.

DIAGNOSTICS

Lichtenberger et. al (2010), reported that when gastrointestinal stasis is suspected, we must initiate the appropriate therapeutic measure as soon as possible. Diagnosis is usually made through clinical signs, physical examination and confirmed through abdominal radiography (Harcourt-Brown, 2002; Reusch, 2005).

Most domestic rabbits accept handling well, however, in cases of nervous and seriously ill animals, they end up not accepting handling and treatment, leading to a delay in treatment, causing risks to the animal, consequently worsening the clinical condition of the patient.

Blood tests are extremely important and after the collection of the blood sample, it must be analyzed. Blood samples are extremely important in helping to detect underlying changes such as anemia and hypoproteinemia among others, such as kidney or liver

disease. Analyzes are important to assist and determine the patient's dehydration status through hematocrit (Harcourt-Brown, 2002). A blood smear is taken to perform a leukocyte count (Harcourt-Brown, 2002). In the blood count, we can assess parameters such as blood glucose, total proteins, creatinine, existence of secondary hypoglycemia, dehydration, anemia and azotemia (Oglesbee, 2006; Paul-Murphy, 2007; Lichtenberger & Lennox, 2008).

Says Harcourt Brown (2002) that one of the frequent etiologies of gastrointestinal stasis is urinary disease, caused by lithiasis. Urine analysis is extremely important, and collection is performed during physical examination. The cystocentesis method in rabbits is similar to that of other species. Ultrasound can help visualize the bladder and be useful in diagnosing possible changes.

Another possible cause of the syndrome is parasitism, and the collection of feces for analysis is of great importance. Performing a direct examination of the feces in saline solution, in order to detect protozoa, a drop of Lugol's solution is also added to better visualize the protozoan oocysts under the microscope (Cray & Zaias, 2004). Thus, faecal flotation is also used to diagnose coccidian oocysts and helminth eggs (Graham, 2006). It must be remembered that the feces of healthy rabbits contain a low to medium amount of capsule yeasts (Bradley, 2001).

IMAGING EXAMS

The ultrasound known as abdominal ultrasound is effective to diagnose the primary cause of stasis, or underlying conditions, abdominal ultrasound is used to have a visualization of the urinary tract (infection, renal failure or bladder sediment), reproductive (tumors, cysts ovaries, infection), liver (lipidosis), abscesses or other categories of tumors, etc. (Krempels, 2005; Reusch, 2005; Fisher, 2005). In cases of gastrointestinal stasis, there is ultrasound evidence of hepatitis and pancreatitis in lagomorphs (Lichtenberger & Lennox, 2010), and it is possible to find other changes such as: large pockets of gas, along the gastrointestinal tract, the stomach may become more rounded, due to content accumulation (Lichtenberger & Lennox, 2010). The cecum is impacted or distended with gas. Currently, a high number of animals have been observed, which, due to a diet with low fiber content, have presented a stomach, which extends beyond the last rib, without abnormal presence of gas (Lichtenberger & Lennox, 2010).

TREATMENT

Harcourt Brown et. al (2002), observed that gastrointestinal motility is affected by the dehydration of the patient, which will have a negative impact on the animal, and all patients who show clinical signs of gastrointestinal stasis syndrome must receive fluid therapy. When fluid therapy is used efficiently, it becomes essential for the treatment of the syndrome. The routes of administration are: intraosseous, intravenous or even subcutaneous, not being the main choice for dehydrated and hypotensive patients, as their fluid absorption will be insufficient due to low peripheral perfusion (Harcourt-Brown, 2002; Oglesbee, 2005).

For intraosseous administration, the proximal humerus, femur or tibial crest must be administered, being the most recommended sites for the placement of a needle or catheter (Lichtenberger, 2008). As for SC administrations, these must be applied to the dorsal part, close to the upper part of the neck. Most IV injections are administered into the cephalic vein and lateral saphenous vein (Rosenthal, 2001). IM injections are often given into the triceps muscle (Rosenthal, 2001) or quadriceps (Bradley, 2001).

Pictures 2 and 3: rabbit showing signs of gastrointestinal stasis.
Source: Courtesy of Animal Veterinary Clinic:Inc. Campinas.

Fisher et. al (2005), tells us that the vast majority of rabbits with clinical signs of the syndrome manifest with shock, bradycardia, hypotension, hypothermia, weak pulse and deep depression. The mucous membranes are pale and capillary filling is not observed. Bradycardia is the decrease in cardiac output that contributes to hypothermia (Lichtenberger, 2004; Ward, 2006; Fisher, 2005). It is necessary to consider that recovery from shock is usually based on crystalloids, which result in a significant accumulation of fluid in the lungs and pleura. Therefore, a combination of lactated ringer with albumin and, simultaneously, rewarming procedures are advised, always avoiding light bulbs, as rabbits have a thin skin (Lichtenberger, 2005; Fisher, 2005; Lichtenberger & Lennox, 2010). When a colloid is used in combination with a crystalloid, there is a reduction in total fluids needed by about 40-60% for recovery compared to administration of the crystalloid alone (Fisher, 2005). The amount of fluid needed will depend on the patient's condition, blood pressure, and serum biochemical test results (Graham, 2006; Fisher, 2005). The treatment of choice in rabbits with anorexia associated with gastrointestinal stasis includes fluid therapy to rehydrate the animal. Parenteral administration of fluids to rabbits must be performed by IV, SC or IO route (Harcourt-Brown, 2002). The fluids administered by the SC route will be used for stable patients, with normal hydration or mild dehydration. Rabbits can tolerate 120 ml/kg/day of fluids subcutaneously, divided into 2 to 3 daily doses (Graham, 2006). Oral fluid administration, on the other hand, is only used when there is no suspicion of obstruction (Graham, 2006; Lichtenberger & Lennox, 2010), thus aiding in the rehydration of the animal's gastric contents (Oglesbee, 2005). Although oral fluid therapy is considerably important in hydrating the gastrointestinal contents, the solution must not be sugary, so as not to exacerbate the overgrowth of bacteria that can be harmful in the cecum (Krempels, 2005).

Lichtenberger et. al (2010), cited that dehydration greater than 5% requires intravenous administration of fluid therapy, using a continuous infusion of a crystalloid fluid. If peripheral vessels are collapsed due to dehydration, an intraosseous catheter must be placed (Graham, 2006). Fluids are administered IO until the patient is adequately hydrated (Graham, 2006). The percentage of dehydration must be estimated based on weight, mucosal hydration, decreased skin turgor, and altered consciousness (Ward, 2006; Lichtenberger & Lennox, 2010). A very useful procedure in rabbits is palpation of the abdominal tract to assess hydration status (Krempels, 2005). An easy way to check if the volume of fluids administered is being adequate is to assess the animal's weight regularly throughout the days, as an abrupt decrease in weight is usually associated with fluid loss (Lichtenberger & Lennox, 2010). The duration of treatment will vary from case to case, varying with the patient's health, response to treatment and recovery from a surgical procedure (Fisher, 2005). Perfusion deficits and dehydration must be the first to be corrected (Lichtenberger, 2008). Fluids that can be used are isotonic crystalloids, colloids (Oglesbee, 2006) and blood components. Isotonic crystalloids, such as lactated Ringer's (Rosenthal, 2001), are normally associated with colloids in the initial phase of fluid therapy (Lichtenberger, 2004; Fisher, 2005; Lichtenberger & Lennox, 2010). Hetastarch, an artificial colloid, is one of the most frequently used worldwide, due to its cost and availability (Lichtenberger, 2004; Lichtenberger & Lennox, 2010). Oxyglobin® (OPK Biotech, Cambridge, UK) is a colloid consisting of stabilized bovine hemoglobin,

which has the additional advantage of transporting oxygen (Lichtenberger, 2004; Lichtenberger & Lennox, 2010). It is essential to administer specific solutions to correct some other deficits. Rabbits with anorexia that last 2 - 3 days have hypoglycemia. When blood glucose is 70mg/dL (Lichtenberger, 2004; Lichtenberger, 2008), 50% dextrose must be added to fluids, producing a 2.5% dextrose solution (Lichtenberger, 2004). Blood glucose is checked 1 hour after administration. If hypoglycemia persists, continuous infusion rate must be continued, with low dextrose concentration, e.g. 1.25% dextrose with crystalloids, while blood glucose can be reassessed every 2-3 hours (Lichtenberger & Lennox, 2010). In the most prolonged phase of anorexia, the administration of glucose can stimulate the synthesis of triglycerides in the liver, compromising the animal's lipid metabolism (Harcourt-Brown, 2002). The addition of colloid helps maintain oncotic pressure in the intravascular space during rehydration therapy (Lichtenberger & Lennox, 2010). Fluid therapy must be administered until the patient can voluntarily ingest the adequate amount of fluids (Lichtenberger & Lennox, 2010).

NUTRITIONAL SUPPORT

Anorexia results from gastrointestinal stasis, so stress worsens the animal's health status. The veterinarian has the challenge of providing adequate nutrition in an efficient way (Graham, 2006). If there is a failure to provide nutritional supplementation, the rabbit will possibly develop hepatic lipidosis, in a short period of time being 2 to 3 days, therefore this is one of the reasons why nutritional supply must start as soon as possible (Harcourt-Brown, 2002; Lichtenberger, 2005; Graham, 2006).

Rabbits tolerate hand feeding with a feeding syringe well, which must be used in a slow process with small volumes, thus preventing aspiration (Lichtenberger, 2005; Graham, 2006; Lichtenberger & Lennox, 2010). This procedure is indicated for sick patients, with adequate perfusion and hydration (Harcourt-Brown, 2002; Lichtenberger, 2005; Lichtenberger & Lennox, 2008). Enteral diets are more suitable for syringe feeding, as they are high in fiber, low in fat and low in carbohydrates (Graham, 2006; Lichtenberger & Lennox, 2010). The liquid diet is widely used as Critical Care® (Critical Care®, Oxbow Animal Health, Murdock, United States of America) for herbivores (Krempels, 2005; Reusch, 2005; Graham, 2006; Oglesbee, 2006; Fisher, 2010). Rabbits that do not tolerate the forced diet must be wrapped in a towel, facilitating the use of the syringe, if the animal shows stress, this means must not be used and, thus, alternatives must be sought (Reusch, 2005), such as feeding via a nasogastric tube, which can be indicated also for severely debilitated patients, as the tube facilitates the supply of food and allows rehydration of gastric contents (Lichtenberger & Lennox, 2008), the use of a local anesthetic such as 2% lidocaine is recommended for the passage of the tube. There are specific diets for feeding via nasogastric tube, such as liquid feeding (Fine Grind®, Oxbow Animal Health, Murdock, United States of America) (Paul-Murphy, 2007; Lichtenberger & Lennox, 2010).

In addition to nasogastric and orogastric tubes, we can mention other techniques such as gastrostomy, pharyngostomy and esophagostomy, all of which require anesthesia. ; Paul-Murphy, 2007).

Regardless of the choice of nutritional support, grass hay, fresh vegetables or herbs must always be available to the animal, for example, to stimulate appetite (Krempels, 2005; Reusch, 2005; Lichtenberger & Lennox, 2010).

Lichtenberger et. al (2010), said that analgesia is extremely important in rabbits with gastrointestinal stasis syndrome, being the key for the animal to fight for life, and in most cases, they perform analgesia inadequately or many times. times insufficient. Pain that is not controlled ends up having undesirable effects, activating the sympathetic nervous system, with harmful effects, causing a decrease in appetite or anorexia, reduction of gastrointestinal motility (Barter, 2011) and simultaneous dehydration is a disease process such as enterotoxemia or hepatic lipidosis (Reusch, 2005; Lichtenberger, 2008; Barter, 2011).

It is recommended to use three main classes of drugs to control pain caused by gastrointestinal stasis, namely: opioids, NSAIDs and N-methyl-D-aspartate (NMDA-ketamine) receptor antagonists (Barter, 2011). Tramadol is one of the opioid drugs used in rabbits, mainly to control chronic pain (Lichtenberger, 2008; Barter, 2011). Fentanyl pibutorphanol with ketamine is regularly used for analgesia due to stasis, being used in low doses, combined, administered with crystalloids and with the aid of an infusion pump (Lichtenberger & Lennox, 2008; Lichtenberger & Lennox, 2010). An interesting fact about ketamine is that with minimal doses in continuous infusion it can promote good analgesia (Lichtenberger & Ko, 2007; Lichtenberger & Lennox, 2008), without cardiovascular effects. Opioids have a large margin of safety and excellent analgesic properties (Lichtenberger, 2008).

One of the most commonly used opioids for analgesia in rabbits is butorphanol, which is an excellent visceral analgesic (Lichtenberger & Ko, 2007). Fentanyl, on the other hand, is one of the potent opioids, which promote rapid analgesia with a short duration of about 3 hours, but respiratory depression can occur when used with high doses (Lichtenberger, 2008; Barter, 2011).

An analgesic protocol for pain relief with buprenorphine or butorphanol can be used as a first approach and then switched, when rehydrated, to NSAIDs such as meloxicam or carprofen (Reusch, 2005). One of the great advantages of drugs in this class, in relation to opioids, is their long duration (Lichtenberger, 2008) and their anti-inflammatory and antipyretic activity (Barter, 2011). Meloxicam is the most commonly used NSAID in rabbits and is well tolerated by them (Harcourt-Brown, 2002; Lichtenberger, 2004; Krempels, 2005; Lichtenberger & Ko, 2007).

Carprofen has minimal toxic effects and is therefore very useful for administration to rabbits, particularly in acute conditions and as part of the protocol for treating GI diseases (Harcourt-Brown, 2002; Krempels, 2005). Some of the side effects of NSAIDs, particularly those with COX-1 inhibitory activity, include impaired kidney function, bleeding, and absence of cecotrophs (Harcourt-Brown, 2002; Lichtenberger, 2008). Analgesia in its entirety is widely used in the treatment of pain due to gastrointestinal stasis, and can use analgesics of different classes (Bradley, 2001; Fisher, 2010), thus the process of normoception of pain, which involves many mechanisms, the use of just an analgesic, it will hardly relieve the pain (Lichtenberger, 2008). Thus, the response to analgesics is due to the animal's behavioral feedback, such as eating, drinking, defecating, sleeping and the return of self-hygiene (Bradley, 2001). Some prokinetic drugs frequently used in rabbits described by Krempels et al. 2000), indicate that they help promote gastrointestinal motility, as do metoclopramide and cisapride (Krempels, 2000; Fisher, 2005; Lichtenberger & Lennox, 2010). Metoclopramide is a dopamine antagonist drug, having a central (antiemetic and depressant) and peripheral (prokinetic) effect. The prokinetic effect is not

as potent as that of cisapride, being limited to the proximal gastrointestinal tract (Harcourt-Brown, 2002; Reusch, 2005). Some studies show that the co-administration of cisapride and ranitidine has a potentiating effect and may lead to improved gastrointestinal motility (Krempels, 2000; Paul-Murphy, 2007; Lichtenberger & Lennox, 2010). In some severe cases, if metoclopramide and cisapride are administered simultaneously, as they will act at different sites, metoclopramide will act on the upper gastrointestinal tract, while cisapride will act on the lower gastrointestinal tract (Krempels, 2005; Paul-Murphy, 2007). Simethicone is useful if the animal has a large amount of gas in the gastrointestinal tract, relieving the pain caused (Reusch, 2005).

Krempels et al., (2005) observed that antibiotics must be administered to rabbits whose primary cause is enteritis or that show signs of bacterial overgrowth, which usually occurs after gastrointestinal stasis syndrome, such as diarrhea, hematochezia, enteroxemia, etc. (Krempels, 2005; Oglesbee, 2006; Harcourt-Brown, 2002). Some antibiotics like enrofloxacin and sulfa are great antibiotics of choice that can help in these situations. If Clostridium spp. is suspected, metronidazole is plausible (Oglesbee, 2006; Harcourt Brown, 2002).

It is advisable to use auxiliary treatments, being simpler and more effective ways to stimulate the gastrointestinal tract of rabbits, it is massaging the abdominal region in a gentle and gentle way, to stimulate intestinal peristalsis and help in the breakdown of impacted contents in the stomach (Krempels, 2005; Fisher, 2005). Probiotics are used to introduce beneficial bacteria into the animal's intestines. Most commercial products contain lactobacillus spp., which are not part of the rabbit's cecal microbiota, however there are studies that prove that they are effective in these cases (Krempels 2005; Harcourt Brown, 2002). Another way to help in the treatment of the debilitated animal is to encourage it to do physical exercise, at least 10 to 15 minutes, every 6 or 8 hours, which can stimulate intestinal motility (Oglesbee, 2006; Fisher, 2005). Therefore, rabbits are animals very susceptible to stress and therefore excessive handling must be avoided. The environment that the animal must be in tends to be calm and peaceful (Oglesbee, 2006).

PROGNOSIS

The prognosis will essentially depend on the primary cause, as well as on the success of the diagnosis of that cause. However, when therapy is started early, the prognosis is excellent to good (Oglesbee, 2006). A blood analysis where the animal has hyperglycemic, the prognosis becomes bad. When a blood glucose value within the limit is obtained, the prognosis is good (HarcourtBrown, 2002). Comparison of several radiographs taken may help in the prognosis, that is, when there is a reduction in the size of the individual pockets of gas, a change in the pattern of gas accumulation, a decrease in the size and less rounded shape of the stomach, as well as the appearance of feces in the distal colon are indicators of a good prognosis, in contrast to the change in signs or the opposite of the above, which indicate a poor prognosis (Lichtenberger & Lennox, 2010).

It is understood that early diagnosis is extremely important, as there are more chances of obtaining a good prognosis, preventing the pathological syndrome from evolving at each stage, reducing the possibilities of restoring the animal's condition.

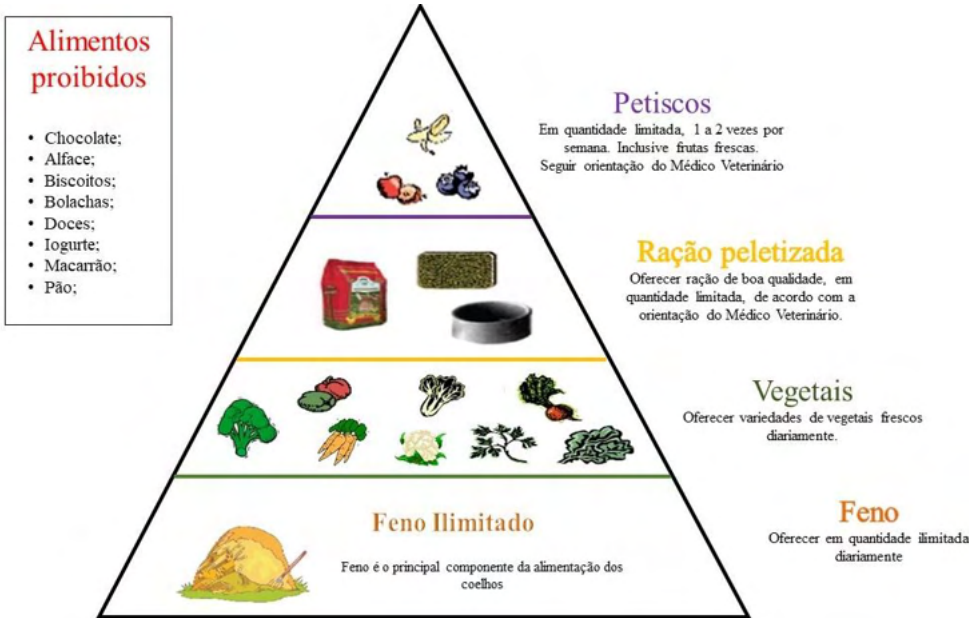
PREVENTION

Davies 2003 et. Such, says that the key to gastrointestinal stasis is prevention so that the rabbit must be provided with a large amount of fiber like grass hay. Irlbeck, 2001., said that

in cases where pelleted feed is offered, it must be ensured that it contains high levels of fiber (at least 18%), low starch content (from 4 to 5%), and adequate protein concentration (from 12 to 14%), and must be offered at 25g/kg/day (Gidenne, 2003; Irlbeck, 2001). A balanced diet, in addition to the quantity and quality of fiber offered, must contain a low starch content and an optimal quality of protein. The rabbit needs to ingest water in a significant amount to keep the intake hydrated and to be able to move properly, for this, fresh vegetables must be offered daily, such as chicory, carrot leaves, watercress, radish leaves, banana leaves, parsley, as it contains a significant amount of water (Bradley, 2001; Krempels, 2005). Care must be taken when offering vegetables, such as dandelion which in excess can lead to kidney damage, cabbage leaves that contain glucosinolate that impair the absorption of iodine by the thyroid, lettuce has lactucarium in its composition, a soporific that has an action similar to opium, being harmful to the health of the animal, as well as toxic plants, which domestic rabbits do not differentiate and can ingest if they are within their reach, and roots and fruits must be offered in moderation due to their high sugar content (Bradley, 2001; Lowe, 2010).

Kahn et. al 2005, said that regular physical exercise helps to keep skeletal muscles strong and thus prevent obesity by helping the smooth muscles of the intestines to become strong and active. It is recommended to prevent the animal from potentially experiencing 'stress', and brushing the animal daily is recommended, especially for long-haired rabbits.

Brandley 2004, advised that females must be castrated, preferably between 4 and 6 months, since female rabbits aged around 2 years have a high rate of developing reproductive problems such as neoplasms such as uterine adenocarcinoma, triggered by gastrointestinal stasis.



Picture 4: Food pyramid determining the food components of the diet of domestic rabbits.

Source: Adapted from Smith et al., 2009.

FINAL CONSIDERATIONS

Therefore, regular visits to the veterinarian are extremely important. For, as soon as possible detect problems that can go unnoticed by tutors, such as dental problems that if they become more serious can lead the animal to develop gastrointestinal stasis. The veterinarian has a duty to educate the tutor about food management and environmental management that this animal must have, leading to prevention and early detection of clinical signs, playing an important role in the treatment of diseases (Bradley, 2001; Krempels, 2005).

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