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APPROACHES TO THE DIAGNOSIS AND TREATMENT OF GASTROINTESTINAL STASIS SYNDROME IN RABBITS

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Abstract

Gastrointestinal stasis syndrome in rabbits is a functional ileus characterized by a reduction or complete cessation of gastrointestinal motility. The prominence of certain breeds from our study reflects their popularity as pets rather than a specific predisposition to gastrointestinal stasis. The presence of molting in nearly 40% of cases supports the hypothesis that fur ingestion may exacerbate the risk of stasis. The most commonly reported clinical signs included reduced appetite or complete anorexia in 88.4%, lethargy 67.4%, absence of fecal output 61.6% and abnormal behavior (hiding or unusual postures) in 55.8% of cases. Radiographs revealing severe gastric dilation with ingesta-filled stomach in rabbits that has been anorexic for several days were suggestive for gastrointestinal stasis syndrome. Treatment was tailored to each patient and adjusted as the condition progresses, integrating fluid therapy, pain management, nutritional support, and prokinetic agents based on the rabbit clinical response.

Key words: anorexia, gastrointestinal stasis, pain, rabbits

Gastrointestinal (GI) stasis is a frequently encountered and potentially life-threatening clinical syndrome in domestic rabbits (*Oryctolagus cuniculus*). It is not a primary obstruction but a physiologic slowdown that may progress to secondary complications such as hepatic lipidosis, dysbiosis, enterotoxemia, and potentially death if untreated. GI stasis is generally not considered as a primary disorder but rather a secondary manifestation of various underlying pathological, nutritional, or environmental disturbances (Meredith A. *et al*., 2016).

GI stasis in rabbits is multifactorial, arising from interactions of diet, stress, pain, dehydration, and dysbiosis. These factors are: dietary (low-fiber diet reduces gastric and cecal motility and alters fermentation; high-carbohydrate foods promote dysbiosis); pain (dental disorders, urinary tract conditions, post-surgical discomfort, musculo skeletal pain); stress (environmental or emotional stress activates the sympathetic nervous system, inhibiting normal GI motility; dehydration which reduces cecal fermentation efficiency and slows transit. As ingesta remains stationary, excess water is absorbed, stomach and cecal contents become dry and compacted and firm gastric masses are formed. The combined reduction in fecal output and impaired caecotrophy reflects a dual failure of fiber transit and fermentation, compounding the rabbit's nutritional and microbial imbalance (Smith S.M., 2021). In rabbits, the primary physiological stimulus for maintaining normal intestinal motility is the presence of substantial amounts of indigestible dietary fiber. A deficiency of this fiber—resulting from either inadequate diet composition or pathological states that induce anorexia—constitutes a major etiologic factor in the development of GI stasis. Indigestible fiber enhances cecocolic motility through luminal distension or via more direct mechanistic pathways. High-fiber diets also facilitate the production of specific volatile fatty acids within the cecum, which in turn stimulate peristaltic activity. (Davies R.R., Davies J.A., 2003).

Hypovolemia compromise intestinal perfusion, predisposing gastrointestinal tract to ischemic injury, reduced mucosal immunity, and delayed epithelial regeneration. The integrity of the mucosal barrier is compromised, increasing susceptibility to bacterial translocation and systemic endotoxemia. These events worsen overall prognosis and may precipitate hepatic or renal complications secondary to stasis (Smith V.M., 2023).

The aim of this study was to provide a comprehensive overview of GI stasis in domestic rabbits, focusing on its multifactorial etiology, pathophysiological mechanisms, clinical manifestations, diagnostic strategies, and therapeutic approaches.

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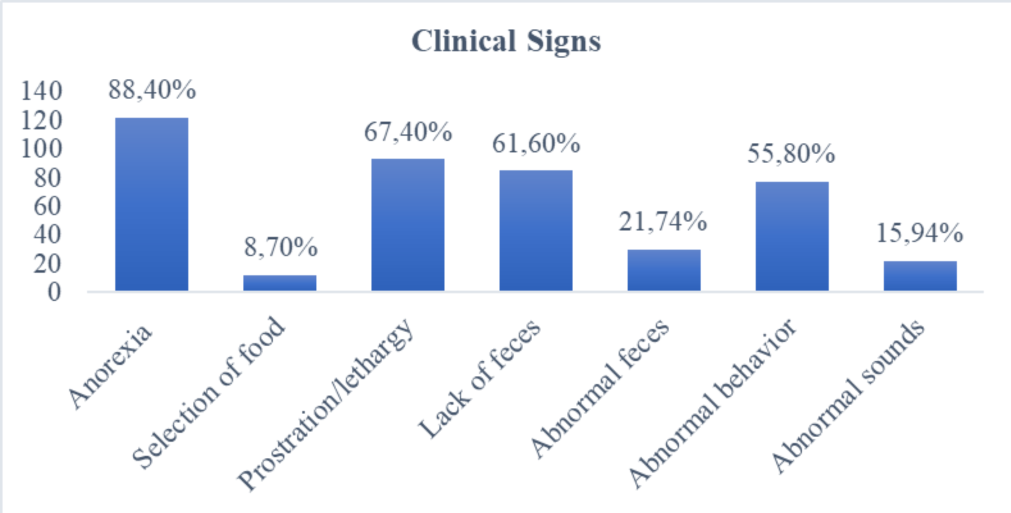

Figure 1 Clinical manifestation of gastrointestinal stasis in rabbits

MATERIAL AND METHOD

A study was conducted on a cohort of 138 rabbits diagnosed with gastrointestinal stasis in private clinic from France during period 2023-2025. The rabbits age proportion of the population asked is about 3 months until 12 years old. Physical examination of a rabbit was performed similar to that in other mammals. (Harkness J.E., Wagner J.E., 1995). During physical examination, it was obtained a complete dietary history, including the type and amount of commercial pellets, hay, leafy greens, and treats. Diagnostic of GI stasis involved a combination of physical examination, ultrasound, serology, radiography (Radiographic machine VET-TECH 300HF), hematology (Idexx ProCyte Dx,Hematology Analyzer) and biochemistry (Idexx Catalyst Dx Chemistry Analyzer). The patient was positioned on the radiographic table according to the diagnostic need. In cases of gastrointestinal stasis, standard projections often included right and left lateral incidences, as well as ventrodorsally positioning to evaluate gas patterns, organ size, and the presence of gastrointestinal contents or obstruction.

RESULTS AND DISCUSSIONS

Gastrointestinal (GI) stasis is the commonly used designation for a syndrome characterized by diminished or absent GI motility and its associated sequelae in rabbits. It is one of the most frequently encountered disorders in companion rabbits. In many cases, it arises from an inappropriate diet. Nevertheless, stress is a prevalent precipitating factor for reduced GI motility, and thus any disease process, painful condition, or stressful event can initiate an episode. Rabbits experiencing GI stasis ultimately cease food intake, and the absence of ingesta within the intestinal lumen further aggravates the condition.

A wide variety of breeds were represented in our study: Angora (2.17%), Dutch (4.35%), Giant (Flemish, Continental, Checkered, American, New Zealand, Californian) (8.70%), Giant Lop (English, American lop, French lop) (2.17%), Mini Lop (7.97), Lionhead (14.49%), Holland Lop (13.77%), Lop Ear (13.77%), Dwarf (13.0%), Rex (2.9%), Rex mini (2.90%), Russian (0.72%) and Mixed breeds (13.0%). The prominence of certain breeds could reflect their popularity as pets rather than a specific predisposition to gastrointestinal stasis. Nonetheless, long-haired breeds may be at higher risk during molting due to increased ingestion of fur. Rabbits ingest hair routinely in the process of grooming. However, they cannot vomit to eliminate accumulated hair. If GI motility is normal, ingested hair moves along with food out of the stomach at regular intervals and is ultimately expelled in the feces. If GI motility is impaired, hair and ingesta accumulate in the stomach. Progressive absorption of fluid from the gastric contents leads to further compaction of the mass. This compacted ingesta induces discomfort, which intensifies anorexia and further diminishes GI motility. A self-perpetuating cycle may ensue, resulting in substantial accumulation of hair and desiccated ingesta within the stomach.

In our study episodes of gastrointestinal stasis were most commonly reported during transitional periods of the year, particularly in early spring and late autumn. These seasons often coincide with molting phases and environmental changes such as temperature fluctuations and shifts in daylight. Among the seasonality 39.4% were reported to be molting at the time of the gastrointestinal episode. Molting appears to be a potential contributing factor due to increased hair ingestion and grooming behavior. In particular, indoor rabbits and long-haired breeds may experience prolonged or abnormal molt cycles. The presence of molting in nearly 40% of cases supports the hypothesis that fur ingestion may exacerbate the risk of stasis. The diagnosis of GI stasis in rabbits posed a challenge due to the frequently non-specific clinical signs exhibited by lagomorphs (*figure 1*). These signs may include reduced appetite, decreased or absent fecal output, reduced activity, and a crooked posture. These early indicators are frequently overlooked, resulting in delayed presentation to the veterinarian.

Initial clinical evaluation begins with the measurement of baseline physiological parameters. The resting heart rate typically lies between 180 and 300 beats per minute, and respiratory rates range from 30 to 60 breaths per minute. Deviations from these ranges are frequent in rabbits experiencing pain, discomfort, or stress (Smith V.M., 2023). A normal rectal temperature in rabbits ranges from 38.5°C to 40.0°C. Hypothermia, often below 38.0°C, may indicate advanced systemic compromise and has been associated with poor prognosis. Conversely, mild hyperthermia may be observed in febrile or septic conditions (Di Girolamo N., *et al.,* 2016; Smith V.M., 2023).

Rabbits have presented decreased skin elasticity, enophthalmos due to orbital fat loss, and tacky mucous membranes. Capillary refill time was prolonged, and the peripheral extremities were cool to the touch. The presence of these signs indicates both fluid deficit and impaired perfusion, contributing to the progression of hypomotility (Oglesbee B.L., Lord B., 2021).

Abdominal palpation was a critical procedure, providing insight into the contents and motility of the GI system. In rabbits with stasis, the stomach felt doughy or firm consistency, indicative of the accumulation and desiccation of ingesta. The cecum, which was usually palpable in the mid-left abdomen, exhibited distension with gas or fluid. This distension can result in discomfort or pain during palpation. In more severe cases, the absence of palpable fecal pellets in the colon may be suggestive of functional ileus or complete cessation of gut transit.

Abdominal auscultation revealed reduced or absent gut sounds, reflecting impaired peristaltic activity. Conversely, high-pitched borborygmi may suggest gas accumulation and early cecal dysbiosis, particularly when accompanied by discomfort on palpation.

Ultrasonography supported the diagnosis by evaluating motility and identifying structural abnormalities. No intestinal occlusion was observed.

Radiographs revealing severe gastric dilation with ingesta-filled stomach in rabbits that has been anorexic for several days were suggestive for gastrointestinal stasis syndrome. As fluid was pulled from the stomach, ingesta became compact and dense and surrounded by a small halo of gas.

Hematological and biochemical parameters usually indicate dehydration, elevated hepatic enzymes, or electrolyte imbalances, which in turn guide clinical management and prognosis.

Complete Blood Count (CBC), provided quantitative and qualitative date on erythrocytes, leukocytes and thrombocytes. In rabbits with GI stasis, CBC findings were nonspecific but supportive.

The biochemical profile indicated dehydration and electrolyte imbalances in rabbits. Blood glucose concentration was a useful parameter in rabbits, particularly in the context of GI stasis. Although not diagnostic on its own, it can provide valuable information about metabolic status and prognosis: hypoglycemia (< 4.2 mmol/L) suggesting anorexia, hepatic lipidosis, indicates a poor prognosis; hyperglycemia >300 mg/dL (15 mmol/L) implies stress, pain, obstruction, early enteropathy (Smith V.M., 2023; Harcourt-Brown F. M. *et al*., 2012).

One rabbit presenting right-sided epiphora, absence of spontaneous nystagmus, bilateral incipient cataracts, and intact pupillary light reflexes, had the serology positive to *Encephalitozoon cuniculi* (positive for IgG and negative for IgM). *E. cuniculi* is a microsporidian parasite that can contribute indirectly to GI stasis through pain, reduced appetite, decreased water intake, neurological dysfunction, or systemic illness.

Slowed motility allows overgrowth of gas-producing bacteria, altered volatile fatty acid (VFA) production, cecal pH shift and decline in beneficial *Bacteroides* spp. Other bacteria normally present are gram-negative oval and fusiform rods, as well as yeast and several nonpathogenic species of protozoa and amoebas. This combined microflora is responsible for processing fiber entering the cecum into digestible nutrients, which are then reingested as cecotrophs.

An inappropriate diet or GI stasis can disrupt the balance of this complex cecal microflora and the environment in which it grows. Diets low in fiber cause cecocolic hypomotility, prolonging the retention of digesta in the cecum and ultimately producing changes in cecal microflora. Populations of potentially pathogenic bacteria, primarily *Clostridium* and coliform species such as *Escherichia coli,* are normally present in small numbers in the cecum. (Fekete, 1989). Slowing of cecocolic motility leads to the production of abnormal cecal fermentation products and alterations in the cecal pH.

The size and consistency of the stomach are key in differentiating GI stasis from obstructive disorders. With GI stasis, stomach size may vary with the duration of disease, but it always contains ingesta, as opposed to fluid and gas seen in rabbits with obstructive disorders.

The treatment of GI stasis in rabbits is multifactorial and should be tailored to the individual case. Medical management of the patient typically included fluid therapy (Ringer Lactat), the purpose of whose implementation is to correct dehydration and restore gut perfusion. If stasis is mild or treated early, many rabbits respond well to oral and subcutaneous fluid administration and are less stressed when treated on an outpatient basis (Oglesbee B.L., Lord B, 2021). The stomach contents were rehydrated by assisted feeding with a syringe or by placing a nasogastric feeding tube.

Rabbits with GI stasis have moderate to severe gut pain, especially if the intestines are distended with gas. Analgesics such as meloxicam (0.5–1.0 mg/kg SC every 24 hours) or buprenorphine (0.03–0.05 mg/kg subcutaneously) were typically administered to relieve pain.

Less painful rabbits may respond well to NSAIDs alone, but a combination of opioids and NSAIDS can be used in very painful rabbits. (Oglesbee B.L., Lord B., 2021)

Prokinetic agents such as metoclopramide (0.2–1.0 mg/kg PO, SC, or Intravenously every 8–12 hours) or lidocaine (4mg/kg/h CRI) were employed, however their use must be approached carefully, particularly when an obstruction has not been ruled out (Harcourt-Brown F.M. *et al.*, 2012). Lidocaine is useful in treating or preventing pain (Schnellbacher R.W. *et al.,* 2017) and associated stasis in rabbits (Oglesbee B.L., Lord B., 2021). If GI motility was sufficient to allow oral administration of medications, rabbits received cisapride (0.5 mg/kg PO every 8 hours).

Most rabbits have begun to eat and pass stool within 48 hours of treatment. Feces passed initially were containing mucus and hair.

Adjunctive therapies included simethicone, which was employed to reduce gas buildup or antibiotics to control suspected dysbiosis.

In severe or refractory cases, surgical intervention may be indicated, although this carries considerable risk due to the rabbit physiological fragility and sensitivity to anesthesia (Smith V.M., 2023). One rabbit had a gastrotomy to remove a large trichobezoar composed of fur and hay.

CONCLUSIONS

Reduced gastrointestinal motility leads to impacted food in the stomach or caecum, impaired glucose absorption, and a reduction in the supply of nutrients and fluids to the cecal microflora. Therapeutic interventions were individualized and dynamic, combining fluid therapy, analgesia, nutritional support, and prokinetics according to clinical evolution. Enhanced awareness of predisposing factors, early clinical manifestations, and appropriate treatment protocols among veterinary professionals and pet owners is critical for effective disease management and the reduction of morbidity and mortality.

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