Analysis of the Causes and Therapeutic Effects of Cat Diarrhea

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Abstract. The purpose of the research is to provide an in-depth understanding of the mechanism and therapy of cat diarrhea by using secondary research which means the aim of this study is to provide a detailed analysis of the causes and treatments of cat diarrhea, with a strong emphasis on feline health. It extensively delves into various factors contributing to cat diarrhea, distinguishing between dietary issues such as intolerance and parasitic infections. Additionally, the paper thoroughly examines the clinical symptoms associated with cat diarrhea. Drawing from the research, the authors propose multiple therapeutic approaches and treatments designed to reduce cat diarrhea, thereby improving the overall health and well-being of felines while alleviating their discomfort. It is hoped that the findings from this review are clinically relevant for use in establishing an optimal treatment regimen and improving the quality of life among cats with diarrhea, which would be beneficial to a wide range of sufferers.

Keywords: Cat diarrhea, mechanism, therapy.

1. Introduction

According to the definition given by International Cat Care, cat diarrhea is characterized by significant changes in the texture and color of feces, including soft, liquid, or watery consistency, and potential alterations in color [1]. There may be fresh blood or mucus in the feces, the cat may produce a greater volume of feces than normal, and an increased frequency of defecation to pass feces. Cats' diarrhea is considered acute or chronic, acute diarrhea lasts less than 2 weeks. Conversely, chronic diarrhea lasts longer than 14 days [2]. A study conducted in 2019, involving a large population of over 1 million adult cats, uncovered that 2.0% (21,142) experienced chronic vomiting and/or diarrhea. This prevalent problem can lead to serious complications [3]. including abdominal distention, melena, hematochezia, vomiting, and weight loss, among others [4]. Dehydration is one of the most severe outcomes, characterized by a deficiency of total body water and a concurrent disruption of metabolic processes. It occurs when the body loses more water than it takes in and can be life-threatening in severe cases. As cats continue to play increasingly important roles as human companions, addressing the problem of cat diarrhea has garnered significant attention in recent times. More than 180000 articles about cats' diarrhea have been published On Google Scholar since 2020 The primary objective of this research is to systematically categorize and synthesize previous studies and experiments to provide a comprehensive overview for advancing the understanding of cat diarrhea in the future. The researcher aims to delve into existing literature and research findings to draw insightful conclusions that can assist future researchers in gaining a deeper understanding of cat diarrhea, ultimately contributing to the reduction of time required to comprehend this field and providing better help to cat patients who suffer from diarrhea to live in a better life.

2. Causes of cat's diarrhea

Diarrhea is a prevalent problem in cats and can arise from a variety of factors. Some of the primary causes of diarrhea in cats include dietary indiscretions, sudden changes in diet, food allergies or intolerances, ingestion of spoiled food, imbalances in gut bacteria, viral or bacterial infections, parasites, stress, and underlying medical conditions such as chronic kidney disease (CKD). It's important to monitor your cat's health and behavior and consult with a veterinarian if diarrhea persists or is accompanied by other concerning symptoms.

2.1. Dietary issue

Dietary indiscretion happens when a cat eats non-food items or food from outside of its typical diet such as garbage, table scraps, wrappers, litter, etc [5]. Cats' curious nature often drives them to explore new flavors, which can bring to dietary indiscretions. Dietary intolerance refers to any unusual physiological symptoms of food that are not often seen in life [6]. The most common factor is protein, such as cow's milk, beef, fish, or cereal [7]. The most common dietary intolerance in kittens is the overhurry of transitioning from breast milk to industrial cat food. can have causes in the skin, gastrointestinal tract, reparatory tract, and central nervous system.

2.2. Biotic issue

Bacterial infections refer to inappropriate microbiomes or bacteria in the host. Pet's health is very related to the microbiome and bacteria [8]. Feline panleukopenia, feline leukemia virus, and feline immunodeficiency virus are examples of viral infections that can cause diarrhea in cats. infections, such as salmonella or E. coli, can also lead to gastrointestinal upset and diarrhea in cats. Parasites are another common cause of diarrhea in cats, such as Tritrichomonas foetus, Giardia, Leishmaniosis, etc.Tritrichomonas foetus may lead to increased mucus secretion, tenesmus, occasional hematochezia in fecal matter, and heightened frequency of defecation [9]. The prevalence of this infection may escalate in multi-cat environments. A study conducted at an international cat show revealed a 31% infection rate among the feline population. Additionally, co-infection with T.Blagburni (Tritrichomonas foetus) and Giardia spp. are prevalent, with a study by Xenolis et al. reporting a 22% co-infection rate among 104 cats.

2.3. Stress

Stress in cats can be triggered by a variety of factors, including physical, emotional, and mental stimuli. An increase in the number of cats within a group can serve as a prime example of how stress can manifest in feline populations. As the cat population grows, physiological pathways such as the hypothalamus–pituitary–adrenal (HPA) axis and the sympathetic–adrenal medulla (SAM) axis are activated, leading to a series of short-term adaptive responses to the heightened population density. Simultaneously, this heightened stress can lead to the production of oxidative stress, as an imbalance between the scavenging of reactive oxygen species (ROS) and their production can contribute to the development of serious gastrointestinal diseases [10].

2.4. Physical disease

Chronic kidney disease (CKD) usually occurs in aged cats and is one of the most often diseases in aged cats [11]. It is defined as structural and/or functional impairment of one or both kidneys for more than three months .CKD can cause diarrhea with dehydration, vomiting, weight loss, and abdominal pain [12]. Inflammatory bowel disease (IBD) normally occurs in adult cats, Its occurrence depends more on genetic factors depending on the feline's barrier function and innate and adaptive immune system. Chronic intestinal inflammation of IBD in cats may be caused when T-cells over-aggressively respond to enteric bacteria with genetic defects that regulate microbial killing, mucosal barrier function, or immune responses.

3. Symptoms and diagnosis of Cat Diarrhea

Cat diarrhea can manifest through various symptoms, some of the most common symptoms of cat diarrhea include [13]. unhealthy-looking stools, mucus or blood in the stool, worms in stools, defecating with higher frequency than usual, nausea, loss of weight, vomiting, weakness, abdominal pain, and weight loss. Many of them can be associated with their causes which are mentioned above. Diagnosing diarrhea in cats can be challenging, as this symptom has many potential causes. However, veterinarians use several methods to diagnose the underlying cause of a cat's diarrhea [14]. diarrhea is considered acute or chronic as mentioned in the introduction. As the knowledge and attention of

humans obviously increased in the field of pets, especially cats. Veterinarians in now's day are more focused on defining the types of illness, to ensure the security of the cats, Cat owners are asked about previous travel history, unsafe (raw or undercooked) meat or dairy products, and contacts with others immunocompromised or sick pets.

3.1. Primary diagnosis

A thorough physical examination is one of the first steps in diagnosing diarrhea in cats. Veterinarians will examine the cat's overall health, checking for any signs of dehydration, pain, or discomfort [15]. When cats have diarrhea, food moves so fast through the digestive system that it doesn't have time to absorb nutrients, and weight loss will happen, following the tiredness and weakness due to missing nutrition.

Then, the fresh feces from the cats can help veterinarians to better diagnose. The color, form, and texture of the stool are the first detectable changes that are visible [16]. As a healthy cat, its feces are normally malleable, on the one hand, its form looks like modelling clay; not too soft and hard. Its color should be dark brown but not dark because dark black feces can mean blood contained inside. On the other hand, feces that show a light color can indicate diseases like liver issues. Faeces with diarrhea are unshaped watery, and very sticky. The microbiome in the feces also shows the physical state of the cat [17]. In 2015, a cautious experience discovered that the microbial communities In the feces of healthy cats and cats with diarrhea are different; A Few bacteria were identified and compared, and the results table indicates to the researcher that the bacteria population of phylum Proteobacteria and the phylum Firmicutes have increased in feces cats with diarrhea and bacteria like Delta-Proteobacteria, the family Bacteroidaceae, and the genera Roseburia and Megamonas have decreased in healthy cats. These bacteria are significantly related to the health of the cats.

3.2. Secondary diagnosis

If the underlying cause of the diarrhea cannot be determined after conducting these initial tests, veterinarians may recommend more advanced diagnostic procedures to further investigate the issue. In cases where parasites are found in the stool, appropriate treatment should lead to an improvement in the diarrhea within 2 to 3 days. However, if the cause of the diarrhea remains unidentified, it is often assumed to be temporary and of unknown origin. Managing the symptoms typically results in the resolution of clinical signs within 1 to 3 days. Should the diarrhea persist or if other symptoms worsen, it may indicate a more serious underlying problem that requires a thorough evaluation and more intensive treatment.

3.2.1 Feces testing

Using zinc sulfate, veterinarians usually test GI parasites by centrifugation of fecal flotation for animals with suspected diarrhea, then, pair with fluorescent antibody testing for Giardia cysts and Cryptosporidium oocysts. In this experimental context, it is essential to use fresh feces whenever possible or refrigerate fresh specimens for a maximum of three days. Subsequently, assessing the total plasma protein and hematocrit in the feces can serve as a reliable method to gauge hydration levels and establish a baseline for clinical observation. It is imperative to identify tritrichomonas foetus, as this parasite is a significant contributor to diarrheal disorders. The recommended procedure involves placing multiple direct fecal smears on fecal specimens with saline and fresh feces at body temperature to enhance the viability of the target cells.

In addition, the fecal culture for enteropathogenic bacteria can correct the misinterpretation of the results of fecal enteric panels on diarrheic cats, bacteria like C.difficile, C.perfringens, Campylobacter spp., and Salmonella spp. Analysis of enteric pathogens can be helpful in the diagnosis of diarrheic cats if they feel systemically ill or had contact with an immunosuppressed individual [18].

3.2.2 Radiography

Experiencers examined the imaging results of 32 cats with inflammatory bowel disease (IBD) in a clinical retrospective analysis. All of the cats experienced clinical diarrhea symptoms, such as

vomiting, diarrhea, weight loss, etc [19]. Histologic sections of the gastrointestinal tissue showed lymphocytic and plasmacytic infiltrates. The findings indicated that cats with moderate to severe IBD had higher rates of crypt distortion, villous blunting, and fibrosis. Clinical signs in certain cats include hypocholesterolemia, hypoproteinemia, anemia and leukocytosis or leukopenia. This study confirmed that radiography can be a valuable tool in the diagnosis of diarrhea by providing a comprehensive diagnosis for IBD.

4. Therapy and prevention of Cat Diarrhea

There are several effective treatment methods for cat diarrhea, depending on the underlying cause and severity of the condition, including pharmic and nutritional management.

4.1. Pharmic management

At present, the main treatment is the use of Antimicrobials [20]. Metronidazole (Flagyl) is an inhibitor of cell-mediated immunity, it has been often used as the supportive agent for the treatment of IBD. Metronidazole can manage cats' diarrhea efficiently, Metronidazole tablets smell like a sharp, metallic taste and unpleasant it is when scored, probably following severe salivation. Unless side effects are possible but rare, including inappetence, seizures, and reversible neutropenia.

If diarrhea is too frequent, and affects the cats or the host's daily lives, if the problem becomes more serious, the ability to rest can be heavily changed, causing severe results in significant fluid loss and discomfort, and veterinarians may use opioids to alter intestinal motility. Diphenoxylate and loperamide are both very useful in reducing the frequency of diarrhea. Unless excitatory behavior rarely occurs, cats should use drugs carefully.

Although antibiotics play an important role in the treatment of diarrhea, the irrational use of antibiotics has led to the emergence of drug-resistant bacteria in pets and the environment in which they come into contact with humans, which has seriously reduced the therapeutic effect of antibiotics [21]. A British documental study imbodied the prescribing habits of veterinarians for cats with acute diarrhea: Antibacterials for 71%, probiotics/antidiarrhea for 26%, steroids, antiemetics for 13% due to concurrent presence of vomiting, gastric protectants for 10% in case if vomiting/melena is present. In this study, researchers were surprised by the frequency of the use of antibacterials for cats with acute diarrhea. Apparent evidence showed that resistance to antimicrobials is increasing among bacteria isolated from pets due to medication overuse, but some other useful treatments must be taught and considered as the first options. Probiotics have broad application prospects in treating bacterial diarrhea, which indicates to veterinarians a new alternative therapeutic method. It has been demonstrated that colitis in cats is associated with increased levels of cytokines, so the right choice of probiotics is essential.

4.2. Nutritional Management

When dietary indiscretion happens, hosts can cure the cats by withholding from 6 to 12 hours, then, feeding cats with higher frequency, 6 meals per day maximum removing the possible triggering factors and feeding a highly digestible protein diet which veterinarians call a "blank diet" such as fish or chickens, not as fat as beef and pork which may be hard for cats with sensitive stomachs, amount of food can wisely increase over time until the symptoms of diarrhea disappear [22]. Most of the time, it takes 3 to 5 days to resolve. On the other hand, high-fiber diets play a beneficial role in reducing the tenesmus and facilitating colonic epithelial reparation. Even more, commercial products are very industrially matured which is ideal with increased mixed fiber, so soluble fiber can be added to the "blank diet" mentioned above [20]. A cautious experiment in 2012 compared the cat's food cans, X diet represents normal cat food and Y diet (Purina Veterinary Diets EN Gastroenteric Feline Formula), then an overall fecal score was given to each fecal with two different diets. The result showed that the Y diet with high both soluble and insoluble fibers, high protein, and low carbohydrate, with an extra source of long-chain omega-3 fatty acids was helpful for the treatment of chronic diarrhea.

4.3. Prevention of diarrhea

Hosts should pay attention to the cat's diet and habits, reasonably match the diet, and strictly control the daily food intake; pay attention to the cleanliness of the cat's living environment, food containers, and the cat itself, clean and tidy up the cat's residence regularly, disinfect regularly, and clean the cat in time to avoid bacterial infection; check and kill insects for cats regularly, feed some insecticides, and prevent and control in advance. Redo physical examinations at least 1~2 times a year to understand the real-time health status of the cat.

In addition to their immunomodulatory effects, probiotics also have a protective effect on the normal microflora of the human intestine through their antimicrobial activity against enteric pathogens. Probiotics are also used to promote the elimination of intestinal parasites and to help the eradication of intestinal parasites. A study in 2005 demonstrated that Enterococcus faecium SF68 can increase the immune response to Giardia intestinalis in mice, which can be investigated in the future in cats. The result showed that oral feeding for 7 days significantly increased the amount produced of specific anti-Giardia intestinal blood IgG and IgA.

5. Conclusion

This article thoroughly investigates the multifaceted causes and diverse treatment options for managing diarrhea in cats. It meticulously analyzes various factors contributing to feline diarrhea, explores a wide array of treatment options, delves into the symptoms indicative of this condition, and offers practical preventive measures. Throughout the discussion, there is an emphasis on the importance of in-depth research and thorough investigation into cat diarrhea, with a focus on its impact on feline health and its potential relevance to humans. The article comprehensively reviews the underlying causes and various treatment options for diarrhea in cats. By providing this information, the aim is to support feline health and overall well-being. Hoping that by raising awareness about this issue, more individuals will be encouraged to take proactive measures in caring for their cats and helping them lead healthier lives. The findings could provide valuable insights into the effectiveness of different therapies in cat diarrhea, which could have significant implications for vet health practitioners and researchers. Looking forward to the overall development of the treatment of felines and hope that the health of pets can be paid attention by more hosts.

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