Diagnosis, Treatment, and Prognosis of Megaesophagus in Cat: A Case Report

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Diagnosis, Treatment, and Prognosis of Megaesophagus in Cat: A Case Report

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Abstract

A 2-year-old Domestic Shorthair cat was brought to the Teaching and Training Pet Hospital and Research Center (TTPHRC), Purbachal, Dhaka, with a chief complaint of coughing, anorexia, and vomiting immediately after feeding for the last two weeks. The animal was evaluated through clinical, biochemical, and radiographic examination. A contrast thoracic radiographic examination of the esophagus was performed using barium sulfate suspension during and one month after the initial consultation. The results showed no biochemical abnormalities. A dilatation of the esophagus was revealed and a diagnosis of megaesophagus was made. The cat was managed with antiemetics medication for the first few days and an upright feeding position for 20-30 min every post-meal to avoid an accumulation of food. The response to this management was satisfactory and the clinical signs were fully resolved within a month. In the follow-up examination, there was no evidence of dilatation of the esophagus. The antiemetic medication and upright feeding position could be an effective measure without surgical intervention for the management of the idiopathic megaesophagus.

Key Words: Megaesophagus; Cat; Vomiting, Diagnosis, Management.

1. Introduction

The megaesophagus is a clinical esophageal syndrome characterized by widespread esophageal dilatation and reduced peristalsis (Washabau, 2003). Megaesophagus is classified into two types based on its etiology: primary megaesophagus, which occurs purely on its own (born with the condition), and secondary megaesophagus, which occurs in conjunction with other diseases such as myasthenia gravis, hypoadrenocorticism, dysautonomia, polyradiculoneuritis, hypothyroidism, polymyopathies, and esophageal cancer (Block et al., 2013; Johnson et al., 2007; Wray & Sparkes, 2006). Esophageal hypomotility is the likely cause of congenital megaesophagus, which is diagnosed at birth. This hypomotility is caused in some people by a delayed maturity of esophageal function, which may or may not get better as the patient gets older (Bexfield et al., 2006). Myopathies, such as muscular dystrophies, dysautonomia, storage disease, and neurogenic muscular atrophy, are some neuromuscular illnesses related to megaesophagus (Evans et al., 2004; Gabriel et al., 2006). Given that striated muscle makes up the majority of the canine esophagus, any neuromuscular condition that manifests in the leg muscles can also manifest in the esophagus (Shelton, 2002). Food and fluids collect in the esophagus and have difficulties entering the stomach when esophageal motility is reduced or nonexistent (Mace et al., 2012). Food in the mouth activates nerves that convey signals to the swallowing area in the brainstem, which triggers the swallow reflex when the esophagus is operating correctly. A failure in multiple critical places throughout the major neural pathways might result in a megaesophagus. The most prevalent symptom of megaesophagus is regurgitation (Köberle, 1958). It can occur due to endocrine dysfunction. Megaesophagus that may be corrected is often seen in individuals with hypoadrenocorticism and hypothyroidism. The megaesophagus is a possible complication of hypoadrenocorticism, which is caused by electrolyte abnormalities and a lack of cortisol. The decreased neuromuscular function is a direct outcome of electrolyte imbalance, which alters membrane potentials. A lack of cortisol may also lead to muscular weakness (Gaynor et al., 1997). Esophagitis, esophageal blockage, gastric dilatation-volvulus, and hiatal hernia are among gastrointestinal conditions linked to acquired megaesophagus. Pyloric dysfunction is the underlying cause of acquired secondary megaesophagus in cats (Wray & Sparkes, 2006). The megaesophagus may be caused by exposure to toxins like lead, organophosphates, or even snake venom. Megaesophagus, severe stomach discomfort, vomiting, and diarrhea are all symptoms of

even little lead exposure (Hopper et al., 2001). Batteries, fishing weights, lead-based paint, flooring, plumbing and soldering tools, and linoleum are all potential sources of lead poisoning (Stenner et al., 2003). The presence of both muscle weakness and cerebellar symptoms at the same time raises the suspicion of organophosphate toxicosis (Farrow, 1988). In simple instances of megaesophagus, patients may appear with merely vomiting and weight loss (Hoenig et al., 1990). Additional clinical symptoms that point to the underlying causes of megaesophagus may appear in other individuals (Chaplow, 2019). The most common complication of megaesophagus is aspiration pneumonia; others could be moist cough, dyspnea, or fever. Other concerns owners may report halitosis (Chaplow, 2019). The prognosis is often poor, especially when subsequent aspiration pneumonia is present (Kajiwara et al., 2009). Megaesophagus is shown in dogs and cats, but the most common cases are in the dog (Datta et al., 2020). Siamese, domestic shorthair, and longhair cats are more likely to develop megaesophagus, and they also commonly have problems with stomach emptying (Maddison & Allan, 1990). Common approach of diagnosing megaesophagus is combining a thorough medical history with an appropriate contrast-enhanced thoracic radiographic examination (Datta et al., 2020). The objectives of the study were to diagnose the megaesophagus, its plausible treatment options and to know the prognosis of this illness.

2. Materials and Method

2.1. Study area:

Teaching & Training Pet Hospital and Research Centre, the first pet animal hospital in Bangladesh, Purbachal, Dhaka which is governed by Chattogram University of Veterinary and Animal Sciences (CVASU).

2.2. Clinical examination:

After initial registration and obtaining a patient's medical history, each patient had a clinical examination. Each case's clinico-epidemiological results were noted on the organized record keeping sheet. In addition to client personal information, data includes address, date, total population, housing system, species, breed, age, sex, body weight, BCS, immunization, deworming, prior sickness history with treatment, length of illness, feces, micturition, and vomiting (age, sex, education, and job). Pulse, respiration, and rectal temperature were collected; skin fold test, examination of mucous membranes, and examination of various organs of the body were done using palpation, percussion, and auscultation. On the organized record keeping sheet, diagnoses and medicine prescription information were also documented. Drug information consisting of the commercial name of the pharmaceuticals, the primary and supplementary drugs, dosage, route, and duration.

2.3. Case description:

A 2-year-old male domestic short-haired cat weighing 3.45 kilograms was submitted for assessment with a 14-day history of weight loss and vomiting after eating from Gaosia, Dhaka. Auscultation indicated an irregular gurgling sound associated with dehydration. Temperature, respiration rate, and heart rate were 100.5 degrees Fahrenheit, 28 breaths per minute, and 136 beats per minute, respectively. A diagnostic radiography scan revealed a pouch-like formation in the esophagus containing minute, brightly colored particles and megaesophagus was diagnosed. Antiemetics were administered every eight hours for seven days, along with anti-HCL secretory medications and maintenance treatment over the next month.

Figure 1: Patient with megaesophagus

2.4. Diagnosis Protocol:

In order to make an truthful diagnosis of megaesophagus, it is necessary to review the cat's history, as well as their general habits and radiological findings. It is necessary to have an x-ray in order to diagnose a dilated sac, and in order to get a better knowledge of the condition, barium sulphate may be given to the patient before the radiographic examination. This helps the patient appreciate the condition better.

2.4.1. Radiologic diagnosis:

After taking the patient's history and doing a clinical examination, the diagnosis of megaesophagus was suspected and subsequently confirmed by lateral and dorso-ventral thoracic radiographs. A contrast thoracic radiographic examination on the esophagus was performed using barium sulfate suspension, which was administered about 20 ml by introducing a syringe into the one side of the cat's mouth and then giving small amounts over the course of 15 minutes for the cat to swallow before giving more. The examination was performed to determine whether or not the cat had esophageal cancer. In order to establish the diagnosis of megaesophagus, standard radiographs of the lateral and dorso-ventral views were acquired immediately after the procedure was finished and afterwards at intervals ranging from 15 to 60 minutes.

2.4.2. Biochemical analysis:

Blood Urea Nitrogen (BUN), creatinine, alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), glucose, bilirubin, total protein, albumin, and globulin for biochemical and for serology Canine Parvo virus (CPV) were performed as complementary tests to determine any association with vital organ function (Liver, Kidney).

2.3. Treatment:

An antiemetics (Metoclopramide as 0.2-0.5mg/kg bd wt, 8-hour interval, i/m) and H2 blocker/antisecretory (Famotidine as 0.5mg/kg bd wt, 24-hour interval, PO) were administered for a week and the initial problems were gone. The cat was only allowed to be fed when standing up, and this position was maintained for twenty to thirty minutes after each meal in order to prevent accumulation of food in the affected area.

Results and Discussion

The present study reports the diagnosis, treatment and prognosis of megaesophagus in cat. The clinical signs were weight loss and vomiting after meal (Kajiwara et al., 2009). Megaesophagus is a functional condition characterized by decreased peristalsis movement and widespread esophageal dilatation (Le Quéré et al., 2016). Supportive care is the only kind of treatment that is typically administered, unless the esophageal dysfunction improves, or an underlying cause can be addressed and remedied. In the current investigation, the exact cause of development of megaesophagus could not be determined. But the owner mentioned and a habit of eating for too long time and having a break in between the meals and staying still on the floor lying on its belly. In this particular instance, when the radiograph was performed, the animal had already displayed the cranial diverticulum to the complete megaesophagus, along with a history of postprandial vomiting beginning at immediately after eating from the age of 14 days. X-ray revealed a pouch like structure which was a dilated part of the esophagus extending from 4th cervical vertebra to 3rd thoracic vertebra (Fig. 2 and 3) like other researcher found in their study (Chaplow, 2019; Forbes & Leishman, 1985). The second time x-ray with barium sulfate showed further clear image that shows small bones within the pouch. The anomalous breathing sound on auscultation was traced back to an underlying reason, which was later shown to be the presence of an additional component seen on x-ray that was placing pressure on the trachea.

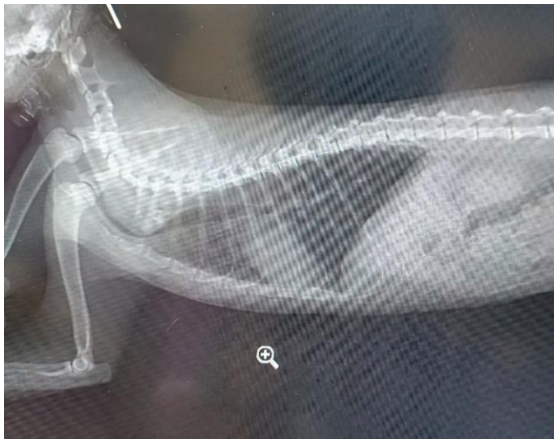

Figure 2: Dilatation of esophagus (left lateral view)

Figure 3: Dilatation of esophagus cropped (right lateral view)

The results of the biochemical tests were within the normal range is shown in Table 1. Few other researchers (Beleoken et al., 2013; Chen et al., 2020; Doit et al., 2021) found correlation of vomiting with other cause where protein and glucose level were low due to improper nutrient as the animal continued to vomiting but in this study, there was no association between vomiting and disorders of the liver or kidneys, and the results of the serology test for FIP were negative.

Table 1: Analysis report of biochemical parameters

Parameters	**Results**	**Reference value**
Total protein (TP)	7.3 g/dl	5-8.8 g/dl
Albumin	3.1 g/dl	2.5-3.9 g/dl
Globulin	4 g/dl	2.3-5.3 g/dl
Bilirubin	0.2 mg/dl	0.1-0.4 mg/dl
Glucose	120 mg/dl	50-170 mg/dl
Alanine aminotransferase (ALT)	87.0 u/l	10-100 u/l
Aspertate aminotransferase (AST)	41.7 u/l	10-100 u/l
Alkaline phosphatase (ALP)	29.2 u/l	10-50 u/l
Serum creatinine	1.2 mg/dl	0.6-1.5 mg/dl
Blood urea nitrogen (BUN)	23.58 mg/dl	14-36 mg/dl

Idiopathic megaesophagus was treated with a supportive care approach, which included elevating food and drink containers so that the patient could use gravity to help them swallow. The guidelines for the conservative therapy that will reduce the risk of content impaction, sepsis, and/or disturbance of the diverticular tissue (Quintavalla et al., 2017). According to the findings of (Chae et al., 2019) Chae's study, the cat developed megaesophagus after being given vincristine at an unsafe and excessive amount; however, our research did not find any data to support this as a possible reason. Megaesophagus is a condition with a bad prognosis, particularly when aspiration

pneumonia is included (Manning et al., 2016). But in this study, we could not find such as problems. An abnormal sound was present in cat due the pressure on the trachea and it causes only sound like that when there is something inside the esophageal pouch. For the upright position, the food got slowed without causing vomiting or breathing difficulties. A paper that was released not too long ago said that the insertion of an esophageal drainage tube resulted in the successful management of regurgitation and aspiration pneumonia in the four cats that were diagnosed with idiopathic megaesophagus (McBrearty et al., 2011). But in our case, we simply used Metoclopramide as antiemetics which not only stops the vomiting but also increase the elementary tract motility so that the feed can puss easily through the G.I. lumen without causing any further blockage (Jacoby & Brodie, 1967; Orihata & Sarna, 1994). It also increases the hunger of animal by emptying the stomach quickly (Pinder et al., 1976). In the initial X-ray image, we found trapped gas within the intestine (Fig – 1) that could lead to discomfort, decrease the hunger, and partially promote to vomiting. In that case a H2 blocker/proton pump inhibitor was used to reduce the formation of excessive gas. The cat showed a positive reaction to these management techniques. The information on the clinical state of the animal, as well as the frequency of its vomiting, was tracked by telephone contact. During these conversations, it was consistently acquired that the patient was stable and fed regularly. (Forbes & Leishman, 1985; Wallmark, 1986) found that treating cats with 1 milligram of sildenafil per kilogram of body weight twice daily for two weeks in conjunction with an upright feeding position resulted in increased weight gain as well as a decline in the number of episodes of regurgitation.

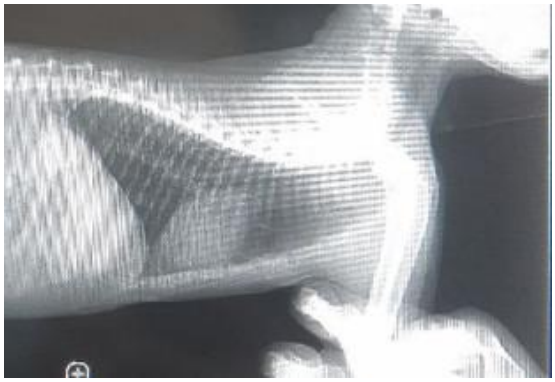

Figure 4: Normal condition after 1 month (No megaesophagus was found)

However, in our study, no therapeutic management was necessary; only an upright feeding position reduced the number of times the cats threw up like other researcher (Datta et al., 2020; Paul, 2021).

If a esophageal diverticulum gets empty every time it starts to heal on its own and try to diminish the overgrown pouch. One month following the original appointment, the guardian came back with the patient to report that the bouts of vomiting had stopped and that the cat was now eating regularly. Additionally, the guardian reported that the cat was no longer losing weight. Even though the cat was able to eat in the typical feeding position again after four weeks without throwing up, and despite the fact that radiographic testing revealed no dilatation in the esophagus (Fig – 4), the cat continued to have no difficulty swallowing. After resolving the issue, the owner was advised to continue with normal feeding behaviour. This case was monitored further but there was no complaint from the owner regarding the previous issue.

Conclusion

According to the findings of our study, megaesophagus can be efficiently managed over the long term with merely basic medication and an upright feeding. However, it is necessary to conduct further comprehensive experiments to determine how upright position is beneficial for megaesophagus with chronic vomiting.

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Data availability statement:

All the data was collected during the case-sheet fillup, diagnosis, treatment. A follow up communication was established between the author and owner through telecommunication technologies. A hard copy of the case-sheet is stored at TTPHRC with the Registration No: S224003

Competing Interest:

Dr. Aparna Datta, who treated the patient, has said she has no conflicting interests.

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Biography of Author

This is Shariful Islam, the elder child of Shafiqule Islam and Nurjahan Khandokar, doing his graduation on Doctor of Veterinary Medicine (DVM) at Chattogram Veterinary and Animal Sciences University under Faculty of Veterinary Medicine. He passed the Secondary School Certificate Examination (SSC) in 2014 from KUP School, Kaligonj - Lalmonirhat and got GPA 5.00 and then Higher Secondary Certificate Examination (HSC) in 2016 from Police Lines School and College, Rangpur and got GPA 5.00 out of 5.00. Currently he is doing his yearlong internship. He has a great enthusiasm in his study area to develop day one skills and gain more practical knowledge to be prepared for the modern era of science.