

IS HELICOBACTER THE MAJOR CAUSE OF GASTRIC DILATATION VOLVULUS (BLOAT) IN DOGS?

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Before I launch myself into this quite detailed review of the initial phase of my research project, I would like to provide you with just a little background information about myself and why the project began. My name is Dorne Carr of the Laumidorn Irish Setters and Beagles Affix. I am immensely passionate about the health and welfare of all animals especially dogs. My first Irish Setter 'Dolly', tragically died from bloat. When Dolly died I wanted answers to my questions. I needed them to help prevent another death happening to my other dogs. The answers I received did not provide the information that I needed. It was, and still is, unavailable. 'Fear is born from the unknown' said Marie Curie. When we know the answer to the unknown, we are no longer fearful. No one knows for sure what causes this indiscriminate killer of our dogs. This fact initiated my research project.

My Scientific Theory of Why Bloat Occurs In Dogs.

My scientific training as a Microbiologist (someone who works with micro-organisms like bacteria, fungi and viruses) and a Biochemist (the chemistry of living organisms) gave me an excellent advantage when reading through the past research papers available on bloat. I was able to understand the scientific language, which can be a problem for some people. As a teacher of science I fully appreciate that some people can be so confused that they stop reading about the subject. I will therefore endeavour to explain any scientific terminology wherever possible.

I began comparing the digestive systems and processes of several animals. The more I went through the digestive system the more; I became convinced that the major cause could be bacterial. I eventually returned to a family of bacteria from my lecture days as an undergraduate at Sheffield University.

The family named 'Helicobacter' (because of their spiral shape) are now known to be responsible for the majority of gastric ulcers and some forms of gastric carcinomas in humans. The species responsible for this is called *Helicobacter pylori*. Many of you may have heard of this type of bacteria, the hospitals now routinely test for its presence when investigating any type of digestive disorder.

It has been suggested that each species of animal contains its own specific species of this bacteria, but there may be cross infection. The species specific for human beings is the subject of research by one of my old lecturers, Professor Dave Kelly of Sheffield University. He is researching the pathogenicity of this species (which factors give this bacteria the ability to cause disease). If we know all of this then we can prevent the diseases. I still have very good links with the University and hope to draw important information from them during this research.

As we should all know, bloat occurs in ALL breeds of domesticated dogs. However it does not occur in wild dogs (see ISAE review 2001). This fact may also give credence to the theory that there can be cross-infection between species. Wild dogs have no contact with humans. I leave it to your imagination as to what the culprit may be.

Past and present research of *Helicobacter* activity in dogs is limited. However, it has been suggested from post-mortem results that *Helicobacter* infection was present in dogs that died from bloat. This requires further investigation.

After almost four years of researching this subject, I firmly believe that the major underlying causative agent of this condition is a member of the *Helicobacter* family in conjunction with certain multi-factors. My reasons for this are as follows:

Genetically Inherited Disorders

v Genetically inherited disorders are easily identified because of the set pattern of symptoms, which are always present in the condition. Example: Cystic Fibrosis (CF). This is a life-threatening inherited condition. To be affected, the sufferer requires two recessive genes, one from each parent. The parents are said to be carriers for the condition. The affected person carries two recessive genes. The lungs of the affected person produce and accumulate far too much mucus type fluid. The patient finds it difficult to breathe. They will in effect die from drowning if this fluid is not removed. Physiotherapy to make the patient cough up the mucus-like fluid, it is the only treatment at present and has to be repeated many times each day. In general, the patient does not have a long life span. Only a simple alteration of the DNA causes CF. This might in future be rectified by genetic engineering. The key issue of this condition is that there are set patterns in the symptoms

of the disease which identify it as Cystic Fibrosis.

v All of the symptoms are present each time, making it easy for the doctor to identify the condition

Bacterial Disorders/Diseases

v Bacterial (diseases caused by bacteria) even viral (diseases caused by viruses) diseases produce many symptoms. However, unlike genetically inherited diseases, not all of the symptoms have to be present for an individual to be suffering from the disease. For example: Influenza (flu) is a good example. A virus causes it. The symptoms might include: raised temperature, sore throat, headache, sneezing and so on.

v These symptoms do not follow a set pattern. They are not always present in a patient. This means the condition is the same, but the symptoms present will vary. This can make it difficult for the doctor to identify the cause of the disease.

v A genetic disease however, will always produce the same symptoms for a specific disease.

Gastric Dilatation Volvulus (Bloat)

v Gastric Dilatation Volvulus (Bloat) is a condition/disease that produces a pattern of symptoms similar to those of a bacterial or viral infection.

v There is no set pattern of the symptoms unlike the set pattern present with an inherited condition/disease.

v From personal experience, research on published sources and interviews with owners of bloated dogs, the symptoms present varied with each case. Of course there were some similarities, but not many. Below is a list of known pre-bloat symptoms.

v Excessive salivation, Restfulness, Irritation, Arching of back, Stomach noises, Panting,

v Whining, Pacing up and down, Frightened expression,

v Frog-legging, Retching, Straining as if constipated.

Helicobacter

Very little is known at present about how the Helicobacter species survive in the harsh conditions of the stomach, or if their pathogenesis causes more than just ulcers and cancer in humans.

The spiral shaped bacteria have been isolated in the stomach of humans for over one hundred years. They have recently been isolated in saliva samples and plaque. These bacteria contain a unique enzyme that converts urea into ammonia, which is an alkali. This activity would result in them creating an immediate alkaline environment that surrounds and protects them. This may be one reason why the bacteria can survive the harsh acidic conditions of the stomach.

The normal pH of the stomach is one. If the bacteria produce an alkali solution, the pH of the stomach will increase (make it less acidic). An increase in pH is known to reduce the motility of the gut lining. This will therefore slow down the emptying time of the gut. The conditions required to breakdown the molecules of food have also been altered, the stomach is therefore less efficient. The process of digestion may have even stopped altogether.

As food sits in the gut it starts to decompose. As part of the natural flora (bacteria) Helicobacter in the stomach begin to break down the food (this is not the normal way these bacteria feed). A by-product of this activity is gas. The internal temperature also begins to increase.

As the activity of the bacteria increases, the volume of gas also increases. With an increase in temperature the gas begins to expand, so exerting pressure on the stomach walls. In response to this the stomach dilates (enlarges). Eventually the pressure exerted on the stomach walls causes the stomach to twist.

When this occurs, the blood supply to the body and vital organs is reduced by approximately 75% and the heart suffers from arrhythmias and toxic shock. Without immediate veterinary intervention the dog will die in agony. Fortunately surgery is more efficient today, but the mortality of dogs post-operatively is still very high.

I postulate that there are two main types of dogs that are be predisposed to bloat:

One

v In a healthy dog where the immune system has not been compromised. The number of Helicobacter in the stomach is small and will have no ill effect on the motility of the stomach. However, if the immune system is compromised (not working to its best), plus some multi-factors are present (see list), the helicobacter species can and will increase in number. This I believe sets the scene for an imminent case of bloat.

Two

v The Immune system that protects us is very powerful. At its worst it can also destroy us. Sometimes our immune system is highly susceptible (allergic) to certain drugs, chemicals, food etc. Being susceptible to certain bacteria is also possible. If the dog is susceptible to this species of bacteria, the immune system could become depressed. The number of bacteria can increase to a dangerous level, giving rise to a case of bloat.

v Susceptibility is I believe the only genetic link connected with the occurrence of bloat. This would possibly explain the reason for dogs with similar lines being affected.

A Multi-factoral Condition

As the research title implies, I believe the major cause is bacterial, but I also believe other factors are needed for the condition to occur. In the absence of one or more of these factors then bloat should not occur.

Identification of these factors, which play a role in the onset of bloat, also has to be investigated. The only way to be able to prove this theory is to conduct a paper research initially for owners of bloated and non-bloated dogs to complete. They can highlight the presence or absence of the factors in question.

From my prior research, I have compiled a list of factors that may contribute towards the onset of bloat.

v Stress, Vaccination/Booster, Medical drugs, Environmental factors, Mating, Whelping,
v Depressed Immune System, Diet, Ergonomic Feeders, Excessive water intake, Breed,
v Exercise prior or immediately after feeding, Feeding, Regime, Conformation, Age, Sex.

I am sure there are others, which will become apparent during the course of the research.

Drug Therapy

Drug therapy, to prevent bloat, has been available in America for several years and was proving to be quite successful. The various drugs available all maintain the motility of the gut, which moves food through the digestive system. It does not however, starve the dog of essential nutrients. To date the application of these drugs has been very successful.

This information re-enforces my theory of Helicobacter causing bloat. The by-product ammonia from these bacteria increases the pH of the gut. This increase in the pH ultimately decreases the motility of the gut. This in turn slows down the movement of food from the gut.

Food staying in the gut much longer than normal would start to be decomposed by bacteria. (Is this a prime recipe for bloat?) The use of the motility enhancing, drugs prevents this happening.

Until the cause of bloat has been fully identified, I strongly recommend use of these drugs with dogs that have previously bloated.

At last the stage was set. I had done my homework and was ready to go public. This however was harder than I imagined possible. I needed the support of our breed clubs to be able to promote my theory.

It would take a very forward thinking, dedicated and open-minded committee to make such a decision. It is hard to support a new theory and not worry about ending up with egg on your face. I am so pleased to see that there are people willing to take a chance and break the ice.

Perseverance finally paid off. The committee of the ISAE consented to my request of presenting the first phase of my research programme at the 2002 Championship show. They have given me the opportunity to present my theory to the people who matter. These are the owners of dogs that suffer a great deal from this condition.

Summary

Research of any form is risky. Is the theory right is it wrong? No one knows until the research has been carried out. The whole exercise was a resounding success. Many exhibitors found the time to take an active part in the research programme. Many generously gave donations towards the cost of this venture, which at present is financed by myself. I hope the results when available from the first and second phases of the research programme, will be of interest to research laboratories to take the programme forward. Questionnaires and saliva test results are steadily being returned. There are however a lot more tests and questionnaires to be completed, before any results can be obtained.

Finally, thank you to everyone who has supported and urged me forward. I look forward to receiving your completed questionnaires and tests.

A peaceful and healthy new year to you all (especially our four legged friend)

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