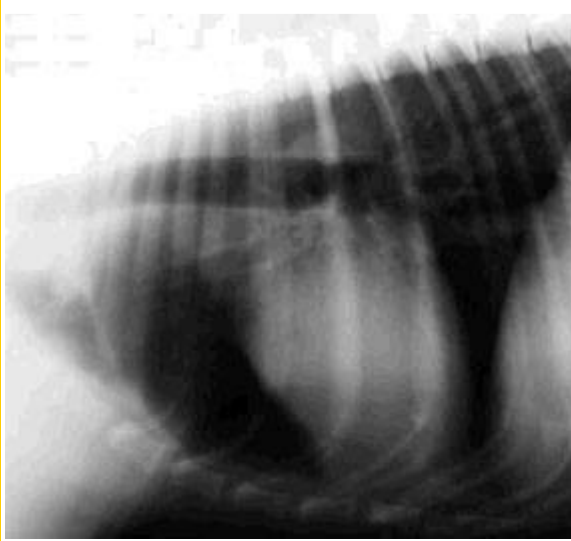


## Megaesophagus



*Normal canine chest radiograph (black "tube" on top left is the trachea, not the esophagus. The esophagus is much thinner and cannot be seen)*



*Megaesophagus in this canine chest radiograph.*

### What is Megaesophagus?

The esophagus is the tube connecting the throat to the stomach. When food is perceived in the esophagus, a neurologic reflex causing sequential muscle contraction and relaxation leads to rapid transport of the food into the stomach, like an elevator going down. Other reflexes prevent breathing during this swallowing process to protect the lungs from aspiration (food and other stomach contents going into the lungs, causing pneumonia which can be severe).

When these reflexes are interrupted, such as by disease in the esophageal tissue or nerve disease, the esophagus loses its ability to transport food. Instead the esophagus loses all tone and dilates. Also, the reflex protecting the lung is disrupted and aspiration pneumonia commonly follows.

### Vomiting Versus Regurgitation

When the esophagus loses all tone and dilates, it cannot coordinate the movement of food into the stomach properly. As a result, food tends to simply roll around in the esophagus according to gravity and ultimately tends to be regurgitated back onto the floor. This is not the same as vomiting; in fact, it is completely different.

Most people do not realize that there is a difference between vomiting and regurgitation. Vomiting is an active process. There is gagging, heaving, and retching as the body actively expels stomach contents. Regurgitation is passive. With regurgitation, food is swallowed from the mouth but never really goes very far beyond that point. Food sits in the esophagus until it

simply falls back out the mouth. In the dog, megaesophagus is the most common cause of regurgitation.

### **What are the Symptoms of Megaesophagus?**

Symptoms of megaesophagus might include regurgitation of water, mucous or food, loss of appetite or refusal to eat, sudden weight loss. Animals with this problem will often show swallowing difficulty, with exaggerated and/or frequent swallowing. They will also try to clear their throat frequently with a "hacking" sound. They may have sour and/or foul smelling breath, and aspiration pneumonia is a frequent complication.

### **What kind of Conditions Cause Megaesophagus?**

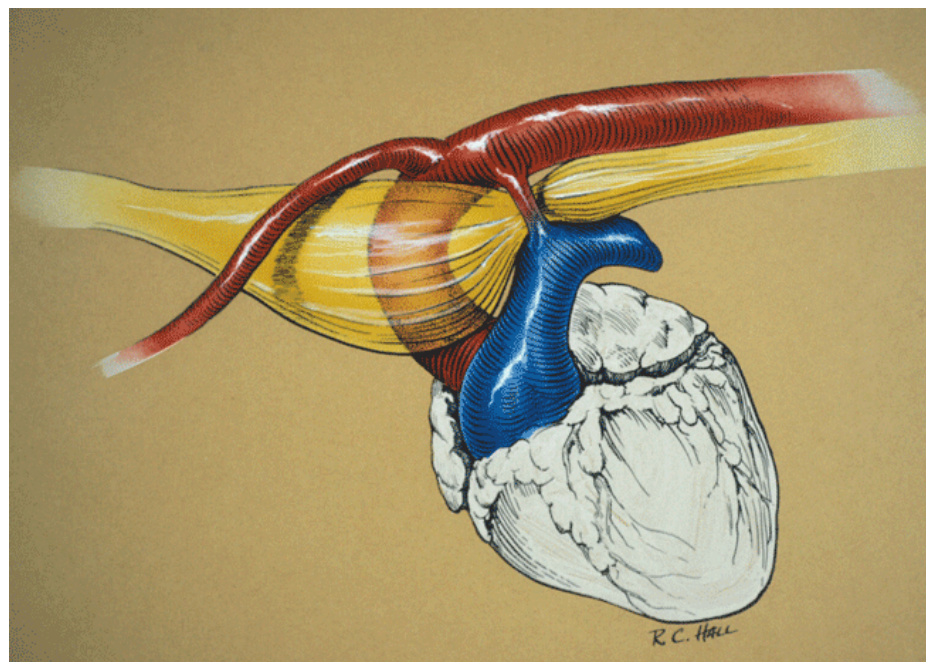
#### *Congenital Megaesophagus*

Congenital means "present at birth." Most cases involve young puppies (Great Danes, Irish setters, Newfoundlands, German Shepherds, Shar pei, and Labrador retrievers are genetically predisposed). In these cases the condition is believed congenital though it often does not show up until the pup begins to try solid food. Congenital megaesophagus is believed to occur due to incomplete nerve development in the esophagus. The good news is that nerve development may improve as the pet matures. Prognosis is thus better for congenital megaesophagus than it is for megaesophagus acquired during adulthood with recovery rates of 20-46% reported in different studies. Most puppies are diagnosed by age 12 weeks though mild cases may not be clearly abnormal until closer to age one year.

Another congenital problem is the vascular ring anomaly of Persistent Right Aortic Arch (PRAA). This is a band of tissue constricting the esophagus. Such tissue bands are remnants of fetal blood vessels, which are supposed to disappear before birth. They do not always do so. Improvement is obtained when the band is surgically cut but in 60% of cases some residual regurgitation persists. In the illustration below, the yellow tube is the esophagus, and the red and blue structures are the vascular ring that blocks esophageal flow.

#### *Acquired Megaesophagus*

In adult dogs, diseases that cause nerve damage can lead to megaesophagus. Myasthenia gravis is considered the most common cause of canine megaesophagus and is the first condition to rule out. Myasthenia gravis is a condition whereby the nerve/muscle junction is destroyed. Signals from the nervous system sent to coordinate esophageal muscle contractions cannot be



received by the muscle in the esophagus. Megaesophagus is one of its classical signs though general skeletal muscle weakness is frequently associated. This condition is treatable but special testing is needed to confirm it. Approximately 25% of dogs with acquired megaesophagus have myasthenia gravis.

Scarring in the esophagus (as would occur after a foreign body episode or with damage to the esophagus from protracted vomiting) may be sufficient to interrupt neurologic transmissions or even narrow the esophagus so that food cannot pass through it. Such a narrowing is called a stricture. Surgical balloons can be inserted in the esophagus to dilate the narrowed area but some residual regurgitation is likely to persist. Tumors or even parasites of the esophagus may have similar effects in that they, too, can cause obstruction.

Addison's disease (hypoadrenocorticism) has also been associated with megaesophagus, though this would be a rare cause. This condition represents a deficiency of cortisone production by the adrenal glands, which alters the metabolism of esophageal muscle. Diagnosis and treatment are not difficult.

External obstruction of the esophagus could cause a similar syndrome by creating a blockage. A mass in the chest could pinch the esophagus closed.

A condition once rare in the U.S. is also worth mentioning and that is dysautonomia. Dysautonomia patients have a 60% incidence of megaesophagus, and it usually affects dogs living in rural areas. The syndrome involves a total disruption of the entire autonomic nervous system leading to difficulty urinating, dilated pupils, flaccid colon (megacolon), flaccid anal tone, poor tear production and, of course, megaesophagus. Successful treatment is unlikely so it is helpful to recognize this constellation of signs from the beginning so that euthanasia can be considered. Testing for dysautonomia involves stimulating the autonomic nervous system with drugs and checking for response (increased heart rate in response to atropine injection, pupil constriction in response to pilocarpine eye drops etc.)

A potentially very treatable cause of megaesophagus is due to irritation due to temporary inflammation in the esophagus, called esophagitis. This can be brought about by a foreign body in the esophagus, swallowing a caustic substance, trauma or even stomach problems.

Many of the above conditions are treatable and it is important to find a cause for megaesophagus if it is at all possible to do so. Unfortunately, most cases do not have a clear cause and must be managed as they are. This can be hard work.

Historically, some have suspected that low thyroid function (hypothyroidism) can cause megaesophagus. The connection is now debated by experts. We do know that dogs with megaesophagus and low thyroid function rarely improve even when low thyroid function is corrected.

### **The Diagnostic Plan**

First, the megaesophagus must be diagnosed. This is done with radiographs (x-rays). If megaesophagus is not obvious on plain films, it is better not to use contrast studies with barium if possible. This is because megaesophagus patients tend to inhale or "aspirate" food contents that back up in their throats. This is dangerous enough when the material is simply food but if barium becomes inhaled, the body has great difficulty removing it from the lungs. Still, sometimes this is the only way to see the megaesophagus.

The next step is to determine whether or not the animal has aspiration pneumonia from inhaling

regurgitated food material. The same radiographs used to diagnose the megaesophagus can be used to determine if aspiration pneumonia is present though just because the chest is clean at one point does not mean aspiration will not occur in the future – it can happen suddenly, at any time. The owner of the megaesophagus dog must be vigilant for cough and listlessness.

Chest radiographs in combination with a history of cough, nasal discharge, and the presence of fever usually indicate pneumonia. Usually the chest radiographs will show disease in the areas of the chest that are lowest in the standing animal as this is where gravity draws inhaled material. Aspiration pneumonia makes the case much more serious as pneumonia can be a life-threatening condition.

After megaesophagus has been confirmed and the patient has been assessed for aspiration, diagnostics continue as a search for a treatable underlying cause begins and a search for additional medical problems associated with megaesophagus also begins.

Endoscopy is an important diagnostic test for the megaesophagus patient and, if possible, should be done in all cases. In endoscopy a long skinny tube with a camera on the end is passed down the esophagus to the stomach. Ulcers on the esophageal walls will be seen and any narrowings will be obvious. Biopsies can be taken of any suspicious lesions.

Blood testing to rule in or out treatable causes of megaesophagus should be performed as described above. Further, the patient should be assessed for thyroid disease as well as for laryngeal paralysis.

Laryngeal paralysis is a condition where the folds of the larynx that coordinate opening for breathing and closing for swallowing become paralyzed and floppy. The patient develops a raspy pant and eventually reaches a critical state from inability to take a deep breath. Both laryngeal paralysis and megaesophagus stem from disease of the vagus nerve so these two conditions tend to accompany one another.

Despite all the diagnostic tests, the majority of megaesophagus cases are idiopathic, which means that no underlying cause can be found. The patient is usually age 5 to 12 years in age and a large breed dog. If there is no defined underlying cause, general management of the megaesophagus is implemented as described below.

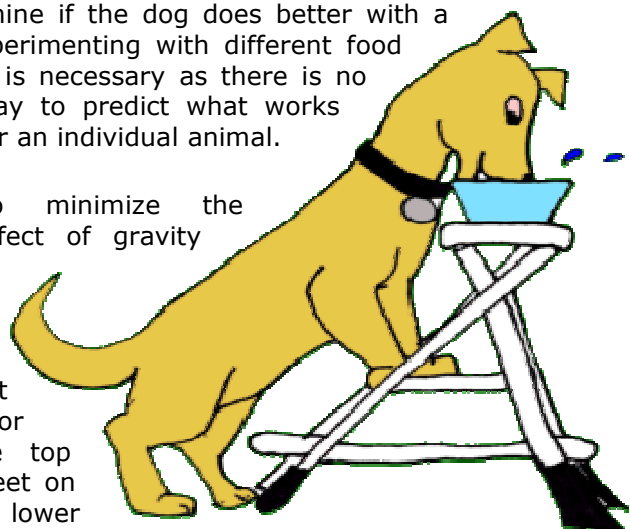
## Treatment

*Food Consistency.* The first step is to determine if the dog does better with a liquid, dry or meatball type or solid diet. Experimenting with different food consistencies including water versus ice chips is necessary as there is no way to predict what works for an individual animal.

### *Elevated Feeding*

on food (and thus minimize regurgitation) you must train the dog to eat in an elevated position. Elevated feeding can be accomplished in several ways and it is of such importance that we would like to review it further. For many dogs a stepstool with three or so steps works well. The food is placed on the top platform and the dog must eat with his forefeet on one of the upper steps and his rear feet on the lower

To minimize the effect of gravity



steps. Ideally, the pet should be kept in this position for 10- 15 minutes after the meal. Water must be consumed in the vertical position as well. Three to four small meals during the meal are recommended, and it is important that animals with megaesophagus have access to no food or and sometimes no water other than at supervised meal times.

Alternatively, a Bailey Chair can be constructed. The Bailey Chair was invented by the owners of a megaesophagus dog named Bailey. It allows for upright feeding and, even more helpful, maintaining the dog in the upright position 15 minutes or so after eating to help the food reach the stomach. The chair is relatively easy to construct and the family who invented the chair is happy to send an instructional video. They can be reached through the Yahoo! Megaesophagus Newsgroup at <http://pets.groups.yahoo.com/group/megaesophagus>.

### **The Feeding Tube**

If elevated feeding is not providing adequate nutrition for the patient, a gastric feeding tube is an alternative. The tube allows food to be delivered directly into the stomach, skipping the diseased esophagus. This does not end regurgitation, as the animal will still be swallowing saliva throughout the day and periodically regurgitating that saliva, but the food regurgitation should be controlled with tube feeding.

The feeding tubes can be placed in the stomach either surgically, endoscopically, or using stomach tube applicators. The tube exits the body from the side where it is comfortable for the pet. A protective bandage is used for daily wear and a clamp prevents leakage of stomach contents from the tube. The pet owner must be comfortable changing the dressings around the tube, for as long as they are needed.

Food is administered as blended slurry through the tube. A liquid diet can be purchased, or homemade food can be made with a blender and strainer. With the tube, food is administered cleanly with no spillage. Some water in a syringe is used to clear the tube before and after feeding.

### **Medications**

A medication called metoclopramide (Reglan®) may help increase the tone of the lower esophageal sphincter. Medication for nausea may be helpful for patient comfort and strong antacids will help minimize acid related damage to the esophagus when food is regurgitated from the stomach.

A motility modifier called cisapride is helpful in many cases. Theoretically this should not be so as the type of muscle in the dog's esophagus is not of a type that should be affected by this medication. Nonetheless, many individuals experience fewer episodes of regurgitation while on cisapride. Given the difficulty in managing this condition, I recommend at least a one-week trial for any megaesophagus patient. Cisapride also is able to increase lower esophageal sphincter tone. Cisapride is no longer commercially available in the U.S., but it can be made up by most compounding pharmacists.

Another medication geared at improving the muscle coordination and contraction strength of the esophagus is bethanechol. This medication helps strengthen the muscarinic nerve receptors in the esophagus, ultimately improving muscle tone there. Studies using this medication are on-going.

Another approach is to consider that a relatively large number of dogs with localized or focal myasthenia gravis will test negative with the usual blood tests for myasthenia gravis. These dogs

respond to treatment for myasthenia gravis so many specialists recommend treating the idiopathic megaesophagus patient for myasthenia gravis to see if improvement results.

Aspiration pneumonia is treated with fluids and antibiotics as is any other bacterial pneumonia, although these individuals may re-aspirate at any time and require treatment all over again. Hospitalization may be required.

Dogs and cats with megaesophagus due to esophagitis are often treated with antacids such as cimetidine (Tagamet®), ranitidine (Zantac®), and famotidine (Pepcid®), as well as protectants such as sucralfate (Carafate®).

Megaesophagus is a difficult condition to manage. Treatment requires dedication and commitment and still may produce poor results. Be sure your veterinarian has answered all your questions about this condition.

Further resources:

[www.caninemegaesophagus.org](http://www.caninemegaesophagus.org)

#### *Gene Mapping Study*

Dr. Leigh Anne Clark at Clemson University is studying the genetic basis of congenital megaesophagus in the dog and would like a cheek swab from any dog that was diagnosed with megaesophagus before age one year. Financial donations to forward research are also welcome. For information or to obtain a cheek swab kit, email Dr. Clark at [lclark4@clemson.edu](mailto:lclark4@clemson.edu).

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#### **References:**

*By Wendy C. Brooks, DVM, DipABVP, VeterinaryPartner.com  
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