

# Gastric Dilation-Volvulus

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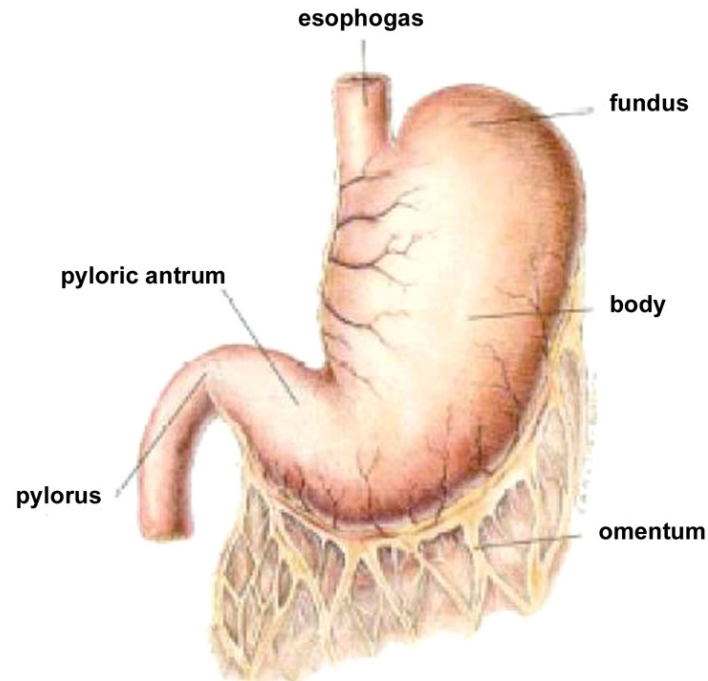
# Physiopathology

- Definitions
  - Normal anatomy
  - Gastric dilation
  - Gastric dilation with volvulus



# Physiopathology

- Definitions
  - Normal anatomy



# Physiopathology

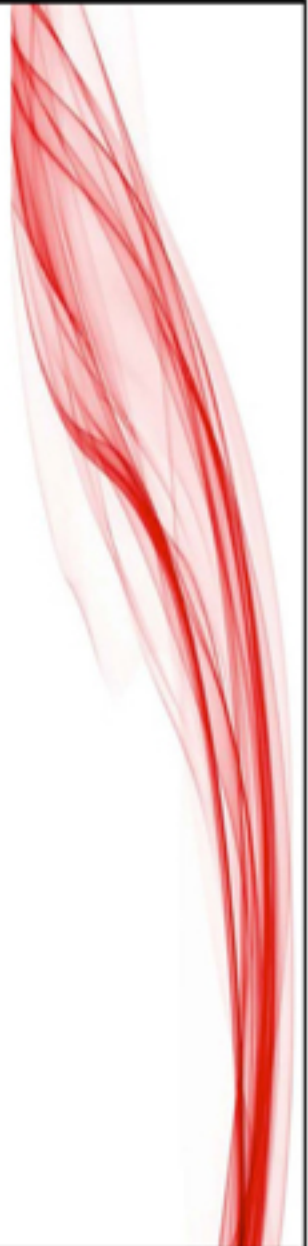
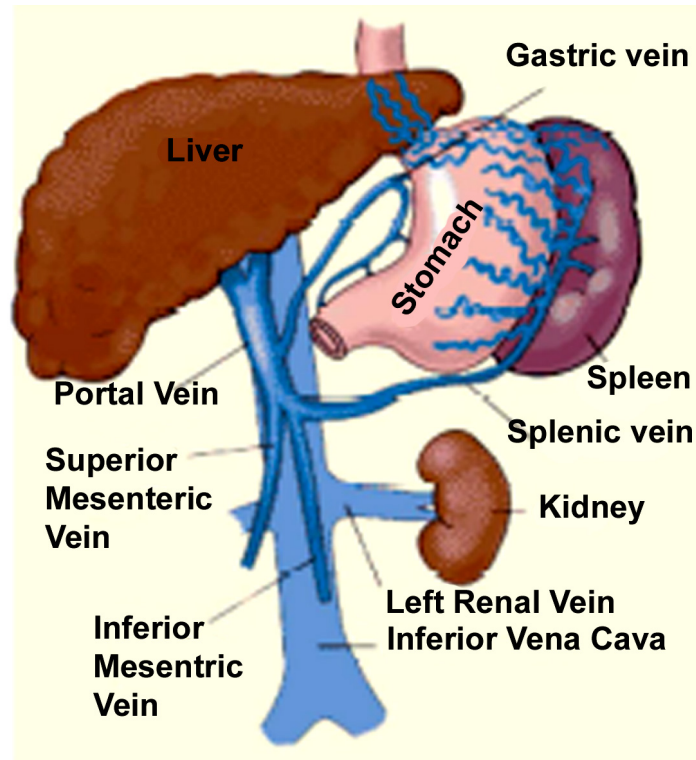
- Decreased blood supply to the stomach





# Volvulus: Consequences

- Cardiovascular



# Volvulus: Consequences

- Cardiovascular
  - Decreased blood return to the heart
  - Hemorrhage
  - Fluid build up in the stomach
  - ➔ **Low blood volume – Hypovolemic shock**



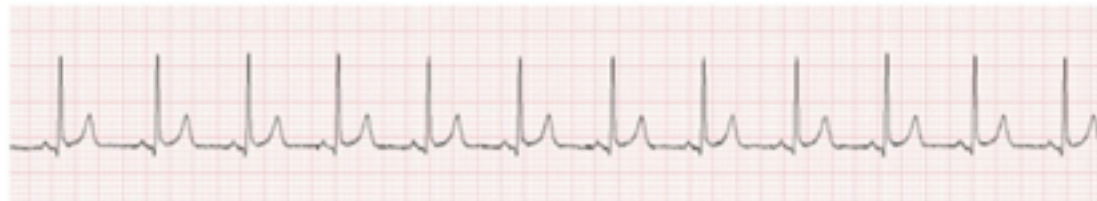
# Volvulus: Consequences

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# Volvulus: Consequences

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  - Abnormal ECG



# What about the Basset Hound?

<i>Breed</i>	<i>2014</i>	<i>2013</i>	<i>2009</i>
<u>RETRIEVERS (LABRADOR)</u>	1	1	1
<u>GERMAN SHEPHERDS</u>	2	2	2
<u>RETRIEVERS (GOLDEN)</u>	3	3	4
<u>BASSET HOUNDS</u>	41	41	34

Breed Popularity in the United States



<http://www.akc.org/news/the-most-popular-dog-breeds-in-america/>



# What about the Basset Hound?

	Prev	Low	High	No. of normal	No. of affected
Gastric dilatation volvulus					
AKC group					
Mixed breed	1.08	0.95	1.21	22,638	45
Herding	1.23	1.01	1.45	9685	39
Hound	1.20	0.91	1.49	5329	15
Non-sporting	2.62	2.23	3.01	6489	27
Sporting	1.93	1.73	2.13	18,884	56
Terrier	3.17	2.68	3.66	4879	6
Toy	1.56	1.31	1.81	9795	3
Working	1.05	0.86	1.24	10,670	75





# What about the Basset Hound?

## Animals

Forty-one dogs with GDV were included in this study. The group consisted of 24 males (2 neutered) and 17 females (1 spayed) with an average body weight of 44.4 kg (range, 24.3–85.0 kg) and an average age of 5.8 years (1–12 years). The breeds were as follows: German Shepherd Dog ( $n = 6$ ), Rhodesian Ridgeback and Bernese Mountain Dog ( $n = 5$  each), Greater Swiss Mountain Dog and Central Asian Shepherd Dog ( $n = 3$  each), Pyrenean Mountain Dog, Doberman Pinscher and Great Dane ( $n = 2$  each), Hovawart, Neapolitan Mastif, Fila Brasileiro, Labrador Retriever, Irish Red Setter, **Basset Hound**, Boxer, Weimaraner, Borzoi, and Giant Schnauzer ( $n = 1$  each) and 3 mixed-breed dogs. 2%

Two hundred and thirty-four dogs were initially identified as presenting for and diagnosed with GDV during this time period. Of those dogs, 124 dogs had preoperative thoracic radiographs. Complete medical records were available for 101 of these cases and could be included in the study. The population consisted of 19 (19%) sexually intact males, 12 (12%) sexually intact females, 43 (42%) castrated males, and 27 (27%) spayed females. Breeds of dogs included mixed breed (14), German Shepherds (14 dogs), Great Danes (13), Standard Poodles (12), St. Bernard (8), Labrador Retriever (6), **Basset Hound** (4), Akita (3), Chow Chow (3), Rottweiler (3), Mastiff breeds (3), Doberman Pinschers (2), Golden Retrievers (2), Great Pyrenees (1), Husky (2), Weimaraner (2), German Short Haired Pointer (2), Boxer (1), Irish Setter (1), Chesapeake Bay Retriever (1), Greater Swiss Mountain Dog (1), Samoyed (1), English Springer Spaniel (1), and Rhodesian Ridgeback (1). 2%

This study included 130 dogs diagnosed with GDV, of which 83 and 47 were in the study and control groups, respectively. Two dogs were excluded from the study, 1 due to concurrent mesenteric root torsion and 1 had concurrent splenic hemangiosarcoma. The following dog breeds were represented in the study: German Shepherd (32 dogs), Great Dane (22), mixed breed (18), Saint Bernard (9), Boxer (6), Irish Setter (5), Berger Blanc Suisse (4), Belgian Malinois, Rottweiler, Rhodesian Ridgeback, Mastino Napolitano, Weimaraner, (3 each), Labrador and Golden Retrievers, Doberman Pincher, Akita, Newfoundland, Italian Mareman (2 each), **Basset Hound**, Cane Corso, Shar-Pei, Afghan Hound, Bull Mastiff, Chow-Chow, Dalmatian, and Great Pyrenees (1 each). There were no significant differences <1%

All 118 dogs that underwent exploratory celiotomy to treat an episode of GDV at the Laro Maggiore Veterinary Clinic between 2002 and 2005 met the criteria for inclusion in the study. Of the 521 dogs that underwent exploratory celiotomy for reasons other than GDV at the Lago Maggiore Veterinary Clinic between 2002 and 2005, 342 met the criteris for inclusion in the control group.

For the 118 dogs that underwent exploratory celiotomy for GDV, mean age was 8.1 years (median age, 8 years). Twelve (10.2%) dogs had a concurrent gFB detected via gastrointestinal tract palpation or visualization and confirmed during gastrotomy (via gastric lavage in 1 case). The mean and median ages for these twelve dogs were each 6.5 years. The FBs retrieved were classified as follows: bones (1 Great Dane, 1 Basset Hound, 1 crossbred dog, and 1 Rottweiler), stones (1 Dogue de Bordeaux and 1 Italian Hound), plastic material (1 Rottweiler and 1 Bernese Mountain Dog), stick ( Briard), socks (1 German Shepherd Dog), and underpants (1 Great Dane). All the FBs were in the dogs stomachs.



# Predisposing factors

- Non-dietary factors
  - Older age
  - Male
  - Lean body condition
  - ↑Thoracic depth/width
  - First degree relative
  - Aggressive or fearful
  - Gastric foreign body in breeds at risk



# Predisposing factors

- Dietary factors
  - Small food particles
  - Feeding once a day
  - Feeding from an elevated bowl
  - Large amount of food
  - Eating rapidly (large but not giant breeds)
  - Aerophagia



# Predisposing factors

## Champion Bloat Initiative Sponsors (\$50,000+):



## Lead Bloat Initiative Sponsors (\$25,000 - \$49,999):

~~Basset Hound Club of America~~  
~~German Shepherd Dog Club of America~~  
Newfoundland Club of America Charitable Trust

## Charter Bloat Initiative Sponsors (\$10,000 - \$24,999):

Akita Club of America  
American Black & Tan Coonhound Club  
American German Shepherd Dog Charitable Foundation  
Briard Club of America Health and Education Trust  
Doberman Pinscher Club of America  
Gordon Setter Club of America  
Greater Swiss Mountain Dog Club of America  
Orthopedic Foundation for Animals  
Weimaraner Club of America

## Bloat Initiative Sponsors (\$2,500 - \$9,999):

American Bloodhound Club  
American Chesapeake Bay Retriever Club  
Borzo Club of America  
Delaware County Kannerl Club  
English Springer Spaniel Field Trial Association  
Flat-Coated Retriever Foundation  
Forthright Kannerl Club  
German Wirehaired Pointer Club of America  
Great Pyrenees Club of America  
Irish Wolfhound Club of America  
Kuvaja Fanclub of America  
Poodle Club of America Foundation  
Rhodesian Ridgeback Club of the United States  
Scottish Deerhound Club of America  
Tartan Gordon Setter Club  
Versatility in Poodles



## AKC Canine Health Foundation Bloat Initiative

<http://www.akcchf.org/canine-health/your-dogs-health/bloat/>



# Predisposing factors

## Code of Ethical Conduct

Last Updated on Sunday, 25 January 2015 06:40

Published on Thursday, 06 May 2010 18:24

Each member of the Basset Hound Club of America will consider the welfare of the breed when engaging in any activities involving the breeding, selling or competition of Basset Hounds. BHCA members, both individuals and member clubs, are urged to comply with the following guidelines:

1. Members of the Basset Hound Club of America will abide by the constitution and by-laws of BHCA and of the American Kennel Club.
2. Members will ensure that all dogs in their care are provided adequate food, water, and shelter, opportunity for exercise, veterinary care, and personal attention to monitor their needs.
3. Breedings will be directed toward producing Basset Hounds of exceptional quality in breed temperament, Basset Hound type and ability to hunt game. Only healthy and mature dogs and bitches free of congenital defects and of characteristic breed type, sound structure and temperament shall be bred.
4. Members should not undertake the breeding of a bitch unless they are prepared to act responsibly regarding the disposition of the resultant puppies. Members shall be discriminating in the placing of puppies and adult hounds, choosing environments in which the Basset Hound will receive suitable care and affection and will not be misused.
5. Basset Hounds offered for sale or males offered at stud must be presented honestly regarding their pedigrees, their potential as bred and their faults or the fault possibilities that may develop in maturity.
6. Members of the Basset Hound Club of America will follow good business practices and ethics in breeding and sales contracts and will honor all agreements. Written agreements in all dealings regarding Basset Hounds are strongly encouraged.
7. No member of this club shall engage in the wholesaling of litters or the selling of breeding stock to commercial sales operations ("puppy mills"). No member will offer or supply Basset Hounds for prizes, raffles, or lotteries.
8. No member shall engage in false or misleading advertising or misrepresentation of his/her Basset Hounds or those of competitors.
9. Members will practice the principles of good sportsmanship, considering competition to be a challenge, not a threat.
10. All members of the Basset Hound Club of America shall conduct themselves in all aspects of the sport of dogs in a manner designed to reflect credit upon our breed and our club.

[http://www.basset-bhca.org/index.php?option=com\\_content&view=article&id=56&Itemid=133](http://www.basset-bhca.org/index.php?option=com_content&view=article&id=56&Itemid=133)





# Predisposing factors

- Future avenues
  - Nelson et al., **Michigan State University**
    - Relationship b/w abnormal contraction and GDV
    - Define biochemical and genetic alterations (Motilin)

## **1935: Abnormalities in the Stomach's Ability to Contract Predisposes Large-Breed Dogs to Bloat**

Principle Investigator: Laura L. Nelson, DVM; Michigan State University  
Grant Amount: \$233,774.00

### **Collaborative Team:**

Dr. John C. Fyfe, DVM, PhD; Michigan State University  
Dr. James J. Galligan, PhD; Michigan State University  
Dr. Joe G. Hauptman, DMV; Michigan State University  
Dr. William A. Horne, DVM, PhD; Cornell University  
Dr. Kent R. Refsal, DVM, PhD; Michigan State University  
Dr. Bryden J. Stanley, BVMS; Michigan State University



**AKC Canine Health Foundation Bloat Initiative**



# Predisposing factors

- Future avenues
  - Sharp et al., **Tufts University**
    - Genome wide association study
      - Epigenomics, transcriptomics, proteomics and, metabolomics

## 1937: Evaluating the Complex Genetic Basis of Bloat

Principle Investigator: Claire Rebecca Sharp, BVMS; Tufts University

Grant Amount: \$251,097.00

Collaborative Team:

Dr. Jerold S. Bell, DVM; Tufts University

Dr. Steve Hannah, PhD; Nestle Purina PetCare Company

Dr. Kerstin Lindblad-Toh, PhD; Broad Institute

Dr. Elizabeth A Rozanski, DVM; Tufts University



Irish Setter being treated for bloat.

**AKC Canine Health Foundation Bloat Initiative**



# When to be concerned?

- Acute onset (most often)
- Agitation
- Hypersalivation
- Restless
- Apparent discomfort or abdominal distension
- Collapse, pale mucous membranes, obtundation, stupor, or coma





# What's next?

- **Gastric dilation**
  - Medical emergency
  - Consider surgery in the future
- **Gastric dilation-volvulus**
  - Medical emergency
  - Surgical emergency
  - Not all clinics are equipped for the surgery



**Call the vet!**



# What to expect at the vet?

- Triage exam
  - **Airway**



# What to expect at the vet?

- Triage exam
  - **Airway**
  - **Breathing**
    - **Respiratory distress?**
      - Increased effort
      - Increased rate
      - Crackles



# What to expect at the vet?

- Triage exam
  - Airway
  - Breathing
  - Circulation
    - Does the dog have clinical signs of shock?



# What to expect at the vet?

- General exam
  - Pain
  - Abdominal enlargement

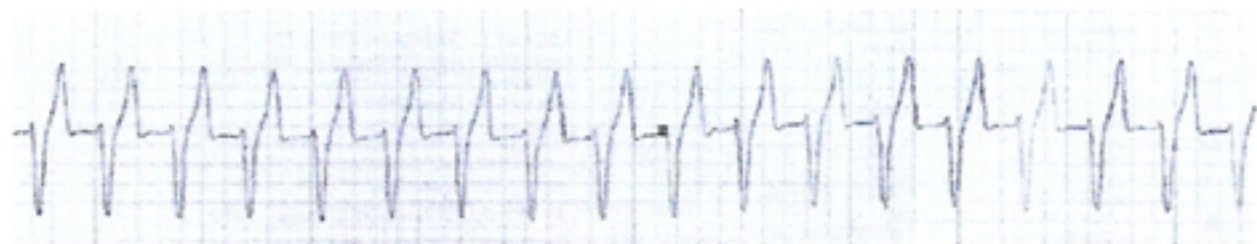


# What to expect at the vet?

- ECG



# Abnormal ECG





# Pre-operative care



# Pre-operative care

- Treatment of shock
- Goal: restore blood volume
  - IV catheter placement



# Pre-operative care

- Treatment of shock
- Fluids
  - Lots of it
  - 20-30 minutes
  - Importance of resuscitation prior to transport!  
Unless travel time is minimal



# Pre-operative care

- Analgesia



# Pre-operative care

- Treatment of arrhythmia?
  - Isolated VPC



# Pre-operative care

- Gastric decompression
  - Percutaneous
    - Clip, clean, surgical prep
    - Large catheter inserted through the skin into the stomach to relieve the pressure



# Pre-operative care

- Gastric decompression
  - Percutaneous
  - Oro-gastric
    - +/- sedation – anesthesia
    - Intubate patient
    - Lubricate tube
    - Gentle rotation





# Pre-operative care

- Gastric decompression
  - Percutaneous
  - Oro-gastric
  - No difference between the two techniques



# Definitive treatment

- Exploratory celiotomy
  - Gastric de-rotation
  - Assess gastric wall viability
  - Gastropexy
  - Splenectomy?



# Post-operative care

- Recumbency
  - Switch sides
  - Passive range of motion
- Analgesia
- Arrhythmias
- Dehiscence of the sutures



# Post-operative care

- Recumbency
- Analgesia
  - Medications
  - Nursing
- Arrhythmias
- Dehiscence



# Post-operative care

- Recumbency
- Analgesia
- Arrhythmias
  - ECG monitoring
  - Consider arrhythmia treatment
- Dehiscence



# Post-operative care

- Recumbency
- Analgesia
- Arrhythmias
- Dehiscence



# How to prevent GDV?

- Prophylactic gastropexy
  - Open abdomen
  - Laparoscopy
  - Endoscopy assisted



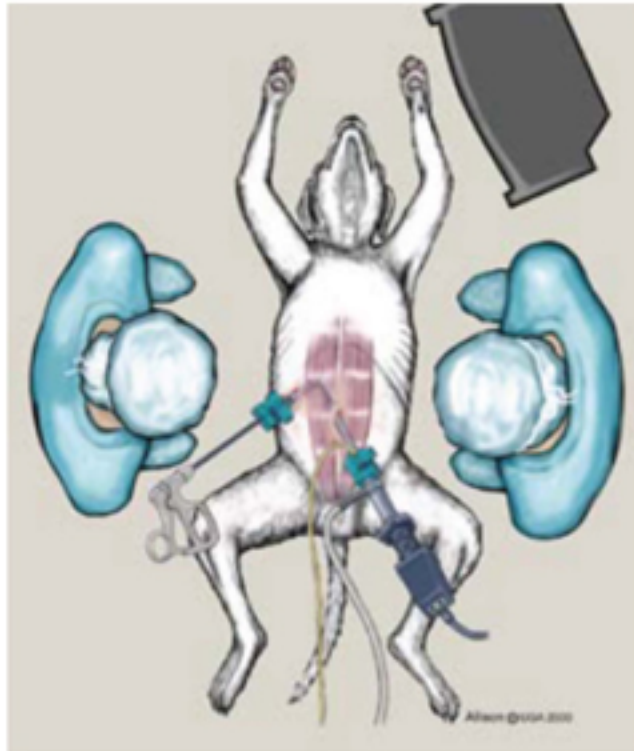


**VIEWER  
DISCRETION  
ADVISED**



# Prophylactic gastropexy

– Laparoscopy

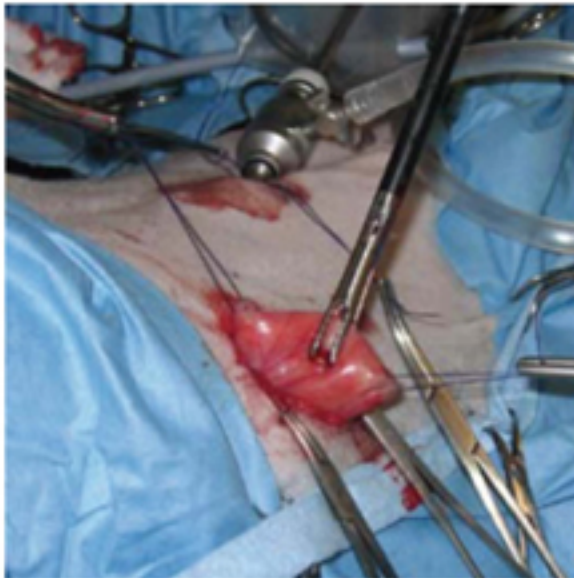


**VIEWER  
DISCRETION  
ADVISED**



# Prophylactic gastropexy

## – Laparoscopy



*Preventative gastropexy tacks the stomach wall to the abdominal wall to prevent it from rotating on itself to cause volvulus.*



# Prophylactic gastropexy

— Laparoscopy



# Conclusion

- Complex syndrome
- Severe systemic consequences
- Broad approach to cardio-respiratory support
- Early and rapid
  - Recognition
  - Treatment
- Future research and incidence





# Gastric Dilation-Volvulus



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*A few slide images have been clarified from the original.*