VET 433B: Gastric Dilation and Volvulus

Pathophysiology

- Three clinical syndromes
  - Gastric dilation
  - Gastric dilation / volvulus
  - Chronic volvulus
- Clockwise rotation of 270-360° most common

Risk factors

- Overall complex and poorly understood
- Intrinsic factors
  - Increased thoracic depth to width ratio
  - First-degree relatives affected
  - Increasing age
  - Underweight dogs
- Extrinsic factors
  - Dogs fed once daily
  - Dogs fed from a raised food bowl
  - Behavior that promotes aerophagia
  - Stress
  - “Happy” or “easygoing” dogs are protected
- Breed-Related Risk
  - Great Danes 40%, 10x
  - Irish Setters 25%, 3.5x
  - Standard Poodles 25%, 3.5x
  - Weimaraners 20%, 4.6x
  - Rottweilers 4%

History and Clinical Signs

- Retching, non-productive vomiting
- Hypersalivation
- Restlessness
- Abdominal distention
- Weakness
- Collapse

Physical Examination

- Distended, tympanic cranial abdomen
- Splenomegaly
- Hypovolemic shock
    - Pale, dry mucous membranes
    - Weak pulses
    - Prolonged CRT
    - Tachypnea
    - Arrhythmias

Laboratory findings

- CBC
    - Hemoconcentration
    - Inflammatory leukogram
    - Evidence of DIC
        - Decreased platelet count
    - Biochemistry
        - Hepatocellular damage
        - Biliary stasis
        - Azotemia
        - Hypoproteinemia
    - Coagulation profile
        - DIC
    - Blood gas analysis
        - Metabolic acidosis
    - Lactate
        - Can be prognostic but do not use it as a reason to not do surgery
        - Biomarker associated with global hypoperfusion
            - > 6 mmol/L is associated with a higher chance of gastric necrosis
            - Final prognosis is worse in dogs with
                - Final lactate of >6.4mmol/L
                - Change in absolute lactate <4mmol/L
                - % change in lactate <42.5%
            - Guidelines
                - Initial lactate <4mmol/L may be associated with fewer complications
                - Initial lactate of >6mmol/L may increase GN and complications

Diagnosis

- Clinical signs
- Plain radiography
    - Right lateral
    - Ventrodorsal

Management of GDV

- Surgical emergency
- Hemodynamic stabilization
- Gastric decompression
- Surgical management
    - Correction of rotation +/- gastric necrosis
    - Prophylactic gastropexy
- Post-operative management

Emergency stabilization

- Treat for hypovolemic shock
- 18g catheters in both cephalic veins
- Fluid therapy
    - Isotonic fluids
        - 45-90 ml/kg then 10-20 ml/kg/h
    - Colloids-Dextran or hetastarch (10 ml-20 ml/kg)
    - Hypertonic saline 4-6 ml/kg
    - Blood products?

Gastric decompression

- Orogastric tube
    - Use no or mild sedation
        - Opioid +/- diazepam/midazolam
        - Avoid acepromazine
    - Administer oxygen
- Trocarization
    - Aseptically prepare an area in the right or left paracostal space at the site of greatest tympany
    - 18g over the needle catheter
    - Perform stabbing motion

    - Remove stylet
    - Can usually hear or smell gastric contents

Surgery

- Usually 180° and clockwise twist
    - Grasp pyloris with one hand on the left side of the body and stomach on the right side with other hand
    - Push down on the right and pull pylorus up from the left side
    - Gently untwist stomach moving in an anti-clockwise direction by moving the pylorus from a left to ventral to right direction
- Assess viability once decompressed
    - Color
    - Consistency
    - Blood flow
    - Motility
- Mucosa versus seromuscular layer
- More objective diagnosis
    - Surface oximetry is useful but not practically relevant
    - Fluorescein dye is unreliable
- Gastric resection
    - Suture
    - Stapling techniques
    - Gastric invagination as a time-saving idea?
- Incisional gastropexy
    - Simple continuous
        - This is the simplest and quickest open gastropexy and has been shown to be highly effective against recurrent GDV
        - There are many forms but none have been proven to be superior

Postoperative Care

- Fluid therapy
- Analgesics
- Gastric wall protection
    - H_2 receptor antagonists
    - Coating agents
    - Proton pump inhibitors
- Antibiotics

- Promotility agents
    - Metoclopramide

Post-Operative Complications

- Cardiac arrhythmias
    - Normally do not need to treat if the patient is normotensive
    - Can treat with anti-arrhythmics if multifocal, v-tach, hypotension, tachycardia, R on T phenomenon
        - Lidocaine, procainamide
- Aspiration pneumonia
    - Bad combination
    - Perform trans- or endotracheal wash
    - Begin nebulization/coupage
    - Antibiotics
- DIC
    - Release of inflammatory mediators causes endothelial damage and microvascular thrombosis
    - Lab signs
        - Prolonged PT/PTT
        - Thrombocytopenia
        - Decreased fibrinogen
        - Increased FDP/D-dimers
    - Treat with fresh frozen plasma
    - Poor prognosis
- Pancreatitis
- Hypoproteinemia
- Post-operative ileus and regurgitation
- Ongoing gastric necrosis
- Dehiscence of gastric resection site

Summary:

Emergency stabilization and post-operative care/monitoring are key to a successful outcome. Overnight care is mandatory.

Permanent gastropexy should always be performed in conjunction with exploratory laparotomy!

Veterinarians should be comfortable with the surgical techniques of gastric resection, splenectomy and gastropexy