Gastrointestinal Foreign Bodies; Food For Thought

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Outline

- Anatomy
- Physiology/Pathophysiology
- Diagnosis
- Pre-op treatment
- Surgery
- Post-op management
- Tips and tricks
- Prognosis

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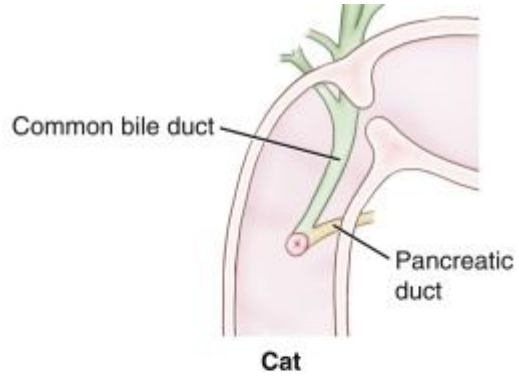
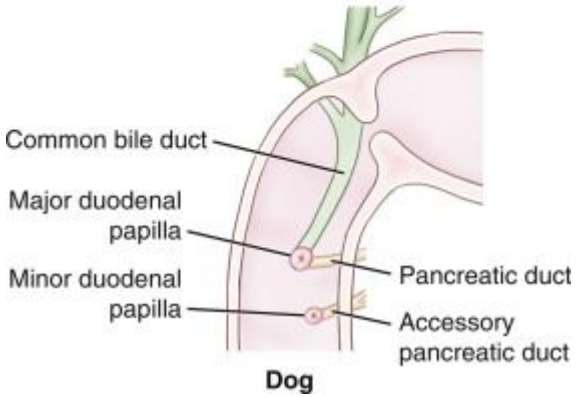
Introduction

- Material that won't readily pass through GIT
- Partial vs full obstruction
- Location of the foreign body
- Size, shape, material of foreign body
- Duration that the foreign body has been present

Anatomy

- Oral cavity □ esophagus □ **Stomach** □ **Duodenum** □ **Jejunum** □ **Ileum** □Cecum □ Colon □ Rectum □ Anus
- **Stomach**
  - Serosa, muscularis, submucosa, and mucosa
- **Duodenum**
  - Common bile duct and pancreatic duct
  - Caudal duodenal flexure
    - Anchored with duodenocolic ligament
  - Close association with pancreas





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Anatomy-jejunum/ileum

- **Jejunum**
  - Most common site for singular FB
- **Ileum**
  - Short, terminal portion
  - Antimesenteric vessel
  - Terminates into ileocecocolic junction

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Anatomy-mesentery/omentum

- **Mesentery**
  - Cranial mesenteric artery
  - Intestinal lymphatics
  - Large mesenteric plexuses
- **Omentum**
  - Surgeons best friend
- **Submucosa**
  - Holding layer

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Physiology

- Segmental specialties
  - Water absorption
  - Digestion
  - Volume reservoir
  - Segmental absorption

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Pathophysiology

- Large esophageal size vs. small intestine
- Causes fluid secretion, malabsorption, and accumulation orad to obstruction
- Irritation to the GI lining and pressure can cause translocation of bacteria
- Either metabolic acidosis or hypochloremic metabolic alkalosis depending on obstruction location

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History and Presentation

- Vomiting, Hyporexia/Anorexia
  - Vomiting vs regurgitation?
  - Increased frequency of vomiting orad
- Observed foreign material
- Diarrhea?
- Hayes, JSAP 2009
  - Vomiting (87%), anorexia (72%), >10% loss of body weight (9%), **diarrhea (5%), and hemorrhagic diarrhea (2%)**
- Hobday, JSAP 2014
  - Vomiting (88-98%), anorexia (80-93%), **diarrhea** (16-23%)

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History and Presentation

Linear Foreign Body

- May be able to visualize
  - 25% of cats, 3% of dogs of all FB animals (Hayes, 2005)
- May have more severe signs (Hobday, 2014)
  - More severe vomiting, anorexia, and lethargy
  - More frequent pain on abdominal palpation

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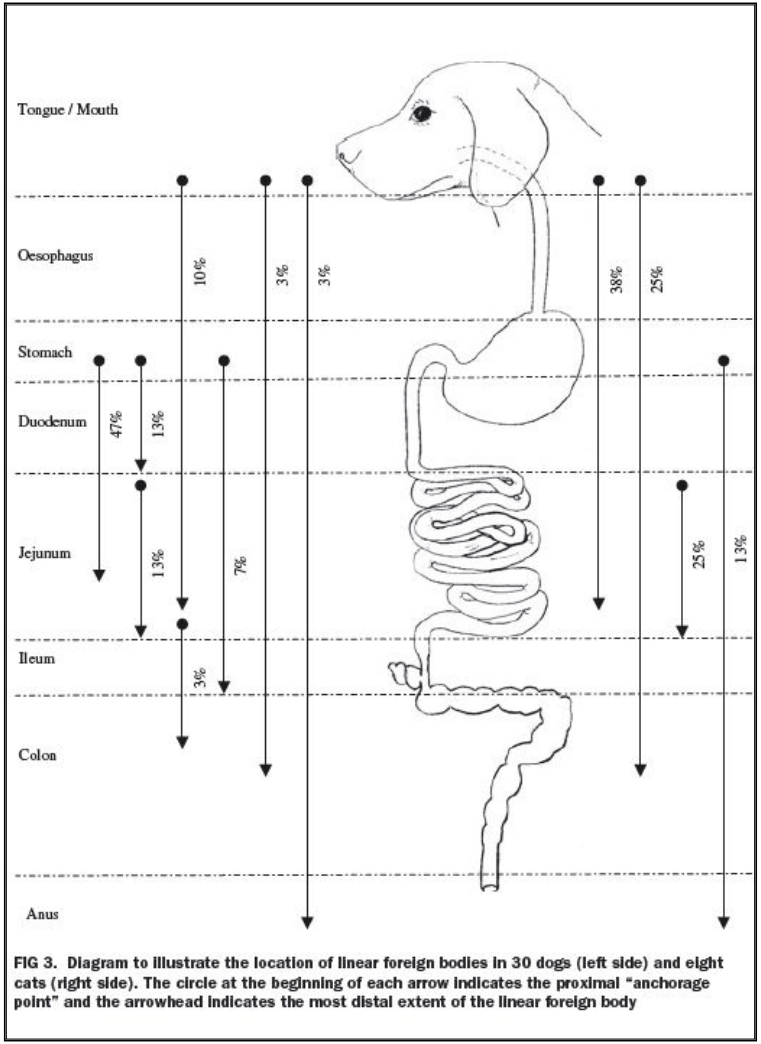
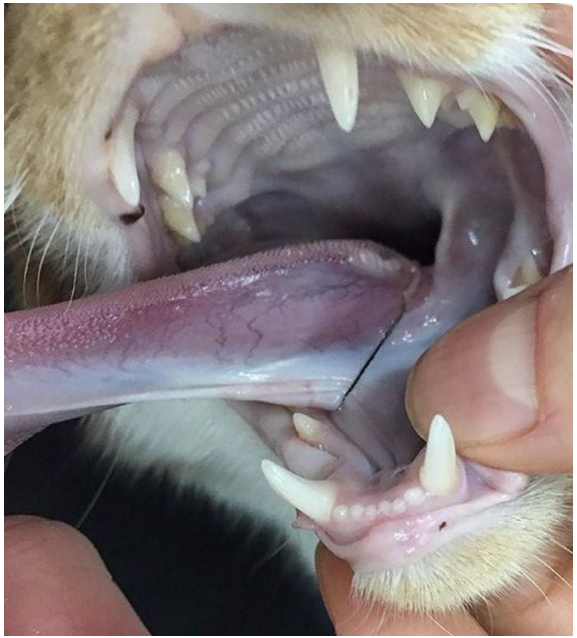


FIG 3. Diagram to illustrate the location of linear foreign bodies in 30 dogs (left side) and eight cats (right side). The circle at the beginning of each arrow indicates the proximal "anchorage point" and the arrowhead indicates the most distal extent of the linear foreign body

Physical exam

- Important diagnostic tool
- Helps round out clinical picture
- Subjective and objective measurements
  - Pain on abdominal palpation
  - String under the tongue
  - BAR



Diagnostics

- History and PE
- Blood work
- Radiographs
- AFAST/AUS

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Diagnostics

Blood work

- Hypochloremia, metabolic alkalosis, hypokalemia, hyponatremia
- No association between site of FB and derrangements
- Linear more likely associated with hyponatremia
- Hyperlactemia noted in 40% (Boag, 2005)

- Dogs with LFB had significantly lower Na^+, K^+ and Cl, and higher bicarbonate, Hct, and BUN (Hobday, 2014)

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Diagnostics

Radiographs

- Radiopaque lesion→ slam dunk
- Barium study?
- Intestinal distension
    - Mechanical vs. Functional ileus
    - Dogs- 1.6x the height of the body of L5
    - Cats- Maximum small intestinal diameter: endplate of L2 >4

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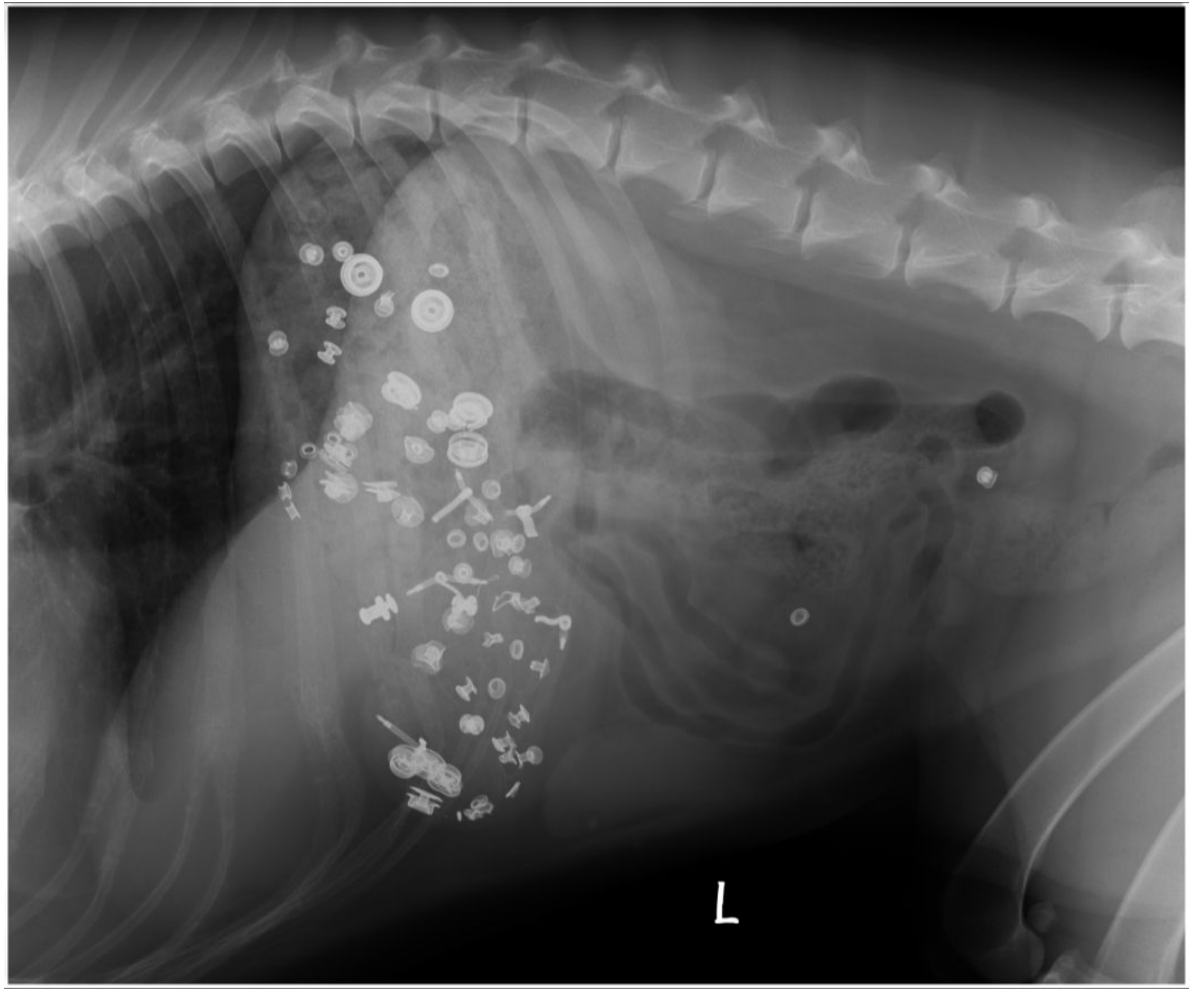
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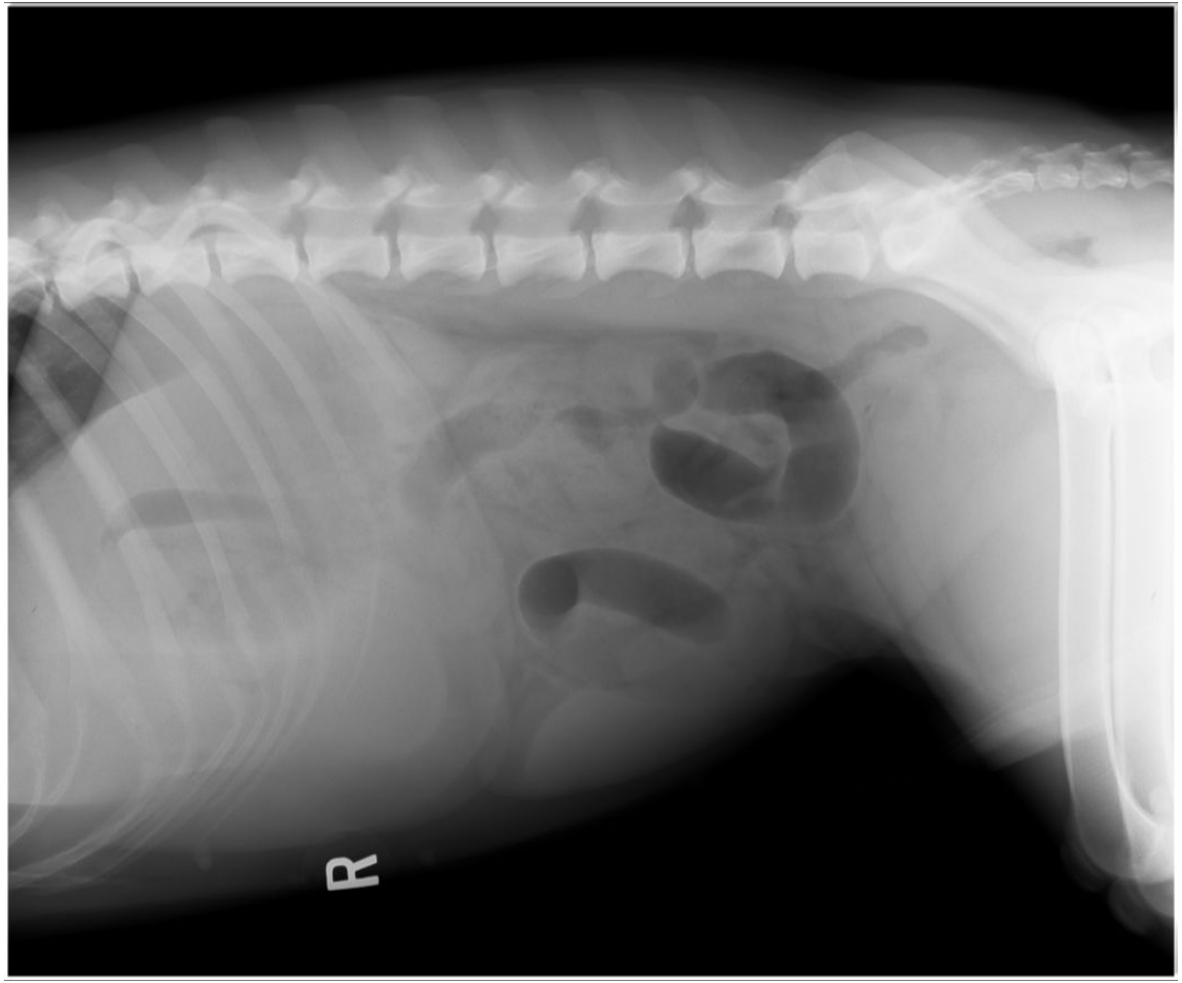
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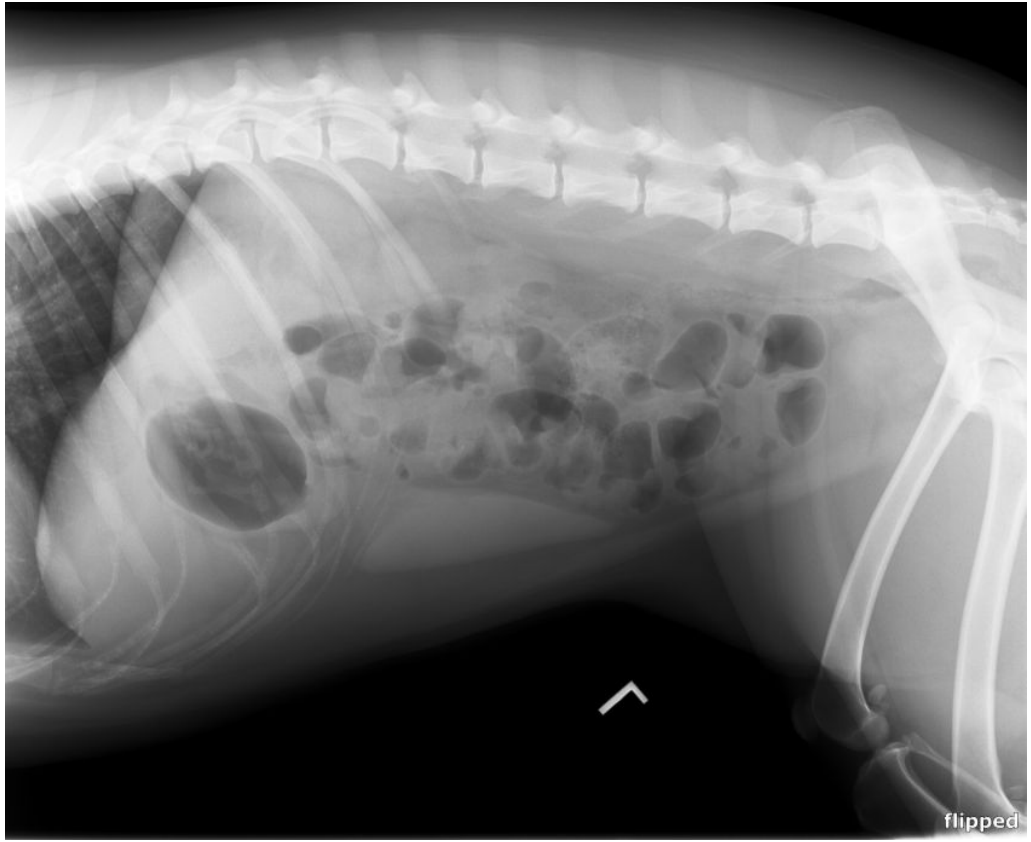
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Diagnostics

Abdominal ultrasound

- Echogenicity differs based on composition
- Can transmit the beam or create marked acoustic shadowing
- Accumulation of fluid visible
- Increased motility in partial obstructions
- Dogs with jejunal serosa-to-serosa diameter of >1.5cm, normal wall layering, and fluid- or gas-filled lumen suspicious

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Diagnostics

Abdominal ultrasound

- Ultrasound
    - Linear foreign body
    - Increased motility
    - Signs of plication/accordion
    - Discrete linear foreign material

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Pre-op treatment

- Pre-operative bloodwork
  - Evaluate dehydration level, electrolyte imbalances, concurrent disease
- Volume resuscitation
  - Begins at hospitalization and progresses through surgery and recovery
  - LRS/P'lyte +/- potassium supplementation
  - Close monitoring of weight and ins/outs

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Pre-op treatment

Antibiotics

- Prophylactic is debated, most often not indicated
  - Early initiation important in septic peritonitis
- Peri-op always indicated
- “Cleanliness” of the surgery *may* dictate post-op treatment

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Pre-op treatment

Antiemetics

- Cerenia is a must!
  - NK1 receptor antagonist
- Pantoprazole
  - Proton-pump inhibitor
- Ondansetron
  - 5-HT3 antagonist

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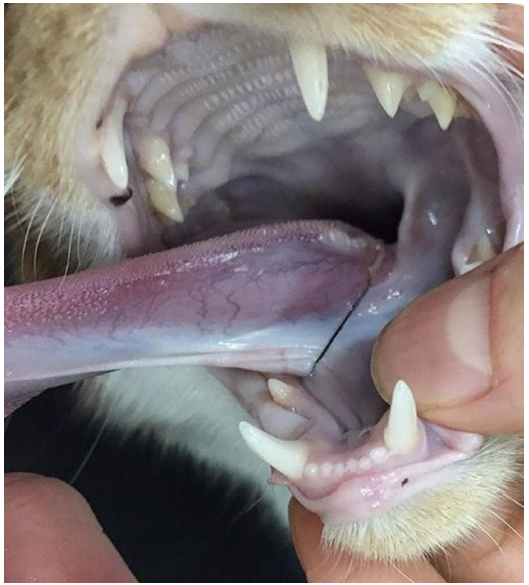
To cut or not to cut

Surgery vs medical management

- Known ingestion of foreign material
- Physical exam
- Diagnostics
- Timing of surgery



To cut or not to cut

In house vs referral

- Further diagnostics needed?
- Comfort with potential need for an R &A
- Overnight staff
- Patient stability
- Cost

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Gastrointestinal healing

Lag/Inflammatory

- First 72 hours
- Enterocyte proliferation, but no support
- Rely on suture

Proliferative/Logarithmic

- 3-14 days post-op
- Fibroblast production of collagen
- 75% normal stomach and SI strength by 14 days, 50% colonic strength

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Gastrointestinal healing

Maturation

- 14-180 days post-op
- Rearrangement/maturation of collagen

Abdominal explore

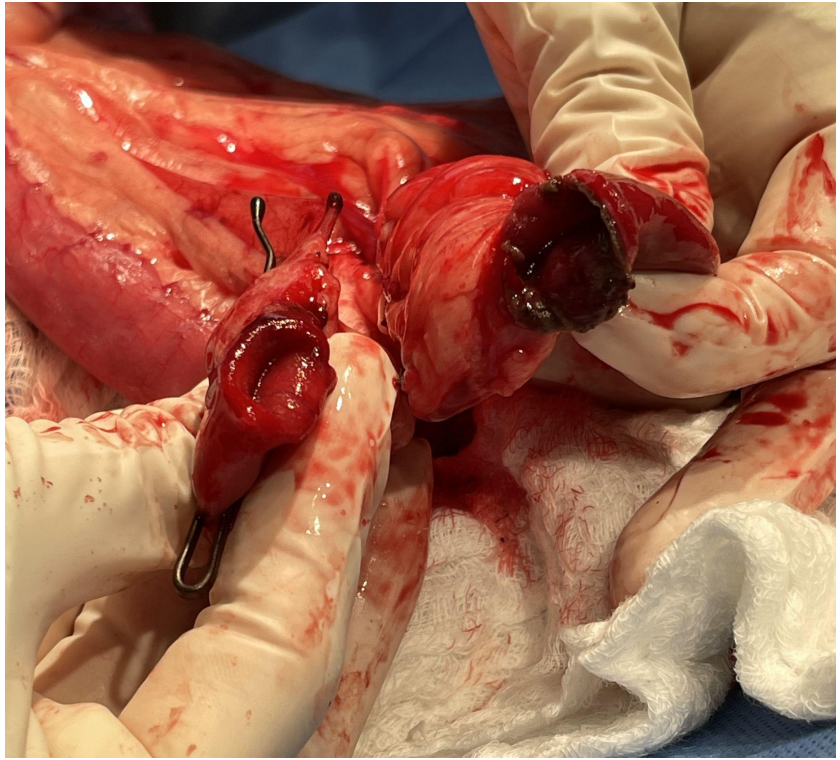
- **Appropriate surgical approach**
  - Visualization is key!
  - Xiphoid to prepuce or 4th mammary
  - Through explore prior to decision making
- **Pass stomach tube to decompress**
  - Prior to gastrotomy
  - In order to allow for through explore
  - Decreases contamination
- **Release the anchor point first.**

Abdominal explore

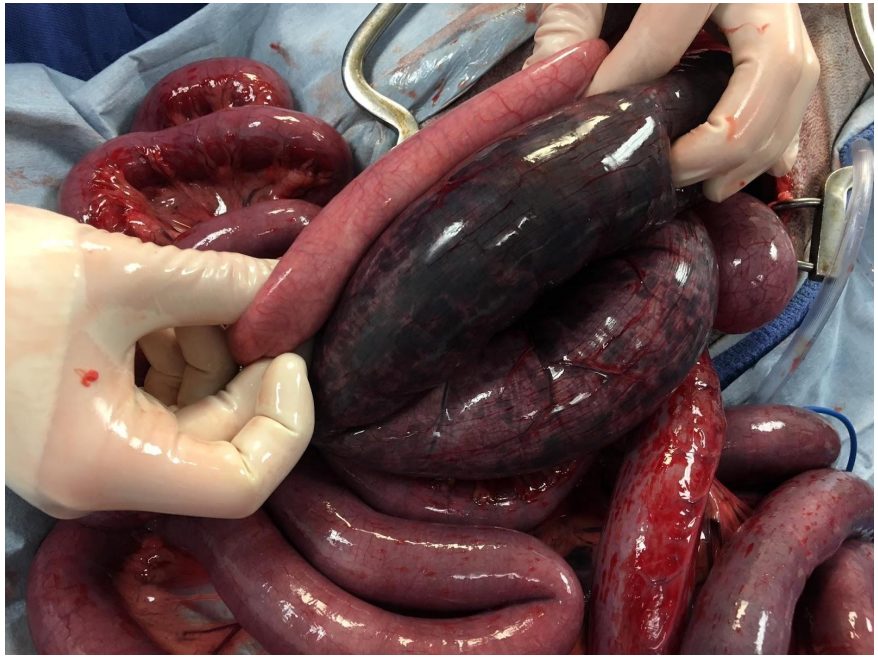
- **Milk the foreign body**
  - Healthier region of intestines
  - Allows full assessment of the mesenteric border
- **Gastrotomy**
  - Double layer closure
  - Inverting patterns, such as Cushing and Connell
- **Enterotomy**
  - Interrupted vs continuous suture line
  - Suture vs skin staples

Intestinal viability

- Color
- Wall thickness
- Peristalsis
- Pulses



Intestinal viability



Suture choice & pattern

- Monofilament
- Limit inflammatory reaction
- Absorbability related to underlying disease
- Interrupted vs continuous
- High level of surgeon preference

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Resection and anastomosis

- Hand sewn vs stapled
- Simple interrupted vs continuous
- Suture material
  - Nylon vs PDS
- Knots on luminal side of mesenteric border
- Ligasure for arterial vessels, releasing duodenal flexure

Suture line reinforcement

Omental Patch

- Can loosely layover site or lightly suture
- Provides vascular pedicle, increased lymphatic drainage, and decreases adhesions

Serosal Patch

- Shown to reliably seal contaminated/infected perforations in humans
- Place antimesenteric side of intestine over site
- Suture with 3-0 or 4-0 interrupted monofilament suture

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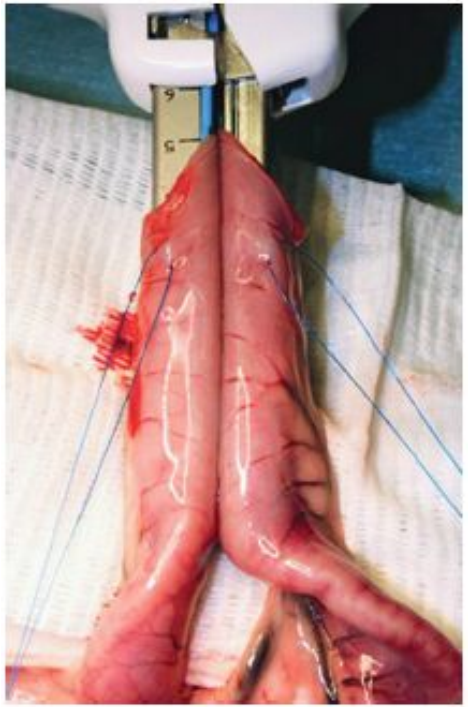
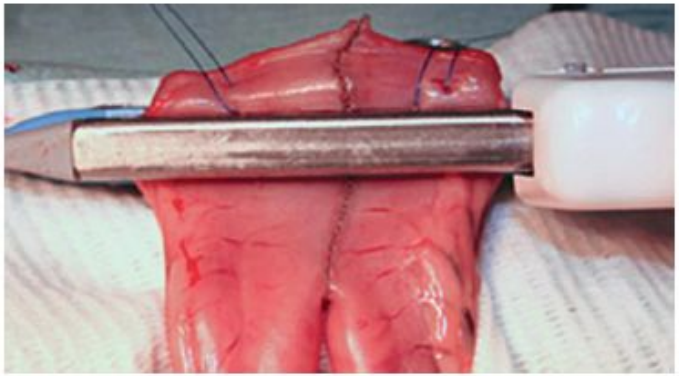
Equipment

- Vessel sealing device
- Stapler
  - Skin vs GIT
- Bobby pins

Stapled R&A





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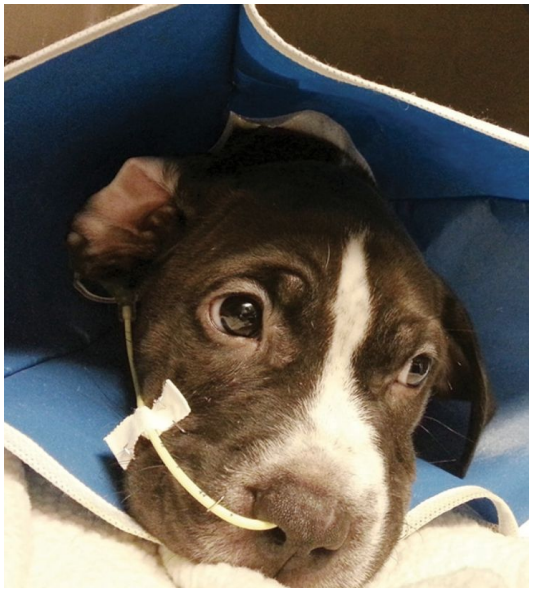
Tips and tricks

- Place an NG tube if high obstruction
- Leak testing?
    - Leak testing reduced instance of leakage in human colorectal surgery
    - No benefit proven in vet med
- Adhesions
- GI protectants to prevent ileus
- Nocita!



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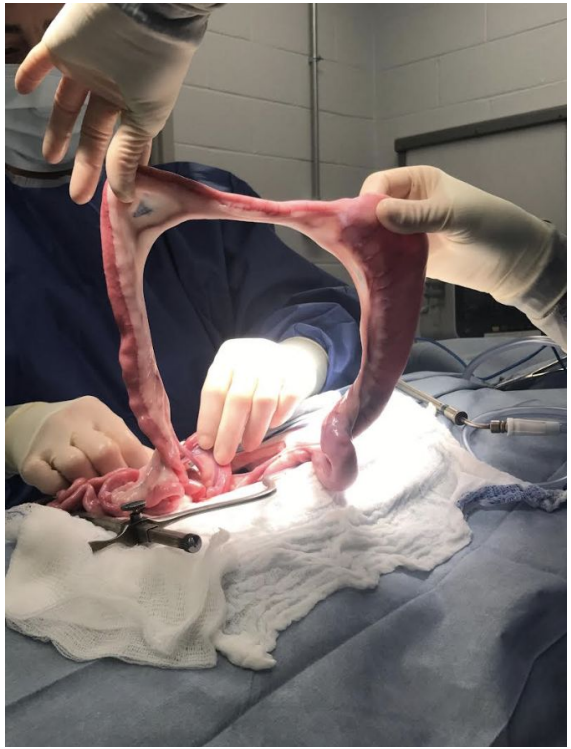
Post-op Complications

- Ileus
- Septic abdomen
- SSI
- (Short bowel syndrome)



Prognostic factors?

- Discrete vs linear FB
- Longer duration of clinical signs
- Multiple surgeries
- Increased lactate
- Hypovolemia
- Hypoalbuminemia
- Presence of pre-op septic abdomen
- Comorbidities
- Steroids

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Prognostic factors?

Outcomes of dogs undergoing immediate or delayed surgical treatment for gastrointestinal foreign body obstruction: A retrospective study by the Society of Veterinary Soft Tissue Surgery (Maxwell 2020)

- Intestinal necrosis and perforation more common when surgery was delayed
- Risk factors include:
  - Increased lactate
  - Linear foreign body
  - Timing of surgery

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Prognostic factors?

Gastrointestinal foreign bodies in dogs and cats: a retrospective study of 208 cases (Hayes 2014)

- Linear FB
  - Vomiting, anorexia, lethargy, pain
  - Intestinal necrosis and R &A more likely
  - Longer hospitalization
  - More costly
  - 96% survival all around

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Conclusions

- Common cases with various presentations
- Decision making important for case outcome
- Many tools in our wheelhouse!
- Communication is key

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QUESTIONS?

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