
CREATING CLARITY
Diagnosis of GI foreign bodies
Presenters: Jesse K Nagy, DVM, MS, DACVR
June 23, 2025
IDEXX
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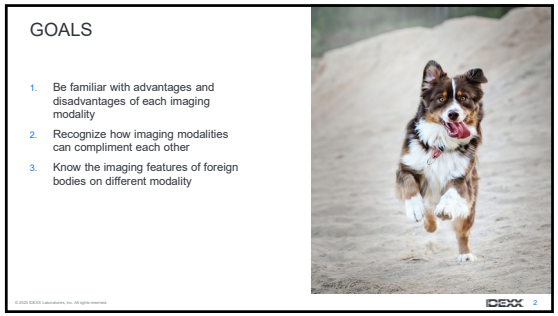
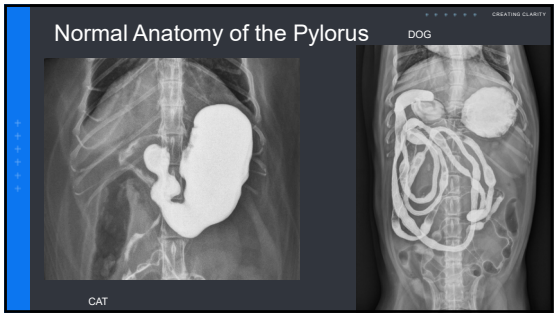
1


GOALS
1. Be familiar with advantages and disadvantages of each imaging modality
2. Recognize how imaging modalities can compliment each other
3. Know the imaging features of foreign bodies on different modality
IDEXX 2

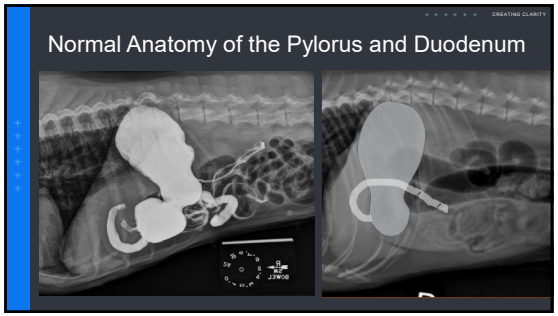
2


CREATING CLARITY
• OUTLINE
Pyloric Outflow Obstructions
Small Intestinal Obstructions
Linear Foreign Bodies

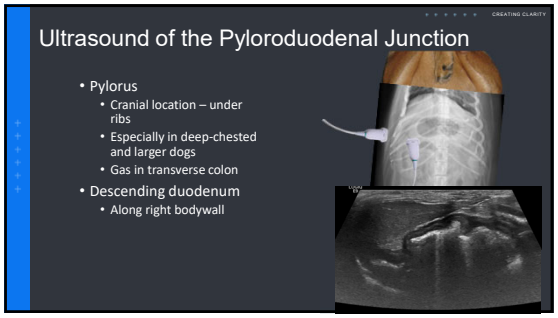
3


CREATING CLARITY
Normal Anatomy of the Pylorus
DOG
CAT

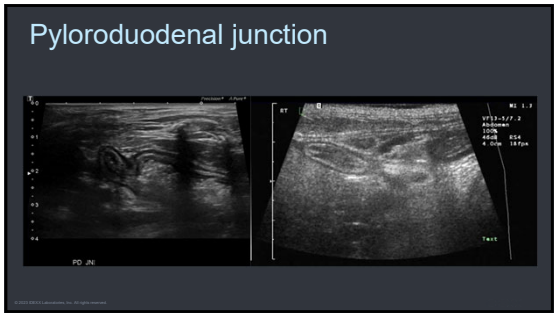
4


CREATING CLARITY
Normal Anatomy of the Pylorus and Duodenum

5


CREATING CLARITY
Ultrasound of the Pyloroduodenal Junction
• Pylorus
• Cranial location – under ribs
• Especially in deep-chested and larger dogs
• Gas in transverse colon
• Descending duodenum
• Along right bodywall

6


Pyloroduodenal junction

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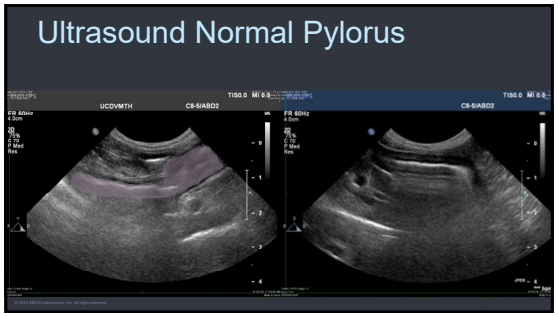
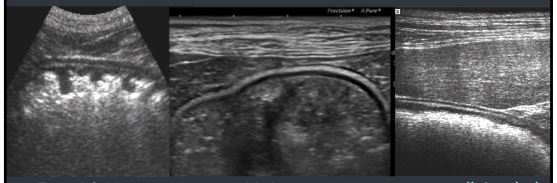

Ultrasound Normal Pylorus

8


Stomach - Empty

9

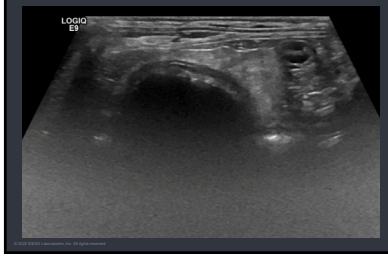
Stomach



Rugal folds with ingesta gas distended

10

Foreign bodies on ultrasound



- Distal acoustic shadow
- Odd shapes/sharp margins

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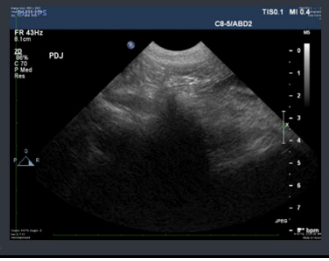
Ultrasound Obstructive Pyloric foreign body



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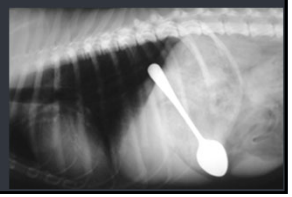
Ultrasound vs. Radiographs Gastric foreign bodies

Ultrasound cannot see through gas

- Pylorus is difficult to ultrasound because patient factors
- Complementary modalities
- Rads give overview – direct the ultrasound
- Aspiration pneumonia
- Esophageal FBs



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Radiographs of the stomach

Squeakers

14

To evaluate gastric outflow tract get both lateral projections

- Use gas in the stomach as negative contrast to fullest advantag
- **To see the pylorus – put patient in left lateral recumbency**

Initial influence of right versus left lateral recumbency on the radiographic finding of duodenal gas on subsequent survey vetnrodorsal projection of the canine abdomen. Daniel Hart & Clifford Berry.*Vet rad & ultraso;*56(1)2015

Prospective study 100 dogs.
Dogs placed in left lateral recumbency first had more gas in duodenum on VD view

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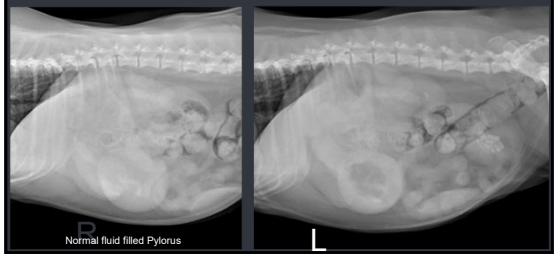
Pylorus right and left lateral views



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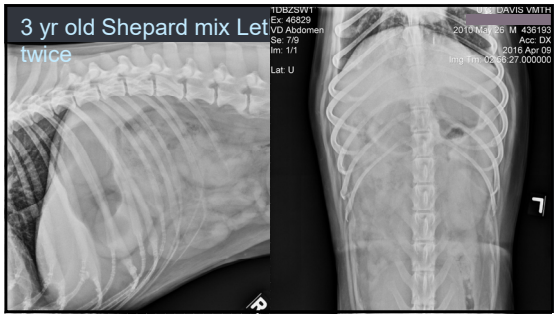
3 yr old Shepard mix Let twice



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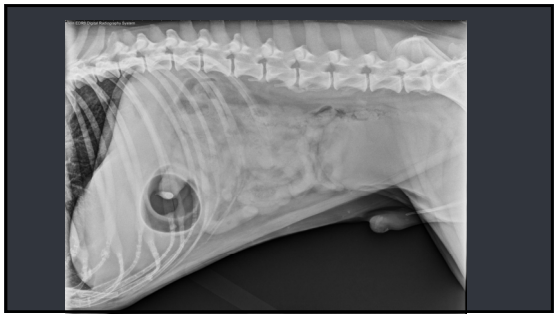

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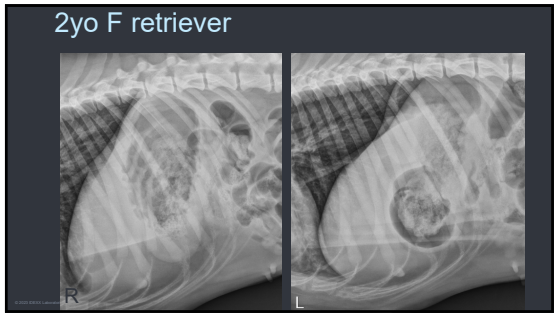

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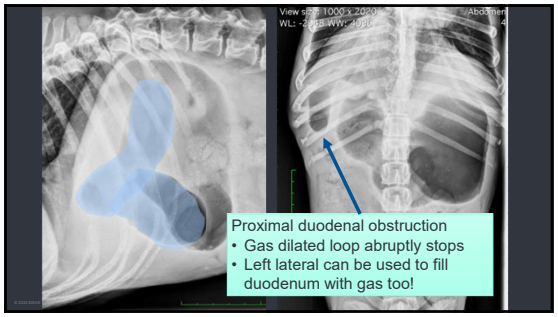

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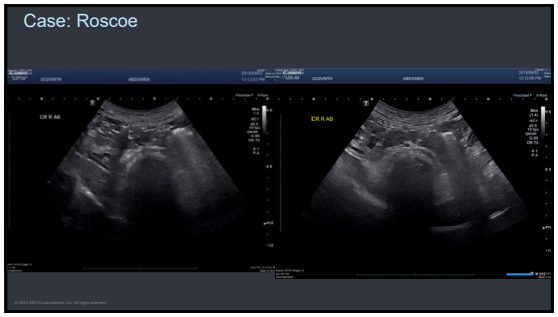

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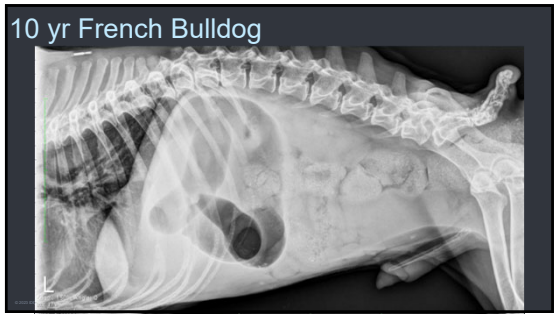

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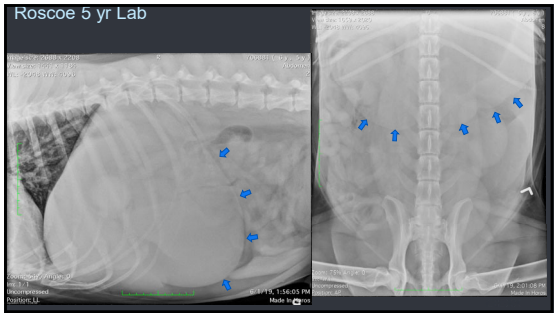

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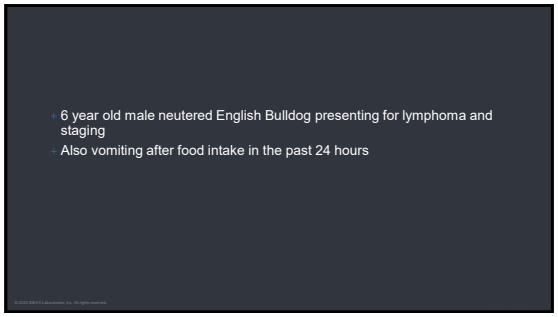

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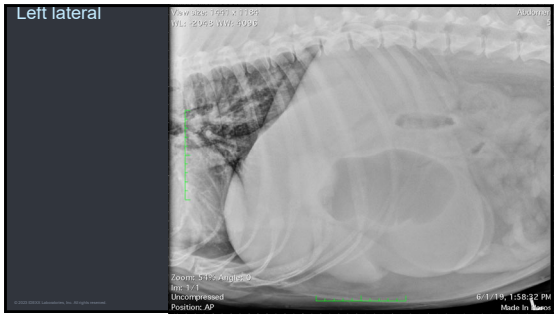

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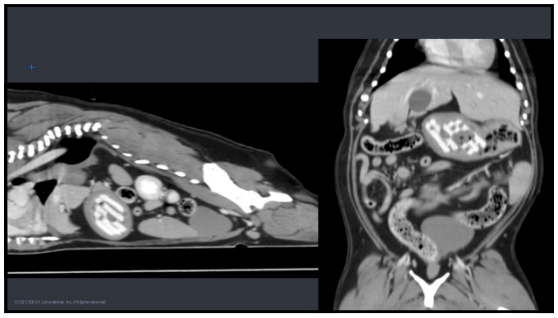

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5 silicone pacifiers retrieved endoscopically

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Take home points on
pyloric outflow obstructions

- A **left lateral** projection is necessary to evaluate the pylorus
- Gas in stomach is natural radiographic contrast – but hinders ultrasound exam
- Pylorus is anatomically challenging to image with ultrasound

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Bruno 3 yr M Flat-Coated Retriever
Anorexia
lethargy

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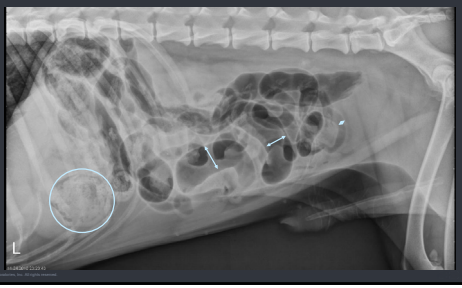

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Small intestinal mechanical obstruction

- "Two populations of bowel"
- "Mixed population of bowel"
- "A sentinal loop = one big dilated loop"

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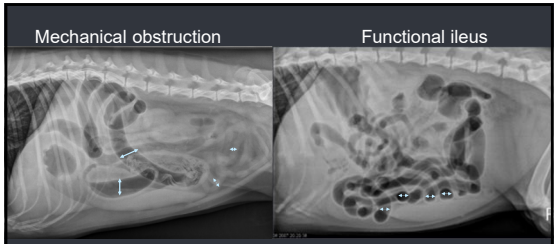

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Mechanical v Functional

Mechanical obstruction

- 2 populations of bowel
  - Outside diameter, not content
- See a FB or mass causing obstruction

Functional ileus

- One population of bowel
- Diffusely distended

35

Radiography for obstruction

Does measurement of small intestinal diameter increase diagnostic accuracy of radiography in dogs with suspected intestinal obstruction? Ciasca TC, David FH, Lamb CR. *Vet Radiol Ultrasound*. 2013; 54: 207–211. https://doi.org/10.1111/vru.12032 PMID:

- 6 reviewers – two 4th yr vet students, two radiology residents, two experienced boarded radiologist
- Sensitivity 20 – 50%
- Specificity 63 – 94%
- Bottom line: Don't feel bad when you are unsure based on rads alone

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Pneumocolon

- If you are unsure if it is colon or distended small intestine
- Negative Contrast Colonography
- Catheter tip syringe, red rubber
- Room air (slow!)
  - 60-100mL/dog
  - 20-30mL/cat

Image curtesy of Lorrie Gashen LSU

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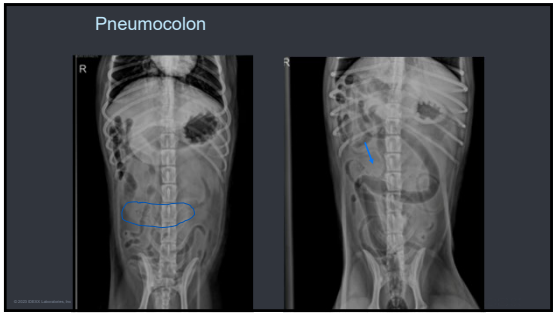

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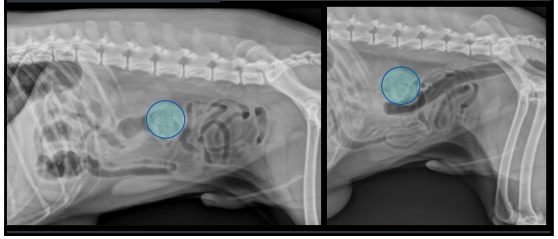

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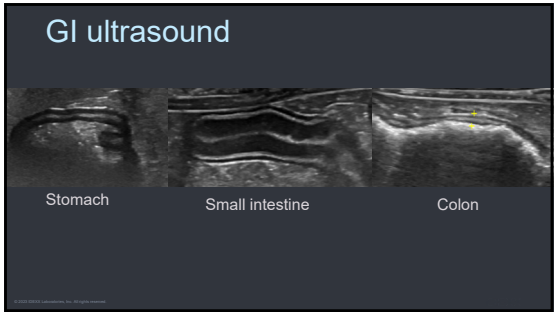

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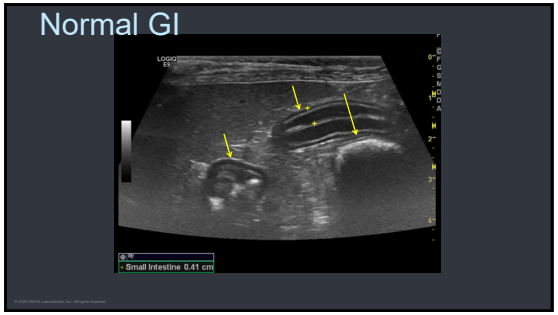

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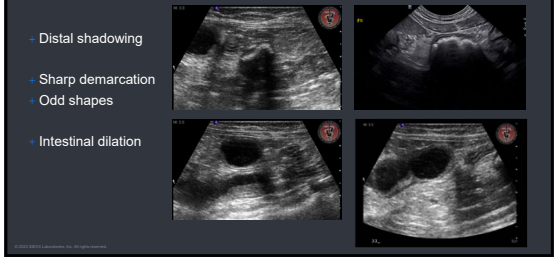

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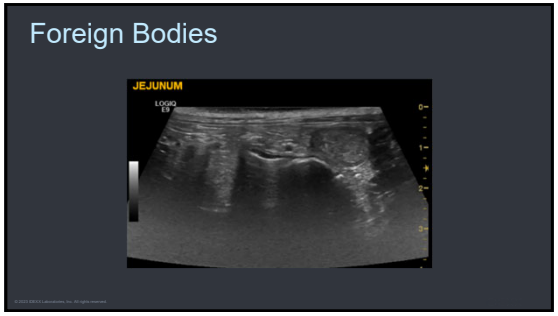

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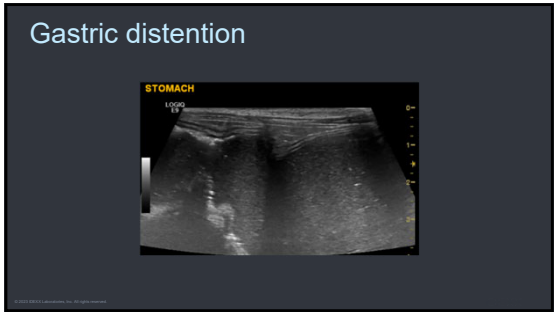

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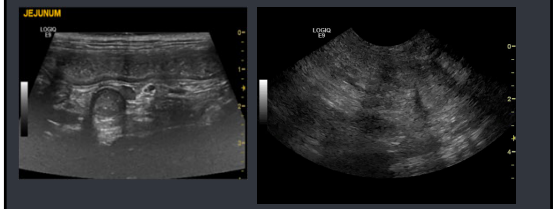
Small intestinal distention



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Foreign Bodies

Potential pit fall

Small intestine distended with giant foreign body or gas could be overlooked as colon –Not realizing it is small intestine.

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Ultrasound small intestinal foreign bodies

Pros

- **Confident when you find it!**
- Can be very specific about location of FB
- Peritonitis
- GI wall layering – other causes of obstruction

Cons

- **Lack of confidence with a negative exam**
- User dependent - technically challenging to tracing
- Gas distended loops overlooked as colon
- Cannot see through gas – could miss/underestimate gastric foreign bodies
- Size limitations of dogs

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Radiographs vs Ultrasound

Survey of the use of radiograph vs. ultrasonography in the investigation of gastrointestinal foreign bodies in small animals. Dayle Tyrrell. & Cathy Beck. *Vet radiol and ultrasound.*(47)4 2006

Radiographs

- Total of 29 patients
- Of the obstructed ones - Radiographs diagnosed it 56% of the time
- Segmental dilation of bowel 77%

Ultrasound

- Of the obstructed ones ultrasound found the obstruction 100% of the time

49

Radiographs vs Ultrasound

Comparison of radiography and ultrasonography for diagnosing small-intestinal mechanical obstruction in vomiting dogs. Sharma A, Thompson MS, Scrivani PV, Dykes NL, Yeager AE, et al. *Vet Radiol Ultrasound.* 2011; 52: 248–255. https://doi.org/10.1111/j.1740-8261.2010.01791.x PMID: 21554473

Radiographs

- Reviewed by 2 radiologist >10 yrs experience
- 70% of dogs with acute vomiting the radiologist were confident in their diagnosis based on rads alone
- 1/3 time obstructed dogs did not have segmental dilation

Ultrasound

- Performed by rad resident & radiologist overscanned
- 97% confident in their final diagnosis
- Did not include gastric foreign bodies in US portion
- US more accurate than rads (p=0.013) for small intestinal obstruction

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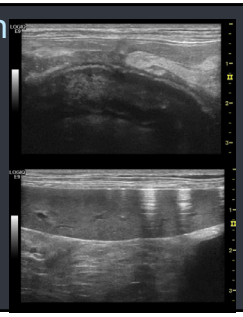
GI Perforation

- What to look for:
  - Peritonitis
    - Hyperechoic mesentery
    - Free fluid
  - Peritoneal Gas
  - Thickened Wall
- Causes
  - Mass
  - Foreign material perforating



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Peritoneal gas

- Easily displaced by pressure of hand
- Independent
- Can just appear as bright speckles in mesentery

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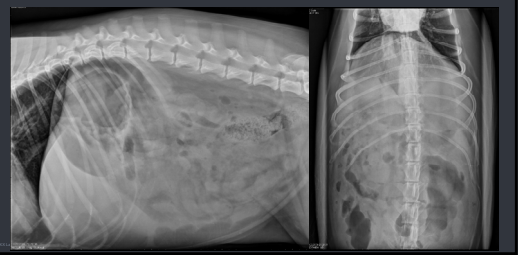
6 yo FS Golden Retriever



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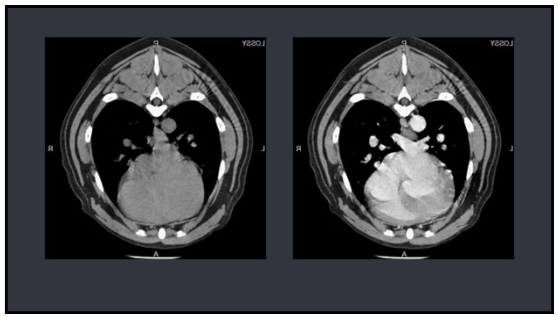
Not sure?

LEFT lateral Wait 5 minutes

54

Jack, 7 yrs, Mn, American Bulldog
Vomiting, started today. Last meal was 10 hours ago.
On physical exam patient is mildly dehydrated, all else unremarkable

55



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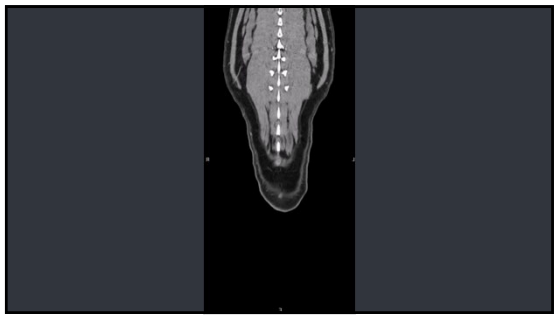

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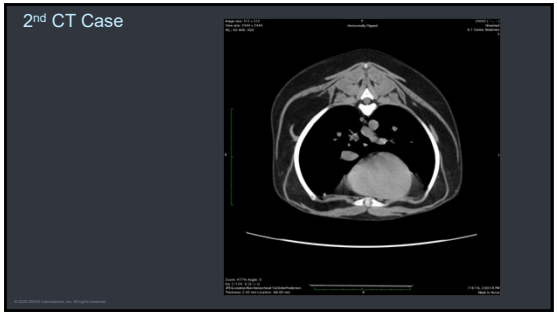
2nd CT Case



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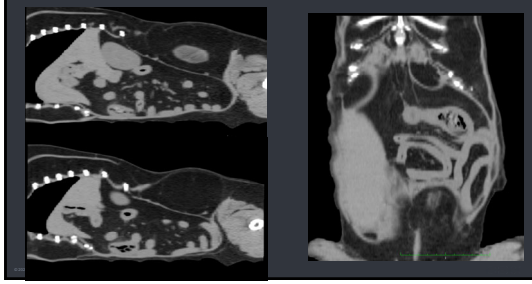
CT Jejunal foreign body



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Advantages of CT

Use of computed tomography (CT) for the diagnosis of mechanical gastrointestinal obstruction in canines and felines

Brianna Miniter, Andreia Gonclves Arruda, Joshia Zuckerman, Ana Caceres, Ron Ben-Amotz. *PLOS ONE14(8)* 2019

97 patients
Surgical findings agreed with CT 100% of the time

- No superimposition
- Can trace each bowel loop
- No size restrictions (just bore size)

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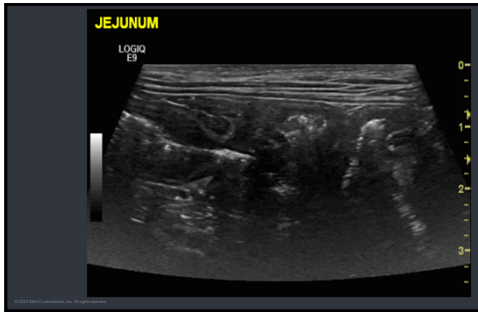
Imaging linear foreign bodies

10 month female spayed Labrador retriever

Acute vomiting

61



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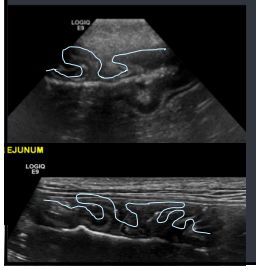
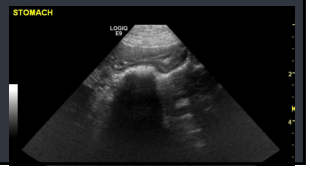
Ultrasound of linear foreign bodies



- Plication
- Hyperechoic line in lumen
- Anchor



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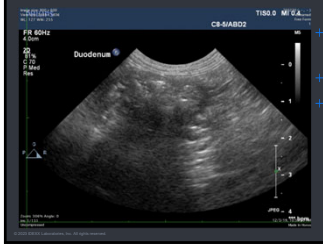
Linear foreign body



- Can develop multiple perforations
- In the folds of the plication
- The plications are not evenly distributed

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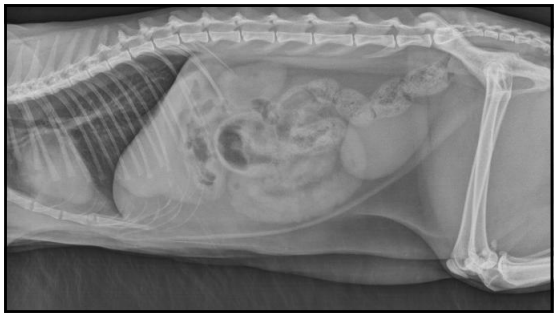

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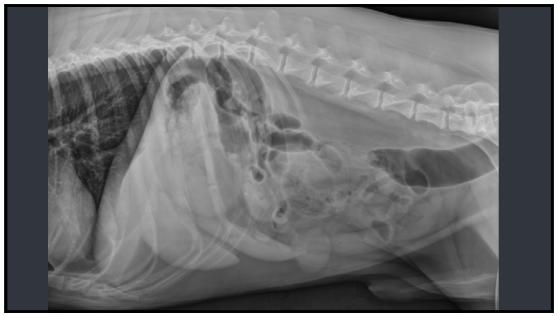

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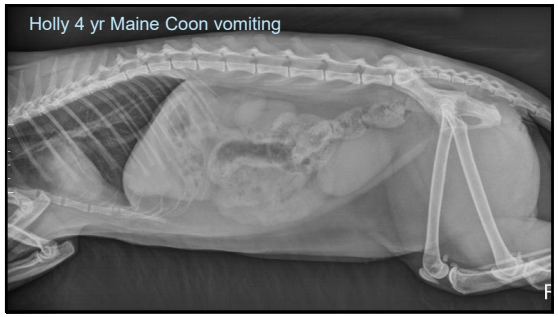

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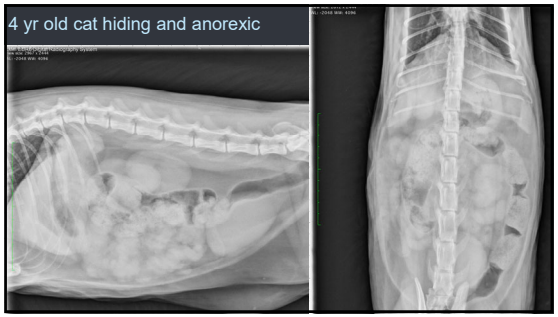

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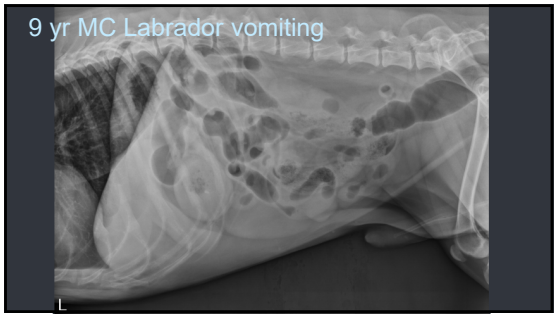

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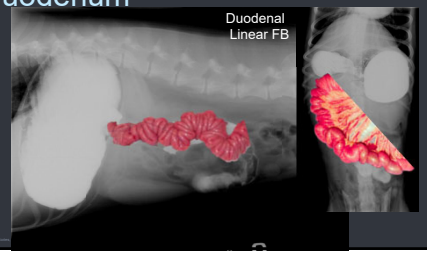
Canine medial deviation of duodenum



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Geometric, paisley, triangle, comma, teardrop shaped gas

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Radiographs of linear foreign bodies

Radiographic features can include:

- Material anchored in pylorus – do a left lateral to evaluate the pylorus!
- Medial deviation of the duodenum on the VD projection
- Loose curling of the small intestinal loops
- Tight plication causing an undulating serosal margins
- Geometric, paisley or triangular shaped gas bubbles

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Pros and cons of Ultrasound

+ Bowel wall layering
+ More sensitive and specific for obstructions than rads
+ User dependent
+ Cannot see through gas – could miss gastric foreign bodies

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Pros and cons of Radiographs

+ Global overview
+ Use gas in stomach to out line the pylorus – always get a left lateral view
+ Good at detecting peritoneal gas
+ Aspiration pneumonia, esophageal FBs
+ May eliminate need for further studies
+ Cheap and readily available

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Pros and cons of Computed tomography

+ Best sensitivity and specificity
+ Not necessarily available, cost prohibitive
+ Can be done sedated +/- contrast media
+ Can be sent out for review
+ Can see in the pelvic canal
+ **Cannot see bowel wall layering**

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CREATING CLARITY

IDEXX

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