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Diagnostic Imaging of the Liver and Pancreas

Lecture Objectives

- Radiographic and ultrasound features of basic liver diseases
 - Hepatomegaly
 - Microhepatia
 - Hepatic neoplasia
 - Biliary disease
- Radiographic and ultrasound features of basic pancreatic diseases
 - Pancreatitis
 - Pancreatic neoplasia

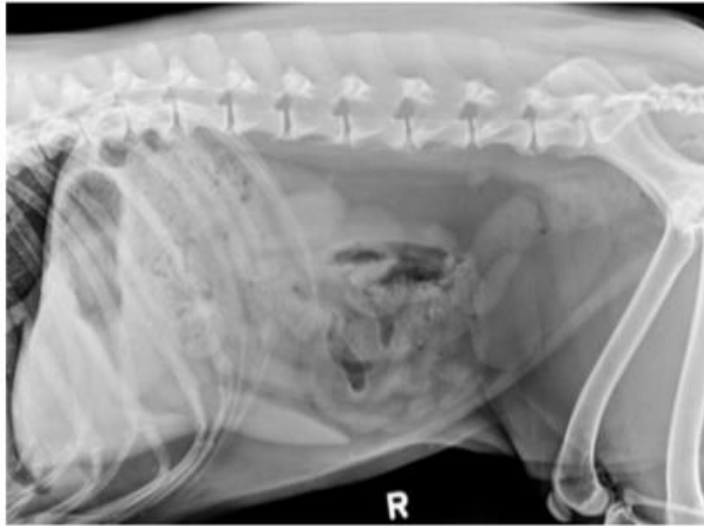
Lando-11 year old Corgi mix.

- Lethargic
- Seems to have a 'full' abdomen
- Elevated liver enzymes

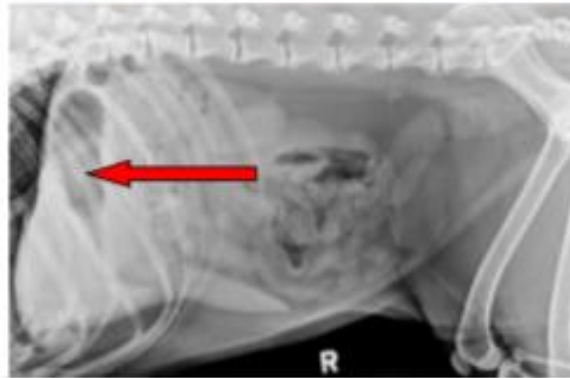




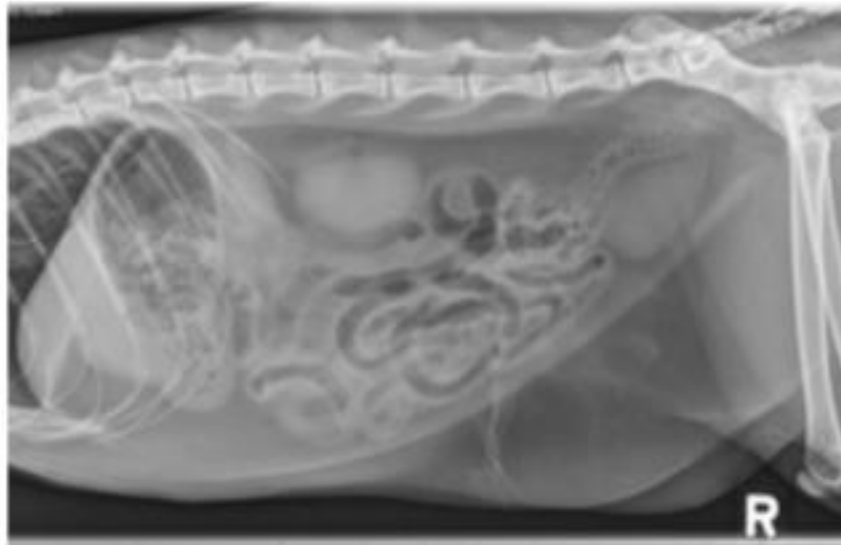
The liver is the cranial most organ
in the abdomen.



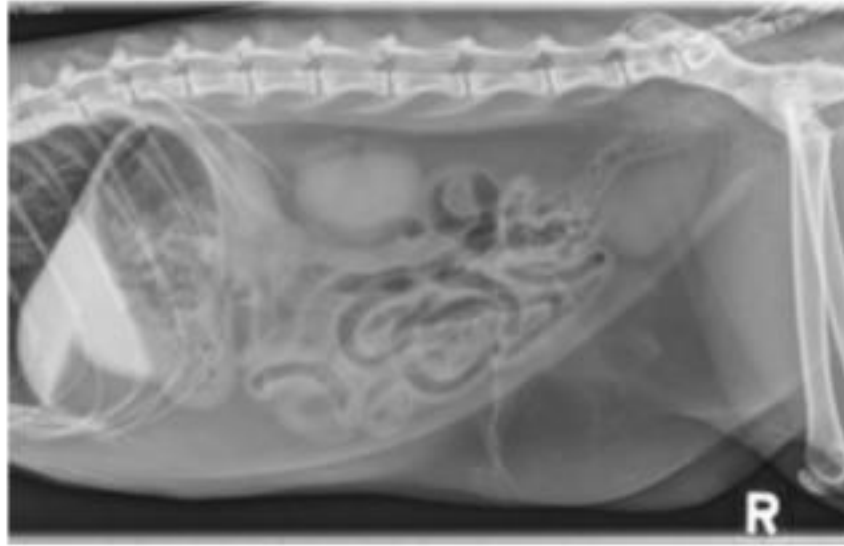
The stomach is caudal to the liver.



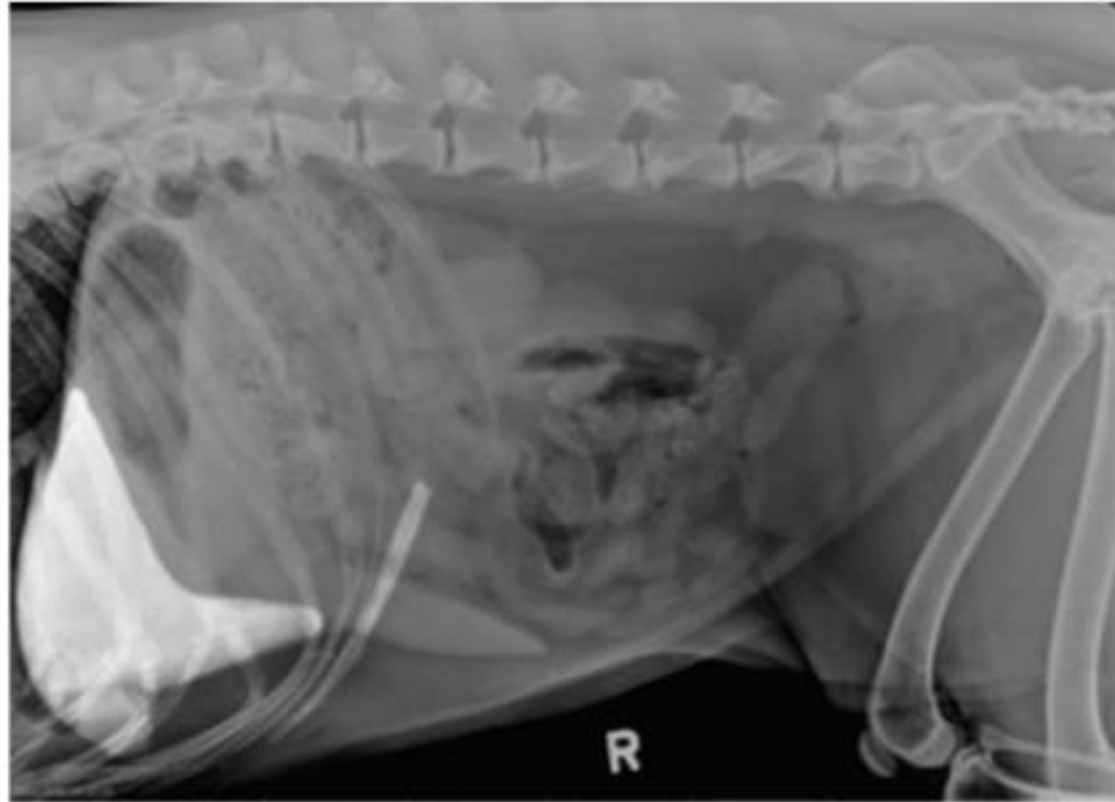
The liver is between the diaphragm and the stomach.



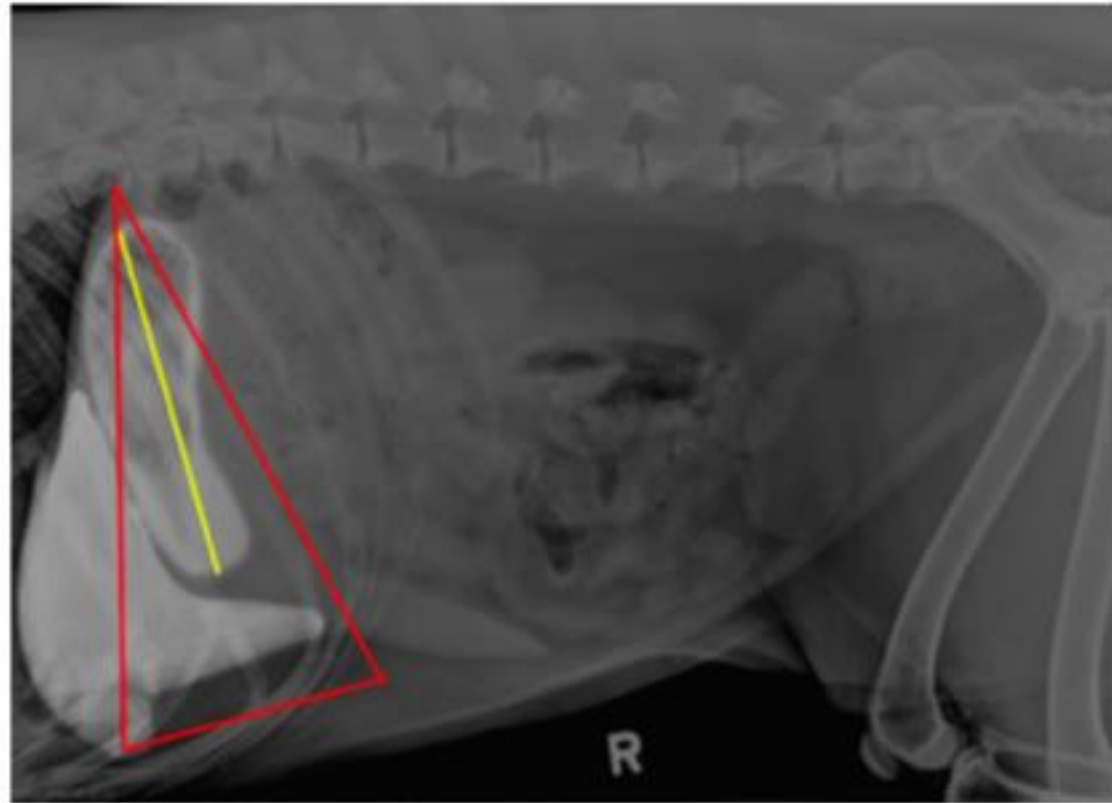
The liver is between the diaphragm and the stomach.



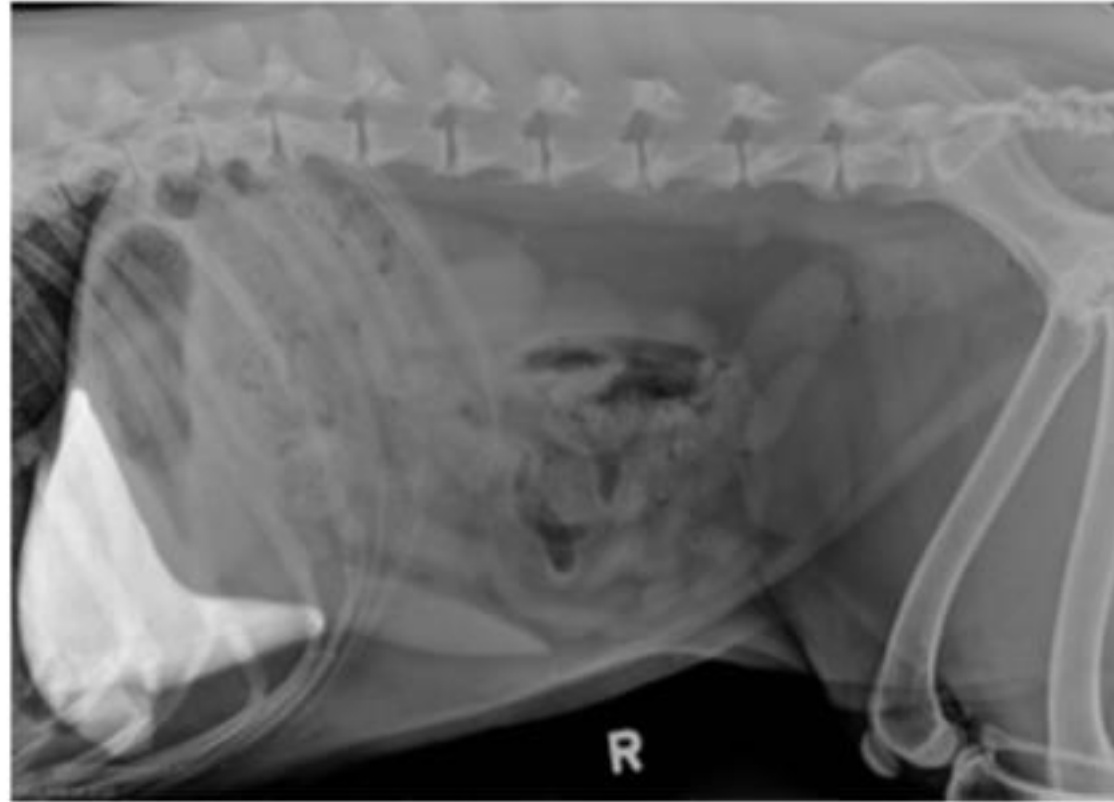
The liver should not extend beyond the costal arch.



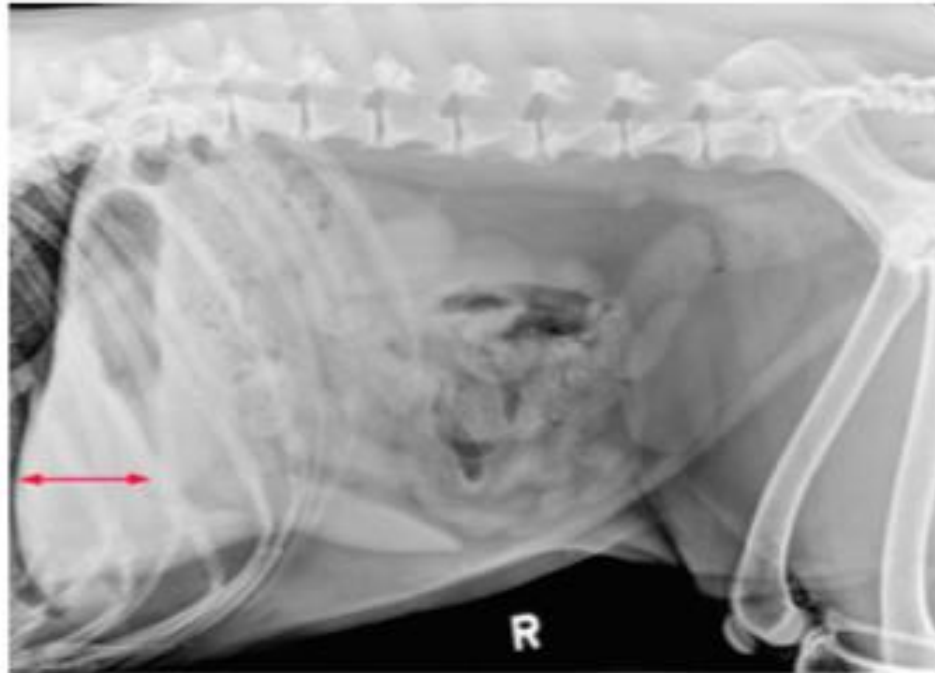
The gastric axis should be within the normal range.



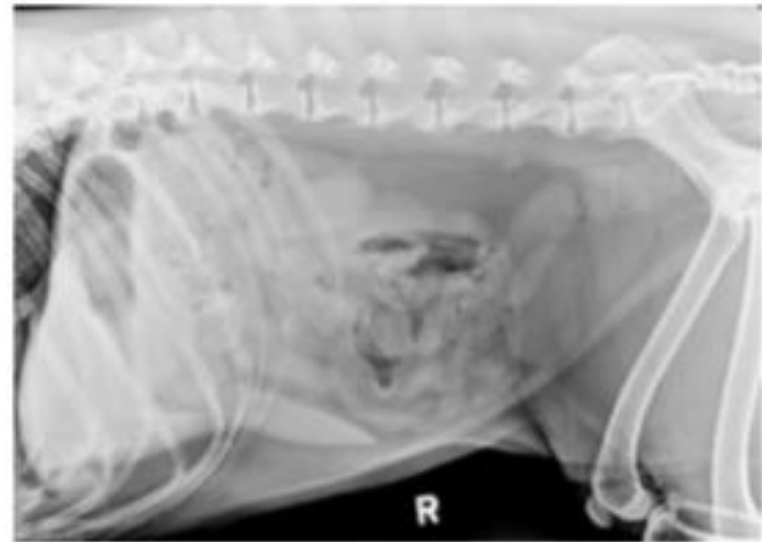
The margin of the liver should be sharp.



“Normal” distance between the stomach and diaphragm.



Hepatomegaly can alter all 4 criteria on the lateral view.



Back to Lando



What are the findings?

- Does the liver
 - Extend beyond the costal arch
 - Have rounded ventral margins
 - Displace the gastric axis
 - 'Look' too big



What are the findings?

- Does the liver
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Ultrasound Interpretive Principles

- Size
- Shape
- Echogenicity
- Architecture

Liver Size



- The Enlarged Liver
 - Extends past the ventral border of the stomach.
 - It is in contact with more than 50% of the right kidney.
 - Has rounded caudal margins.

Liver Size



- Enlarged

- Hepatitis
- Hepatopathy
- Infiltrative disease

- Small

- Cirrhosis
- Shunt
- Deep chested dog

Liver Shape and Echogenicity

- Shape
 - Smooth capsular margin
 - No deformation of gall bladder
- Echogenicity
 - Less than spleen
 - Close to kidney
 - Less than falciform fat

Liver-Normal



Liver-Lando



Put it all together

- Size-Enlarged
- Shape-Normal
- Echogenicity-Variable/hyperechoic
- Echotexture-Mottled

Steroid Hepatopathy

Steroid Hepatopathy



- Enlarged Liver
 - Compare to the stomach
- Repetitive mottled appearance
- Hypoechoic poorly defined nodules
- Echogenic parenchyma

Hepatic Lymphosarcoma



- Enlarged liver
 - Normal Texture
 - Hypoechoic Nodules
- ** Look for disease in other organs**
spleen
nodes

PHILIPS

TIS0.0 MI 0.3

C8-5/ABD2

FR 54Hz
5.0cm

2D
81%
C 70
P Med
Res

Spleen

P

M5

- 0

X- 1

- 2

- 3

- 4

- 5

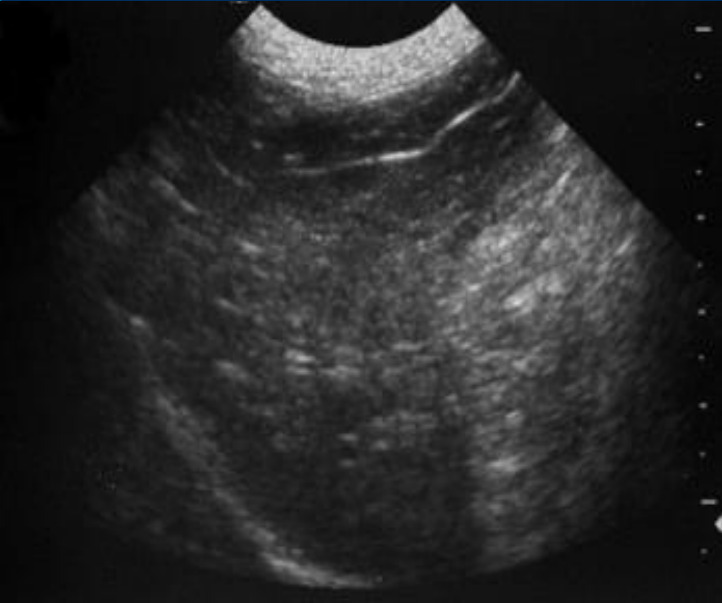
JPEG

5... bpm

G
P R

15 of 64

Hepatitis



- Acute Phase
 - Normal appearing liver
 - Enlarged liver, subtle mottled texture.

Chronic Hepatitis

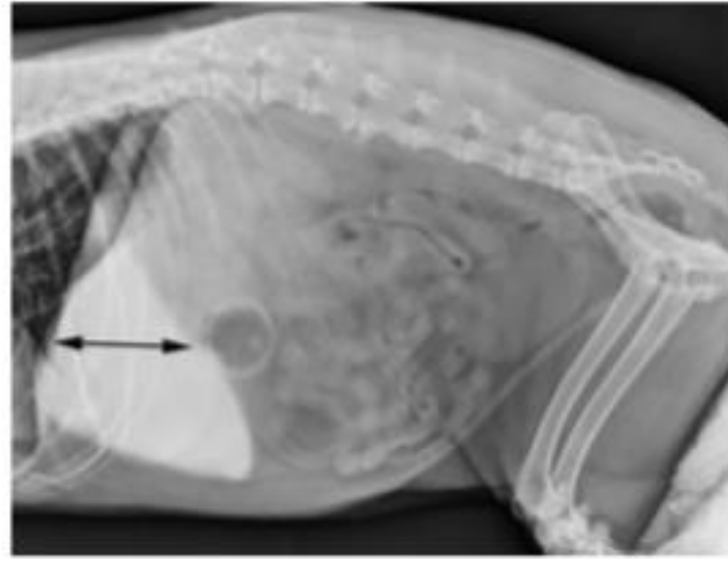


- Chronic disease
 - Small liver
 - Irregular Capsule
 - Nodular

In microhepatia, the stomach is angled cranially.



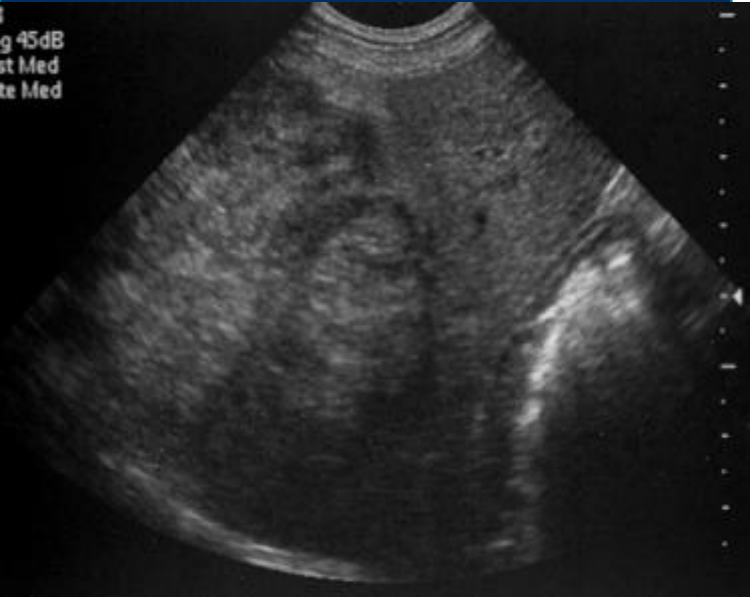
The distance between diaphragm and stomach indicates size.



Hepatic masses



Put it all together



- Size-Normal or slightly enlarged
- Shape-Compressed gall bladder
- Echogenicity-Variable
- Echotexture-Focal mass

Hepatoma

Focal liver enlargement changes
the normal contour.



Focal liver enlargement changes
the normal contour.



Hepatic Neoplasia



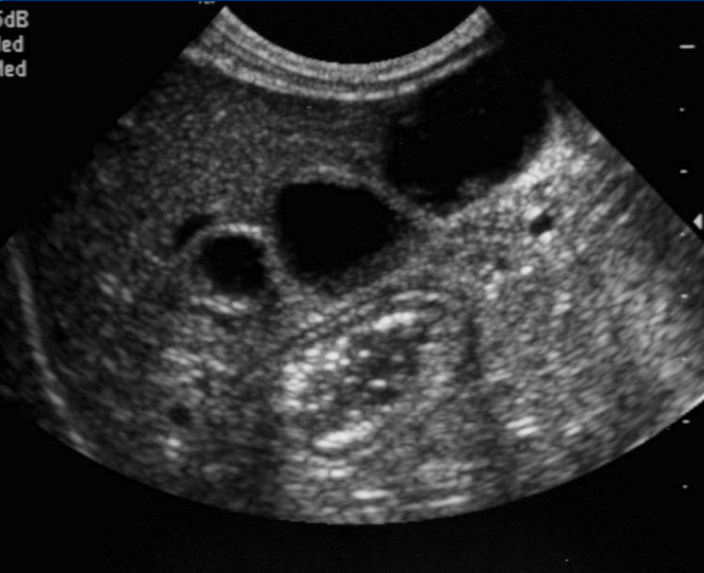
- Primary Liver Tumors
 - Carcinomas
 - Usually are echogenic and can be singular or multiple.
 - Mixed patterns are common, echogenic outer surface and hypoechoic central portion.

Neoplasia- Metastatic Disease



- Well defined echogenic or mixed masses
 - Carcinomas
 - adenocarcinomas
 - Pancreatic masses
 - Bowel or gastric masses

Hepatic Cysts



- Variably sized anechoic structures with far field acoustic enhancement
 - True cysts
 - Cystadenomas- feline
 - Biliary Cysts
 - Often these are incidental

Peanut

13 year old DSH.

- Screening thoracic radiographs prior to dental cleaning
- Otherwise healthy





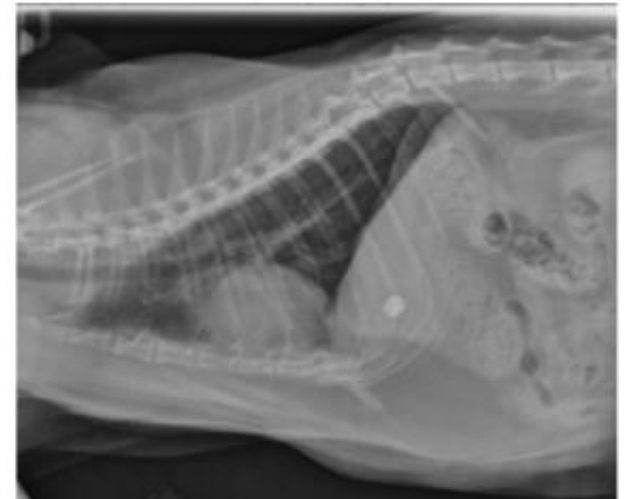
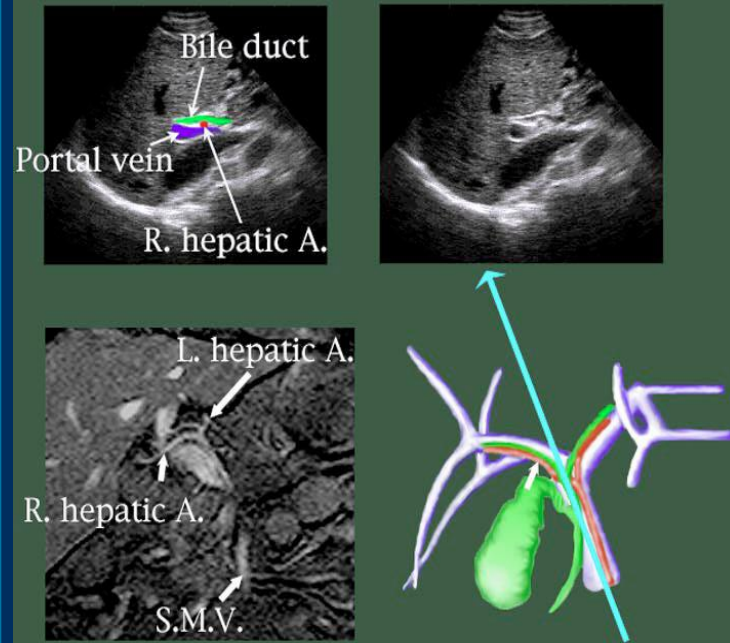
What are the findings?

- Remember to evaluate
 - Size
 - Shape
 - Density
 - Location
 - Margination
 - Number

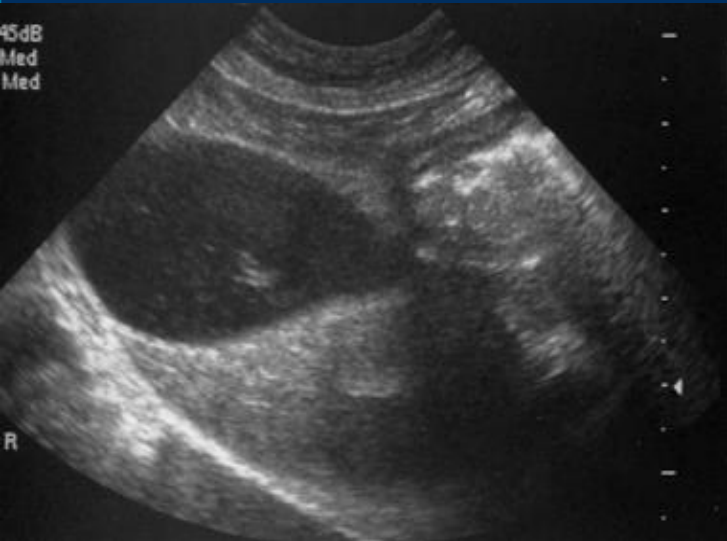


The Biliary System

- Normal Findings
- Obstruction
- Cholangiohepatitis, Cholangitis



The Normal Gall Bladder



- Variable amounts of sediment should be anticipated IN THE DOG
 - Echogenic
 - Amorphous
- Gall Bladder size
 - Depends on last meal

Cholangiohepatitis

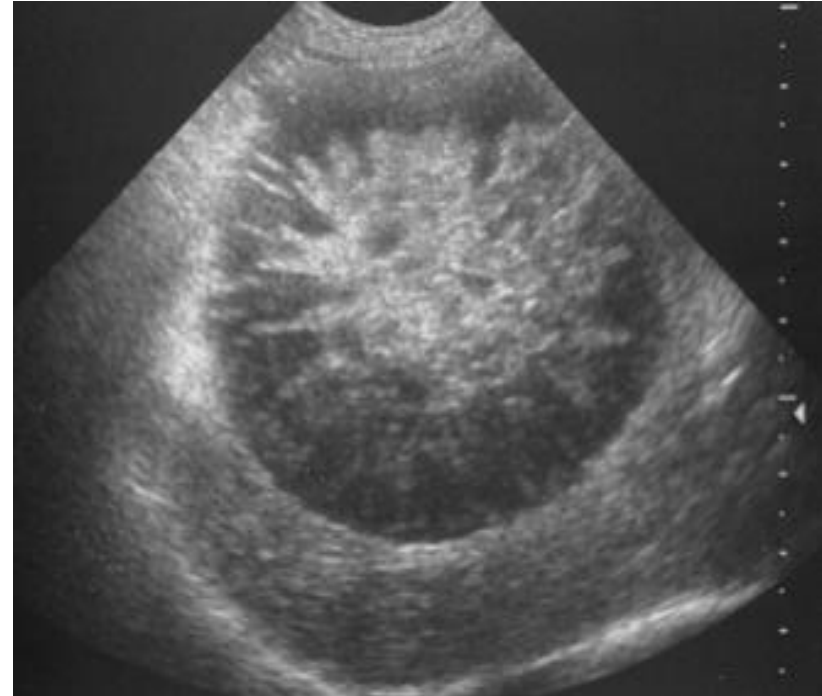
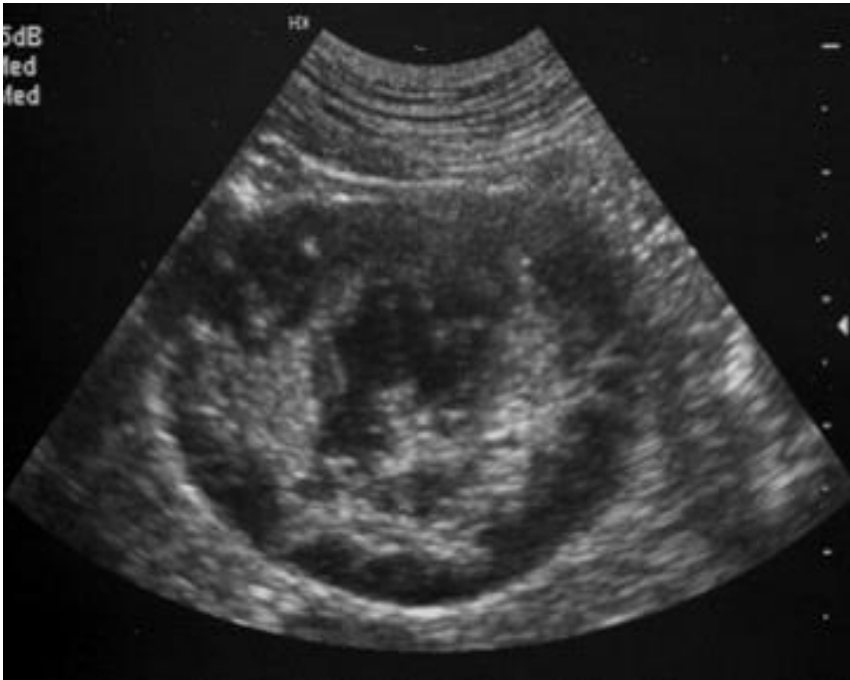
- Gall Bladder wall thickening
- Prominent cystic and common bile duct
 - Greater than 2 mm in diameter
 - Echogenic walls
 - Echogenic mesentery surrounding the duct



Peanut



Gall Bladder Mucocoele



Salsa-6 yo MC Dachshund mix

- Acute onset vomiting
- Physical examination
 - BAR, 5% dehydrated
 - Discomfort with abdominal palpation



The pancreas is bordered by pylorus, duodenum, and transverse colon.



The pancreas is caudal to the stomach on the lateral projection.

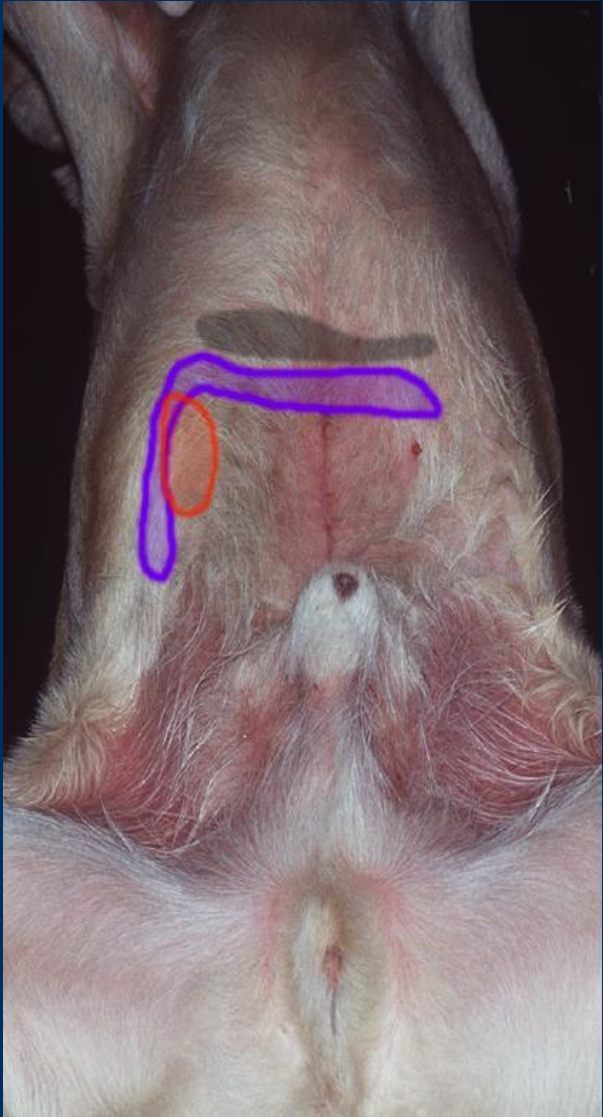


The body of the pancreas is in the
gastroduodenal angle.





Ultrasound



- Use a two step procedure
 - Left limb
 - Right limb

Pancreatitis-Dogs

- Right pancreatic limb and body seem more commonly affected.
- Early pancreatitis is easily missed.
- Ultrasound is much more sensitive than radiology.

Acute Pancreatitis- “The Classic”

- Hypoechoic pancreas
 - Enlarged and rounded
 - Edema and hemorrhage
 - Inflammation
- Hyperechoic surrounding mesentery
 - Fat saponification
- Rigid appearing duodenum



Pancreatic Neoplasia

- Adenocarcinoma, carcinoma
 - Aggressive
 - Mass lesions
 - Metastatic to surrounding mesentery and organs
 - Biliary obstruction is occasionally seen
- Islet cell tumors (Insulinoma)
 - Difficult diagnosis
 - Small oval shaped masses
 - Infiltrative
 - Metastatic potential does exist

The Feline Pancreas

- It is unusual to encounter necrotizing pancreatitis in the feline
- May be a component of triaditis
IBD/cholangitis/pancreatitis

“If you can see it, it is most likely abnormal”





Questions