

Ultrasound of the Pancreas

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BOLAND VET SALES
SAMSUNG



**JORGENSEN
LABORATORIES**

covetrus



Indications for Pancreatic Ultrasound

- Vomiting and/or Diarrhea
- Abdominal pain (acute abdomen)
- Anorexia, weight loss, dehydration in the cat
- Fever of Unknown Origin
- Serum panel – “pancreatitis pattern”
 - hyperlipidemia, elevated liver enzymes, bilirubinemia, hypocalcemia, hypoalbuminemia, abnormal cPLI /fPLI/lipase
- Diabetic Ketoacidosis

As ultrasound technology has improved, the pancreas has become easier to visualize

Patient Preparation

- *Fast for 12 hours*
- Place in dorsal recumbency
- Lateral recumbency for:
 - Compromised or deep chested patients
 - Left lateral recumbency for the right limb & body of the pancreas (intercostal in deep chested dogs)
 - Right lateral recumbency for left limb of the pancreas
- Standing/sternal may be necessary for patients with large abdominal masses

Transition Adjustments

- *Depth* – more superficial for right limb & body in the dog
- *Frequency* – varies 5-7.5 MHz
 - May need higher frequency for smaller pets
- *Gain and Contrast* – usually no change from liver & spleen
 - Setting the gain too high can cause false negatives
- *TGC* – top levers to the right

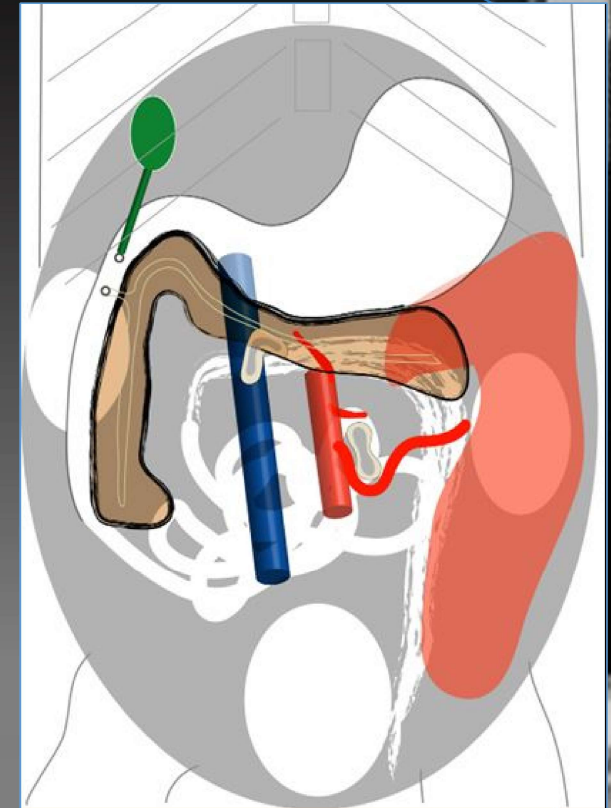
Landmarks for Pancreas

Right Limb – Between the right kidney and the duodenum

Body - between the pylorus and the portal vein/colon

Left Limb – caudal to greater curvature of the stomach

- Between stomach & transverse colon
- In triangle between stomach, spleen, kidney



Landmarks for Pancreas

Right Limb – Between the right kidney and the duodenum

- Dorsomedial to duodenum, at mesenteric border
- Ventral to the right kidney and caudate lobe of liver
- Lateral and ventral to the portal vein
- Triangular in transverse view (easier to locate in this view)
- Hypoechoic pancreatic duct and vein in the center

Body - between the pylorus and the portal vein

- Caudodorsal to pylorus
- Lateral to the portal vein
- If you can see the gall bladder, you are likely in the body

Landmarks for Pancreas

Left Limb – caudal to greater curvature of the stomach

- slide from right limb to body to left limb
- Triangle just caudal to the greater curvature of the stomach on transverse view
- medial to spleen and left kidney
- cranial to colon
- Just ventral to the splenic vein

Image Views

Right Limb (2) - right kidney, duodenum

1. *Short Axis (transverse)*
2. *Long Axis (sagittal)*

Body (2) - gall bladder, portal vein, stomach

1. *Sagittal*
2. *Transverse*

Left Limb (2) - stomach, spleen, left kidney

1. *Short Axis (sagittal)*
2. *Long Axis (transverse)*

Image V

Right Limb (2) - right kidney, d

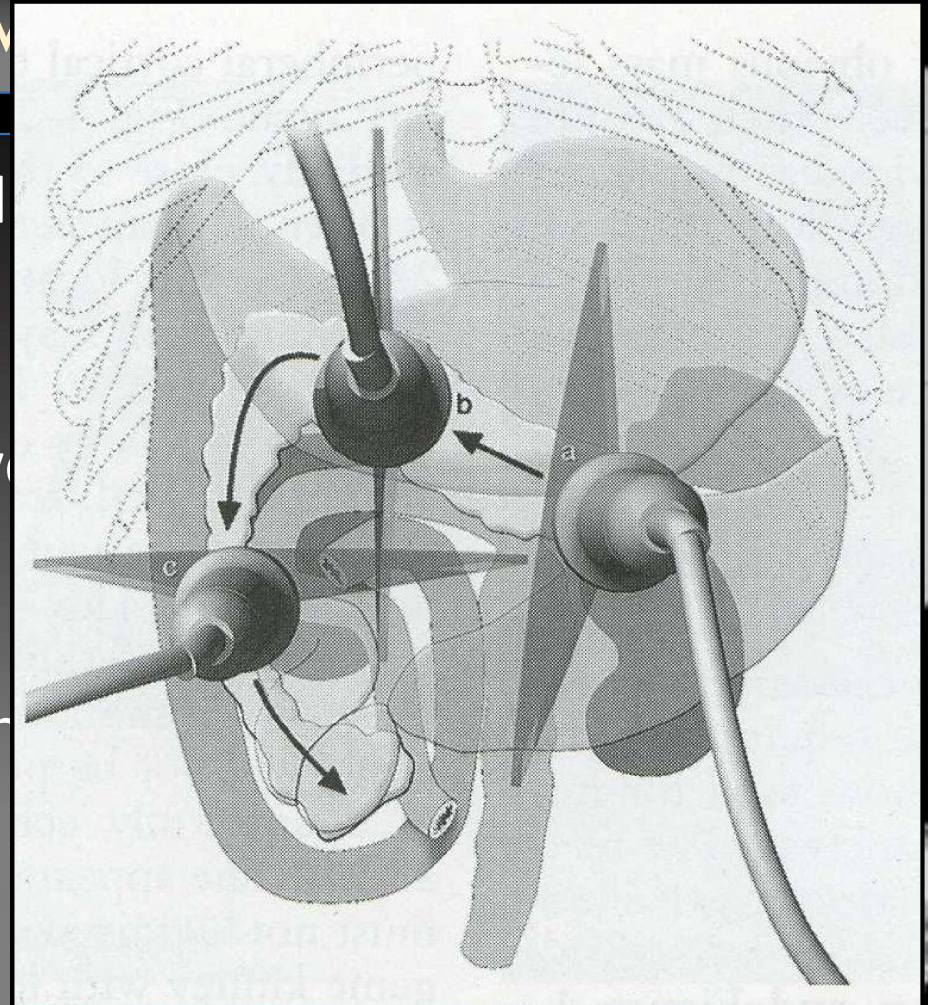
1. *Short Axis (transverse)*
2. *Long Axis (sagittal)*

Body (2) - gall bladder, portal v

1. *Sagittal*
2. *Transverse*

Left Limb (2) - stomach, spleen

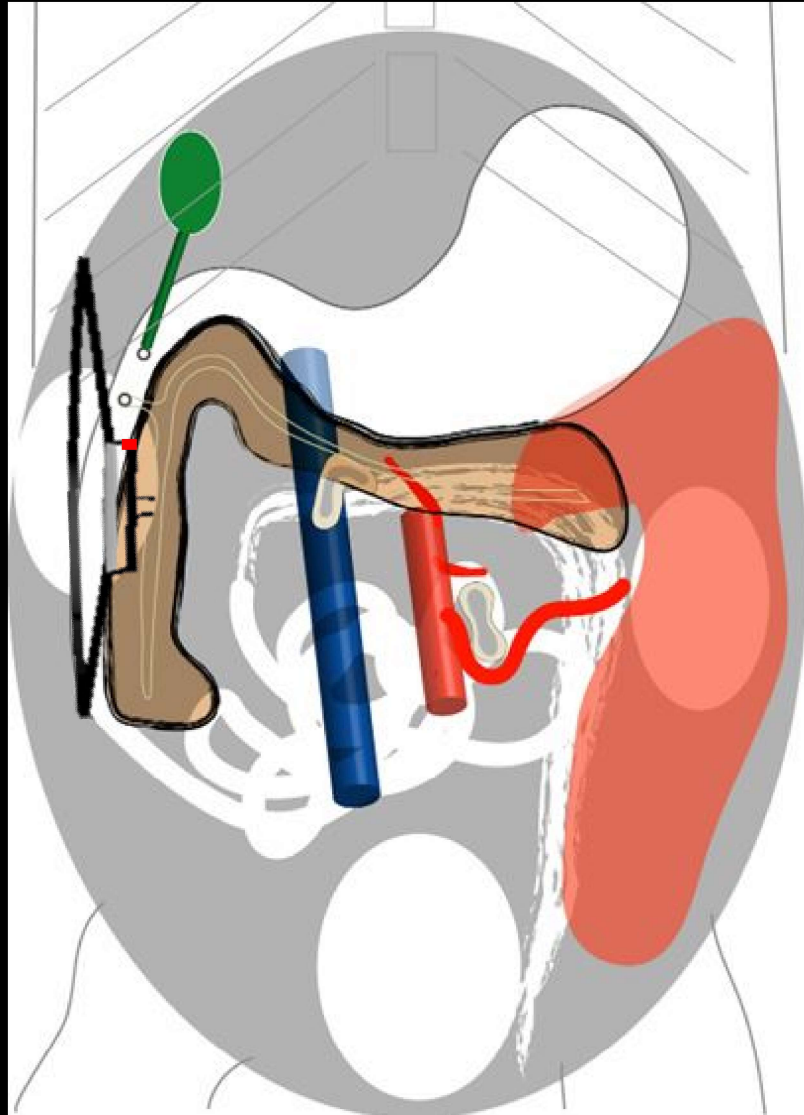
1. *Short Axis (sagittal)*
2. *Long Axis (transverse)*



Scanning
the Pancreas

Right Limb

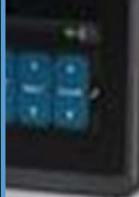
Long Axis
sagittal



Video

Onc
Dan

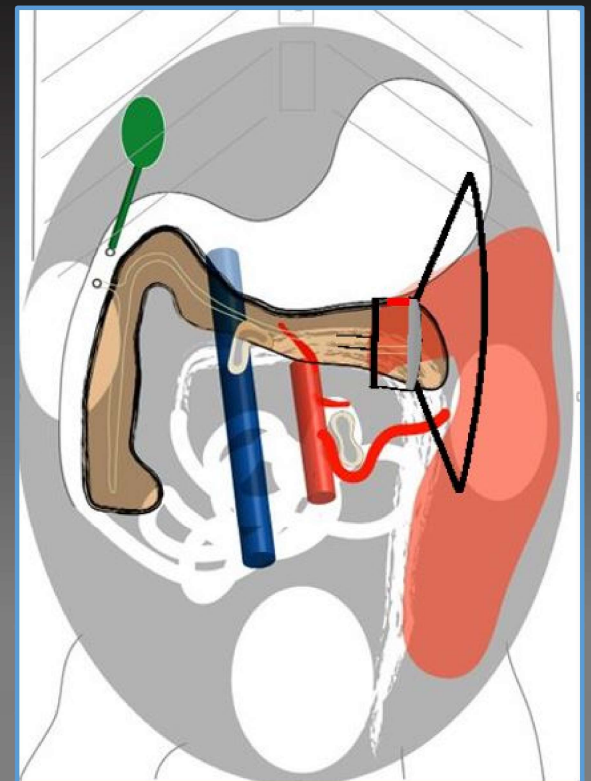
Pancreas



Telemedicine Videos

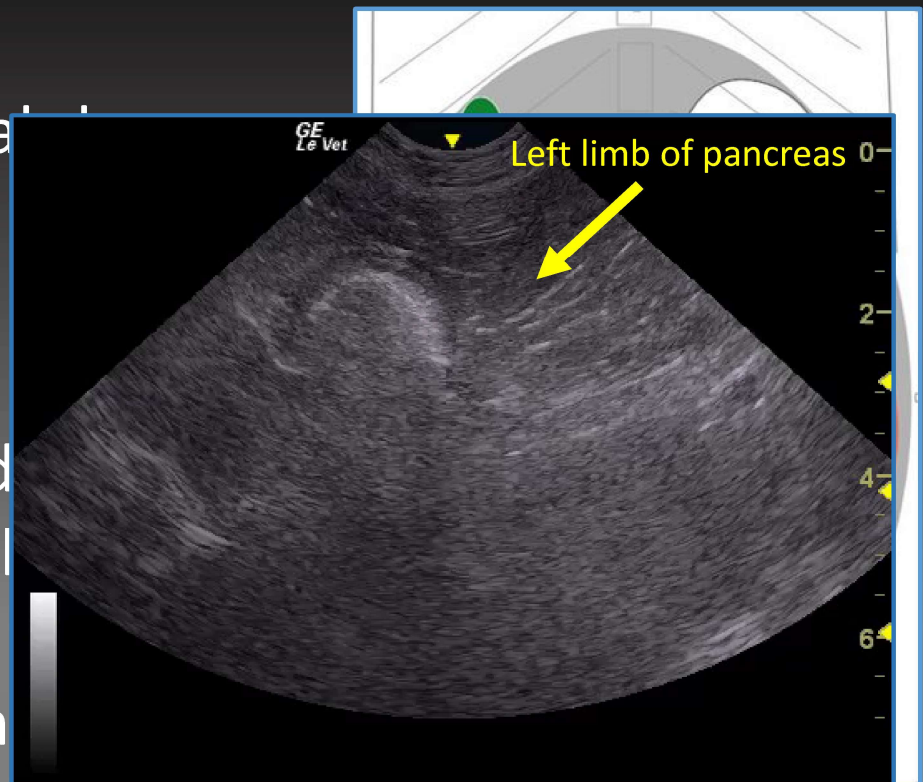
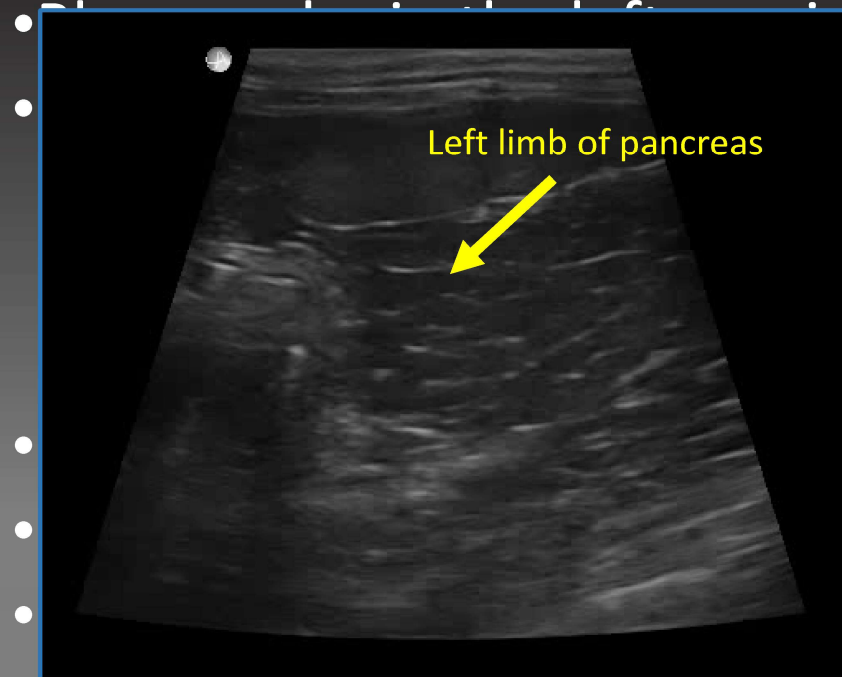
Left limb of the pancreas

- Place probe in the left cranial abdomen
- Find the triangle between:
 1. Fundus of the stomach (transverse)
 2. head of the spleen
 3. Cranial pole of the left kidney (long)
- Orient the probe in the sagittal plane
- Fan medially to laterally
- Don't worry if you don't see the pancreas

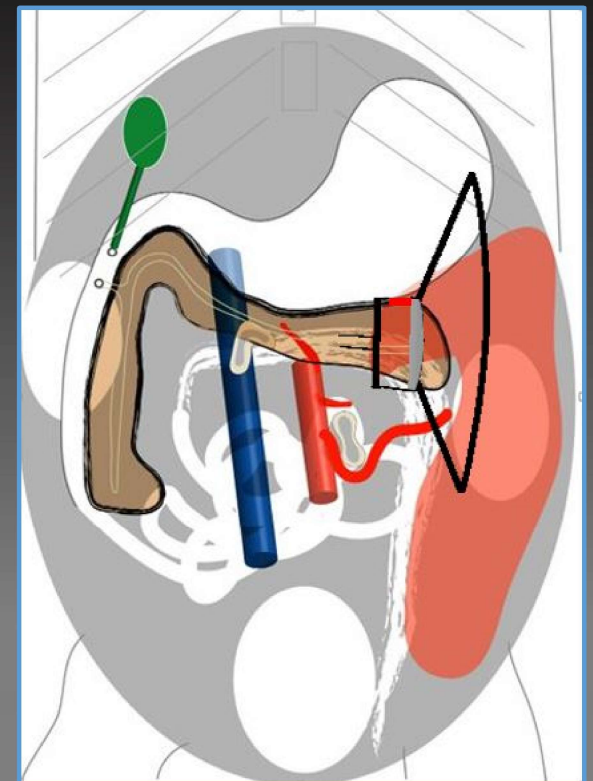


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Left limb of the pancreas



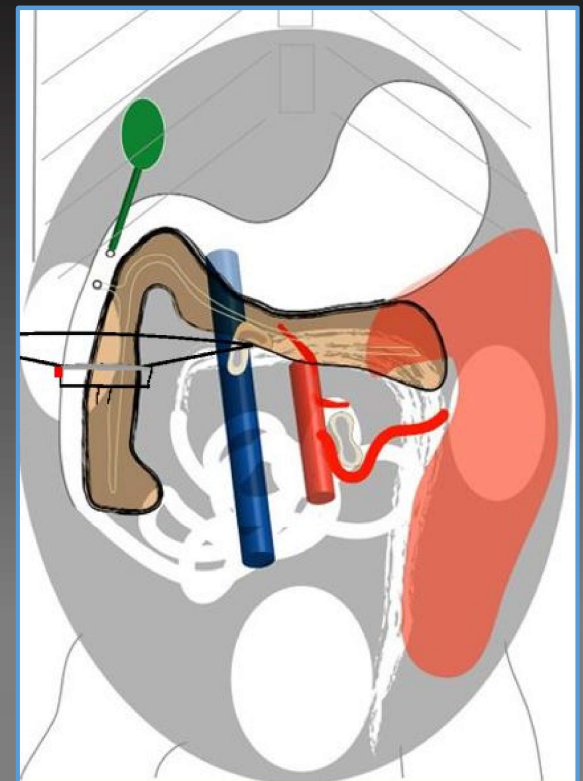
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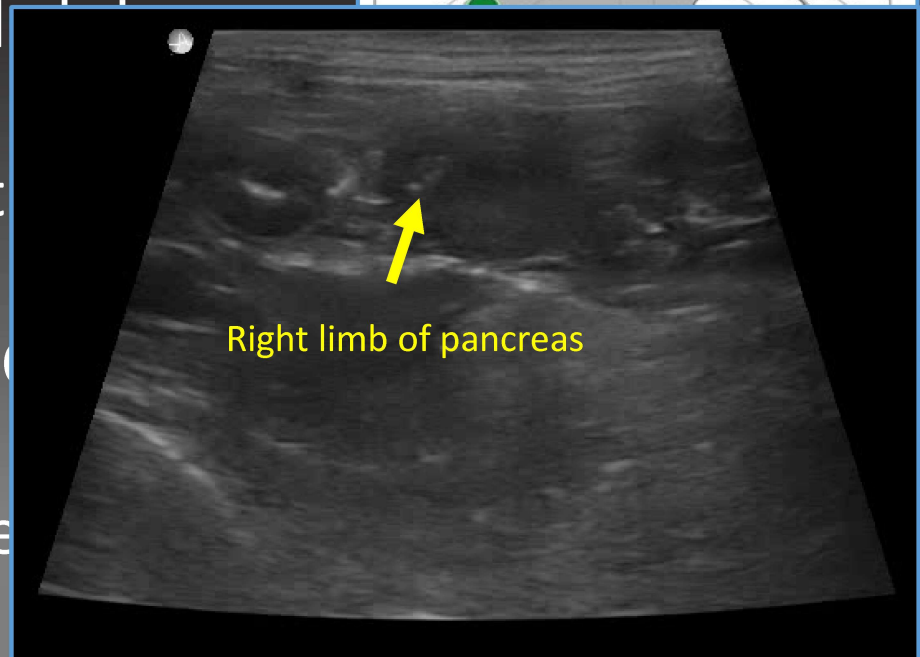
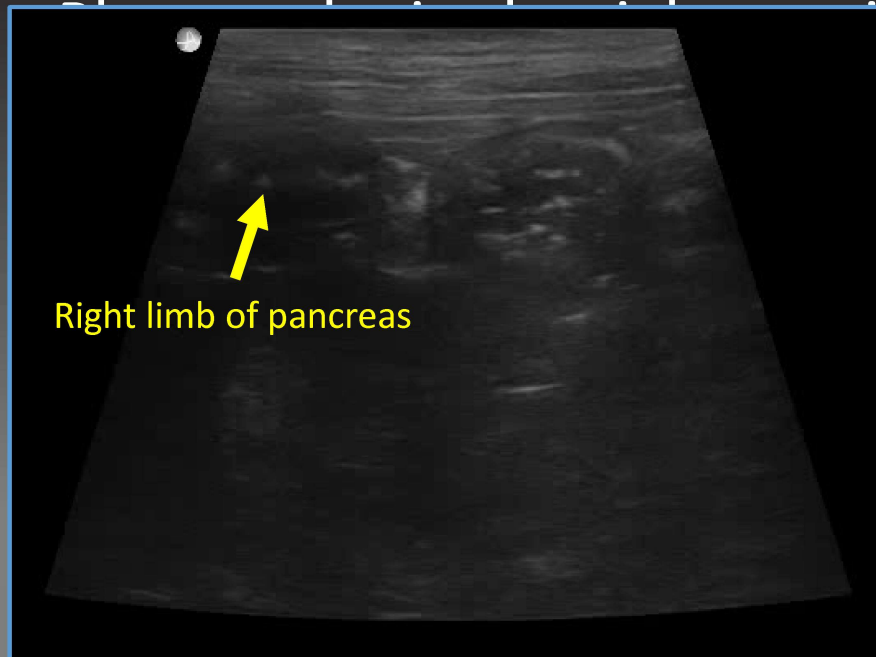
Right limb of the pancreas

- Place probe in the right cranial abdomen
- Find the triangle between:
 1. Descending Duodenum (transverse)
 2. Right kidney (transverse)
 3. Ascending Duodenum or Colon (transverse)
- Orient the probe in the transverse plane
- Fan cranially to caudally



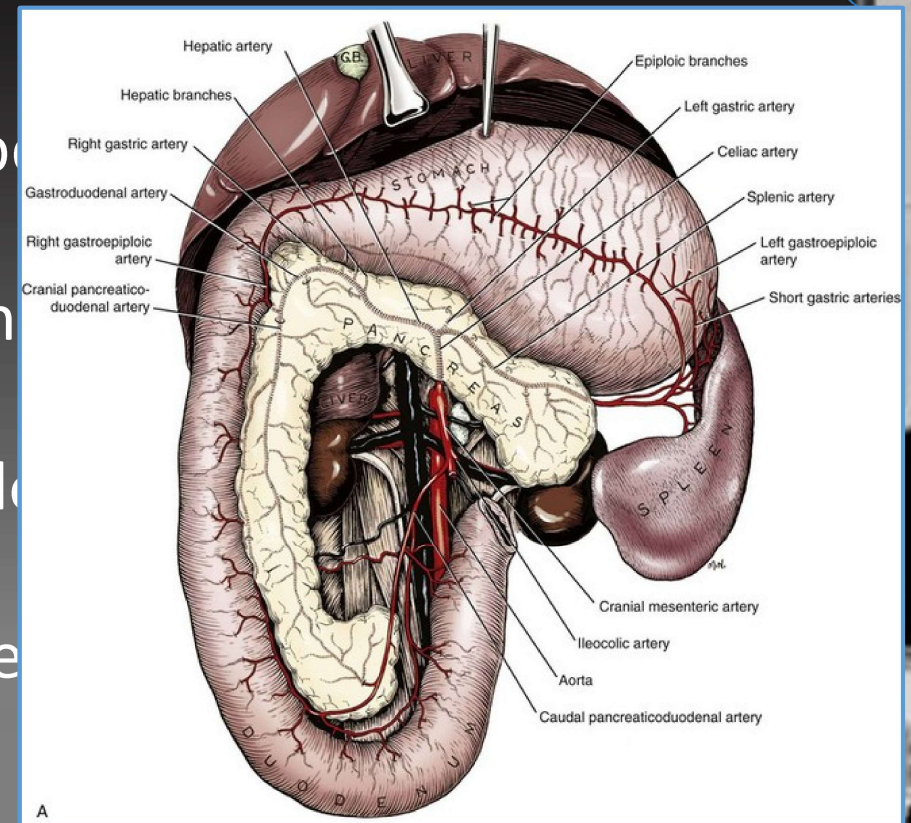
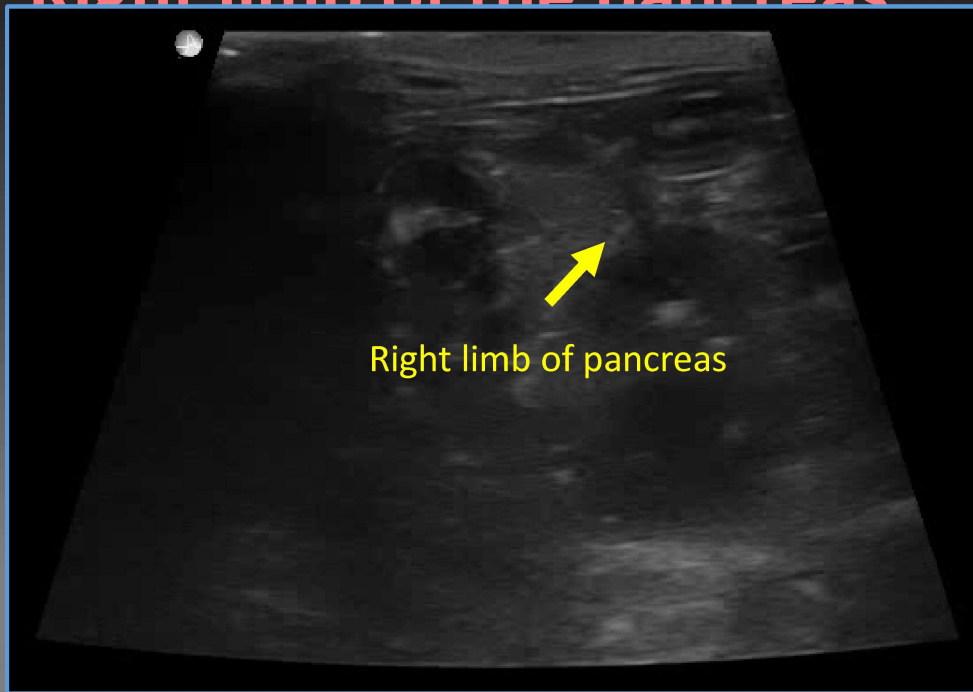
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Right limb of the pancreas



Telemedicine Videos

Right limb of the pancreas



Goals – Pancreatic Ultrasound

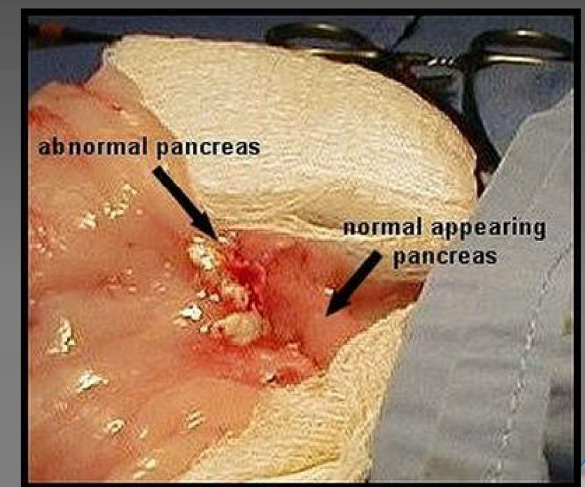
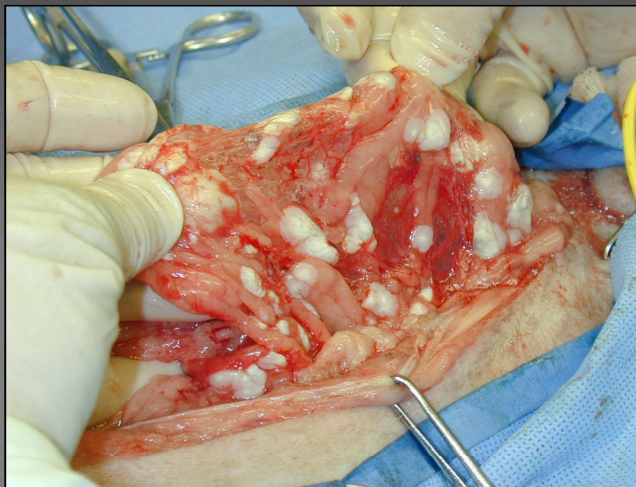
- Identify pancreatitis in sick patients, to begin therapy that might be life saving
- Assess echogenicity relative to fat
 - isoechoic or slightly hypoechoic relative to mesenteric fat
 - Echotexture may be more lobular
 - *Normal pancreas may not be visible*
 - very thin (mm), obscured by GI gas, isoechoic to mesenteric fat
- Identify masses in the pancreas

Tips – Pancreatic Ultrasound

- Left limb larger and easier to find in the cat
 - Along the greater curvature (caudal to) the stomach
 - Cranial to the transverse colon
- Ultrasound highly specific, but not as sensitive for mild pancreatitis (getting better with time)
 - Older study shows US 40% sensitive for feline pancreatitis
 - Newer study (2008) shows US
 - 80% sensitive for severe pancreatitis
 - 62% sensitive for mild pancreatitis
 - 73% specific

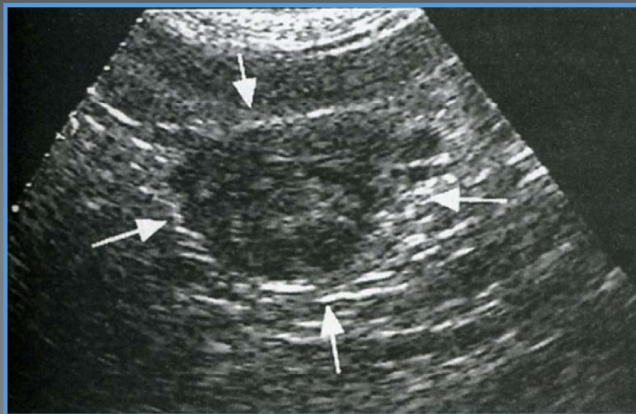
Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:
 - Pain at the scan site
 - Hyperechoic peripancreatic fat (steatitis) and fibrosis
 - May throw an acoustic shadow (saponification)



Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:
 - Pain at the scan site
 - Hyperechoic peripancreatic fat (steatitis) and fibrosis
 - May throw an acoustic shadow (saponification)
 - Hypoechoic (edema) to mixed echo pancreas



Pancreatitis – hypoechoic to mixed echo – mild changes

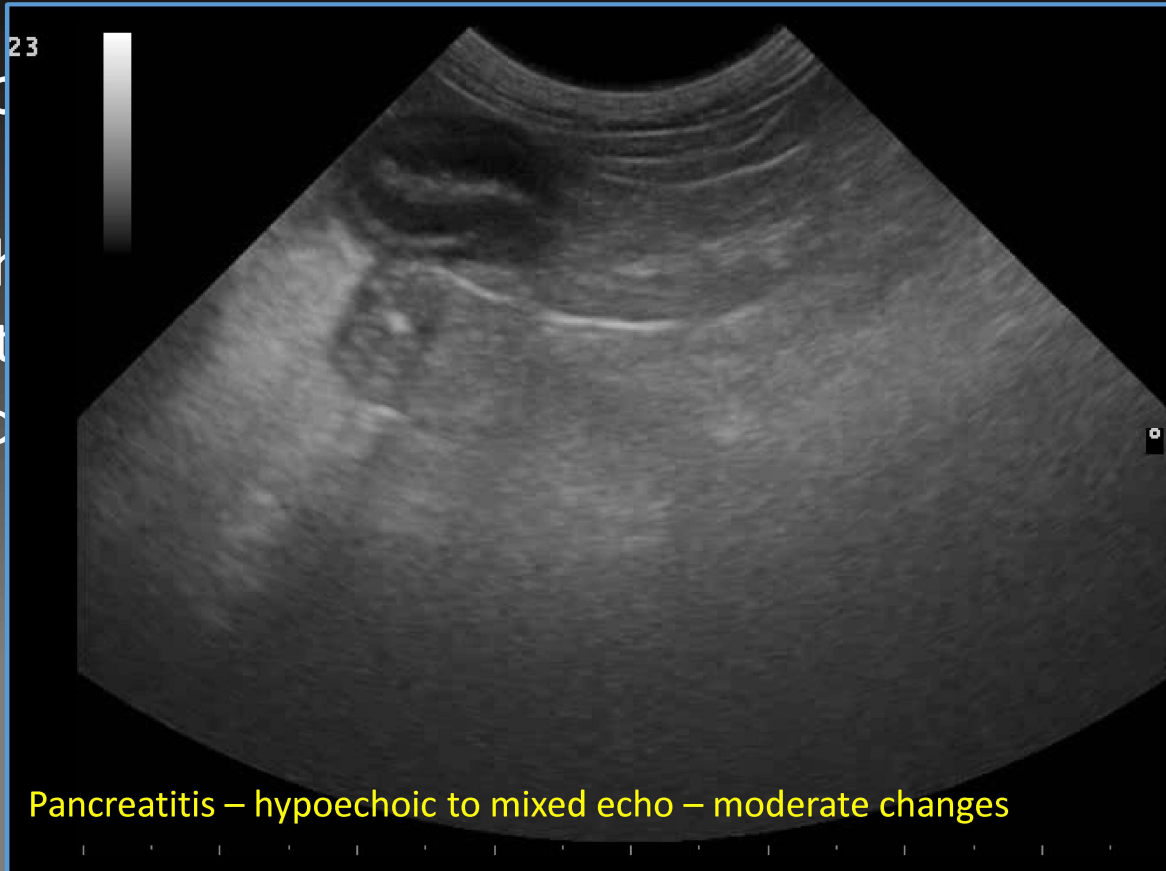
Tips – Pancreatic Ultrasound

- Sonogram
- Pain at
- Hyperechoic
 - May
- Hypoechoic



Tips – Pancreatic Ultrasound

- Sonography
- Pain at
- Amorphous
- May be
- Hypoechoic



Pancreatitis – hypoechoic to mixed echo – moderate changes

Tips – Pancreatic Ultrasound

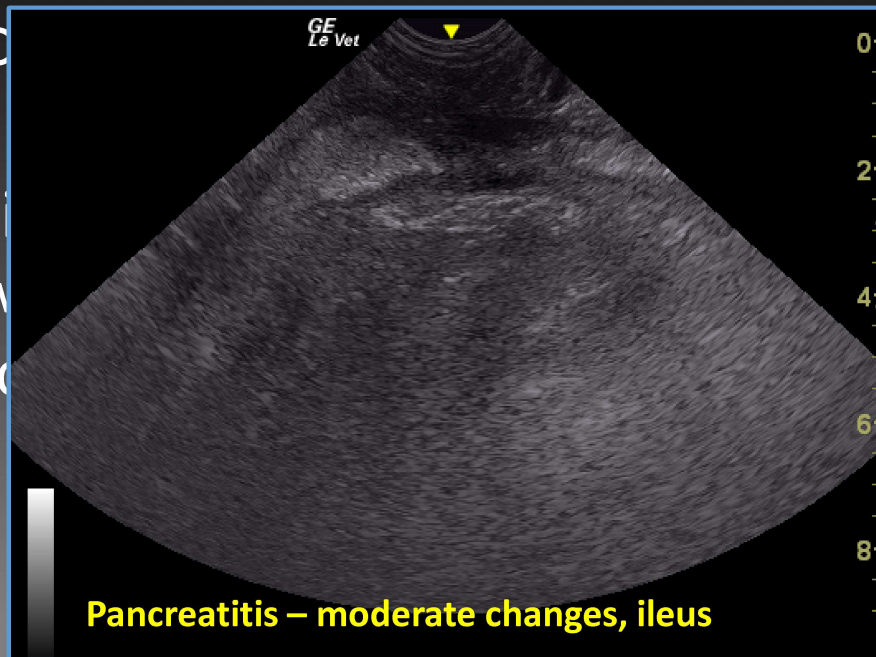
- Sonographic

- Pain at the

- Hyperechoic

- May throw

- Hypoechoic



and fibrosis

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reas,

Tips – Pancreatic Ultrasound

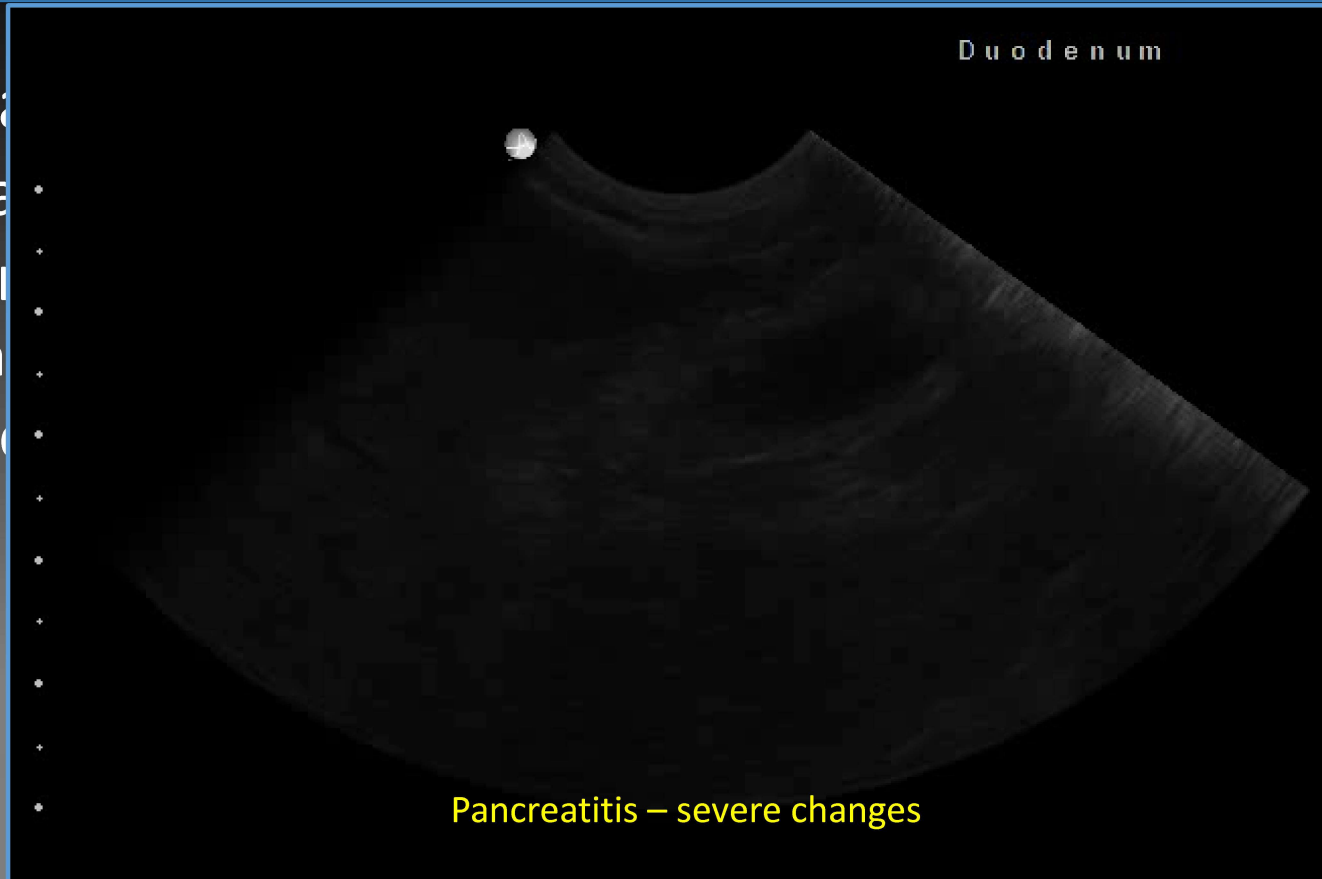
- Sonogram

- Pain at

- Hyper

- Ma

- Hypo



Pancreatitis – severe changes

Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:
 - Pain at the scan site
 - Hyperechoic peripancreatic fat (steatitis) and fibrosios
 - May throw an acoustic shadow (saponification)
 - Hypoechoic (edema) to mixed echo pancreas
 - Thickened pancreas ($>1\text{cm}$)
 - Peripancreatic fluid (hypoechoic halo)
 - May develop walled off cavitary lesions with time (sterile abscesses or cysts)

Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:

- Enlarged gallbladder (some think)
- GB Sludge



non bile duct

Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:
 - Enlarged gallbladder, enlarged/tortuous common bile duct (some thin)
 - GB Sludge
 - Duodenal waves 3-6



crystalline

Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:
 - Enlarged gallbladder, enlarged/tortuous common bile duct (some think latter can be normal variation)
 - GB SL
 - Duod
 - waves
 - Local



Tips – Pancreatic Ultrasound

- Sonographic indications of pancreatitis:
 - Enlarged gallbladder, enlarged/tortuous common bile duct (some think latter can be normal variation)
 - GB Sludge
 - Duodenal ileus and/or corrugation (normal peristaltic waves 3-6 per minute)
 - Local ascites in the cranial abdomen
 - If severe – hemothorax, hemoabdomen

Attendee – City TX



Tips – Pancreatic Ultrasound

- Pancreatic adenocarcinoma can resemble pancreatitis
- Use a light touch when looking for the right limb near the duodenum
 - Pressure can displace the duodenum from the right kidney
 - Pressure tends to move the duodenum laterally

Pitfalls – Pancreas Ultrasound

- Gain set too high will make the pancreas difficult to see
- Pancreatic masses are often too small to be seen on ultrasound
 - Insulinoma
 - Adenocarcinoma
 - Hepatic metastasis may be the main sonographic clue
- *Cannot rule out pancreatitis based on normal pancreatic ultrasound*
 - Or even not finding the pancreas at all

Summary

- PowerPoints - [Ultrasound of the Pancreas, Pancreas Ultrasound Cases](#)
- .pdf of PowerPoint - [Ultrasound of the Pancreas, Pancreas Ultrasound Cases](#)
- Video: [Ultrasound of the Pancreas](#)
- Animated PowerPoint - [Scanning the Pancreas](#)



Summary

- Hidden slides: indications, patient preparation, landmarks, transition adjustments, video on ultrasound of the pancreas



Acknowledgments

Soren Boysen & Jennifer Gambino

Chapter 7: Focused or COAST³ - Gastrointestinal and Pancreas
**Focused Ultrasound Techniques for the Small Animal
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