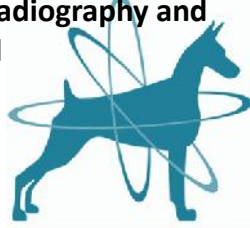


### Abdominal Imaging: The practical Utility of Radiography and Ultrasound



**VICSO**  
VETERINARY IMAGING  
CENTER OF SAN DIEGO

Jonathan Hayles, DVM, MS, Dipl ACVR

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### Life is hard

- Internist
- Surgeon
- Oncologist
- Neurologist
- Dermatologist
- Radiologist!!!
  - ✓ The digital era has lightened the load



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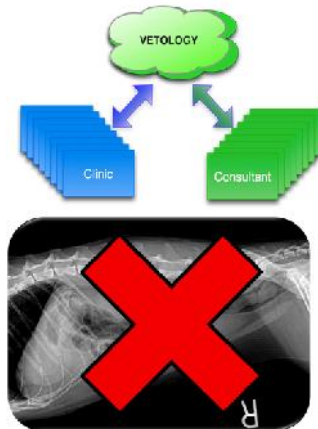
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### Question?

- Patient Concerns
  - In need of imaging
- Client Concerns
  - \$\$\$
- Logistics
  - New DR System



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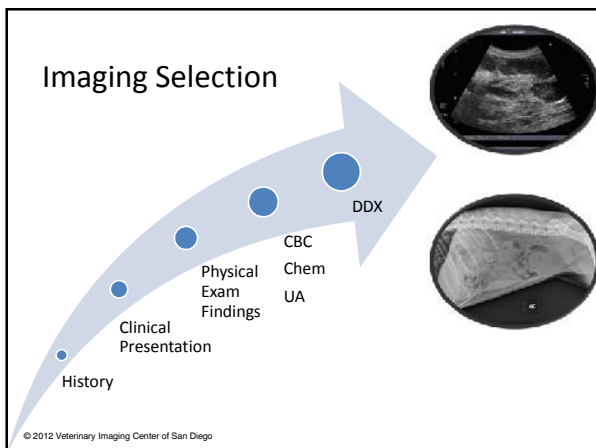
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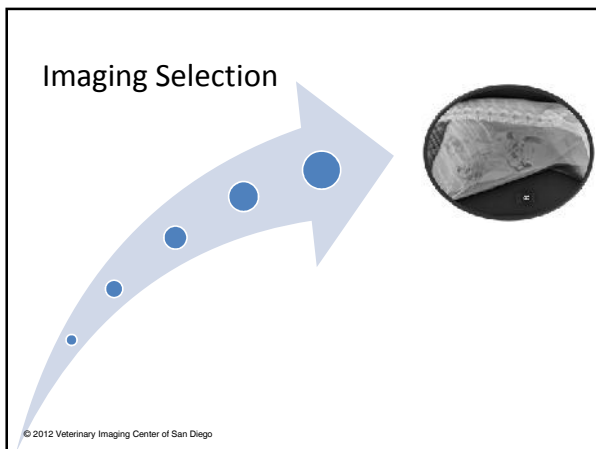
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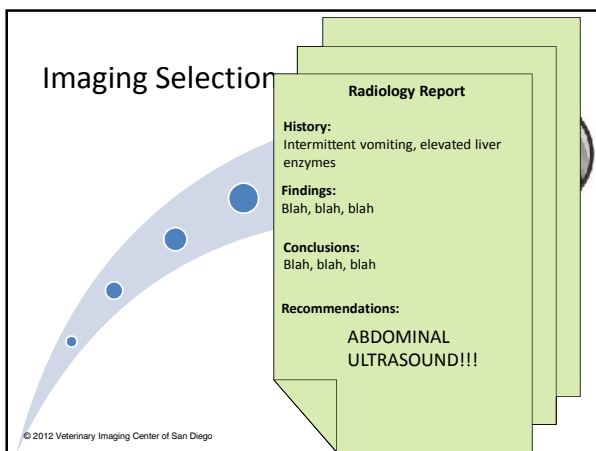
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### The Pros and Cons

 <b>PROS</b>	<ul style="list-style-type: none"><li>• Bone</li><li>• Gas</li><li>• Comfort</li><li>• \$\$</li><li>• Digital</li><li>• Independent</li><li>• Availability</li><li>• Spatial Res</li></ul>	 <b>CONS</b>	<ul style="list-style-type: none"><li>• Super</li><li>• Contrast</li><li>• Radiation</li></ul>	 <b>PROS</b>	<ul style="list-style-type: none"><li>• Super</li><li>• Contrast</li><li>• Radiation</li><li>• Digital</li></ul>	 <b>CONS</b>	<ul style="list-style-type: none"><li>• Bone</li><li>• Gas</li><li>• Comfort</li><li>• \$\$</li><li>• Dependent</li><li>• Availability</li></ul>
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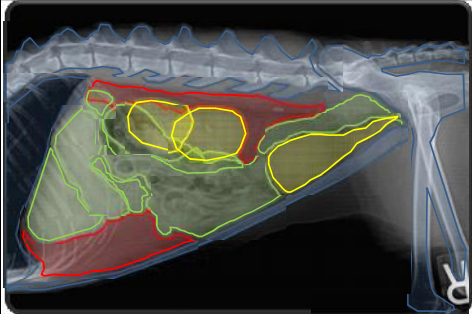
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**Approaching the Rad**  
(Interpretation Paradigm)

1. Extra-ab structures
2. Peritoneal/Retro space
3. GI +
4. Urogenital +

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Canine



Can you identify the colon?

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## Chino

- 14 yr MN Shepherd X
- 1 month Hx of Wt. loss
- Inappetence, intermittent vomiting and diarrhea
- PE: BCS 3/9 and palpable soft, gas filled bowel
- Blood Chem/CBC/UA/T4: WNL



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## Possible differentials for Chino:

- Abdominal mass or obstruction
  - Rads, US, Exlap
- Nonprimary GI dz
  - R/O with labs
- Primary GI dz
  - Inflammatory (-itis, IBD)
  - Partial obstruction
  - Motility disorder



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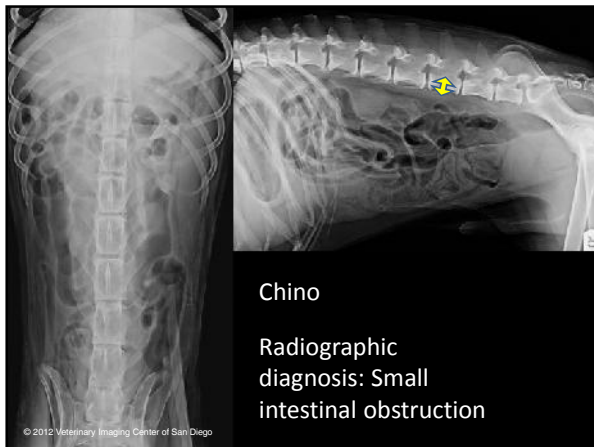
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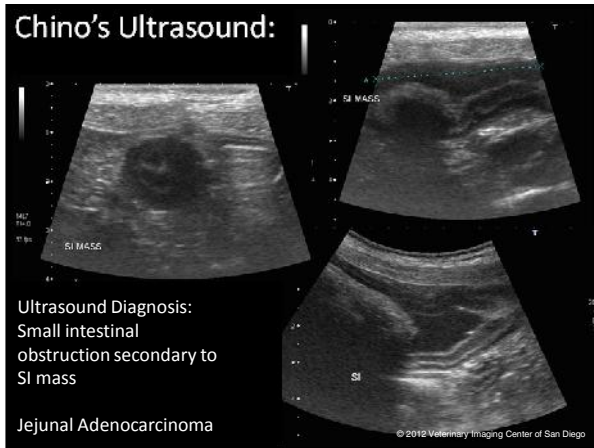
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COMPARISON OF RADIOGRAPHY AND ULTRASONOGRAPHY  
FOR DIAGNOSING SMALL-INTESTINAL MECHANICAL OBSTRUCTION  
IN VOMITING DOGS

ALAN SHARMA, MARGRETT S. THOMPSON, PETER V. SORIANO, NEERAN L. DEEKS, AMY E. YEAGER,  
SEAN R. FRIER, HOLLEN N. EHR

Vet Rad 2011

- Cross sectional study of acutely V dogs (82)
- Definitive Results
  - Rads 27/82 (33%)
  - US 80/82 (97%)
- Concluded both are accurate
- BUT... US had >accuracy <equivocal results >confidence

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### Sweetie

- 10 yr MN DSH
- Vomiting



Mattoon, WSU

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### Sweetie



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### Sweetie



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### Sweetie

- Radiographic Findings: markedly distended segment of *small intestine*
- Radiographic Diagnosis: small intestinal obstruction
- Surgical Diagnosis: Terminal ileal neoplasm



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### Reba

- 4 yr FI Doberman Pinscher
- History of abdominal distention (5 hrs)
- Vomiting and ptyalism



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Reba's Ultrasound:



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Little Bill

- 8 yr MN DSH
- History of hematochezia with otherwise normal feces
- Elevated renal values



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Little Bill

Radiographic diagnosis: Irregular kidneys, left nephrolith, mineral body in right retroperitoneal, unremarkable colon

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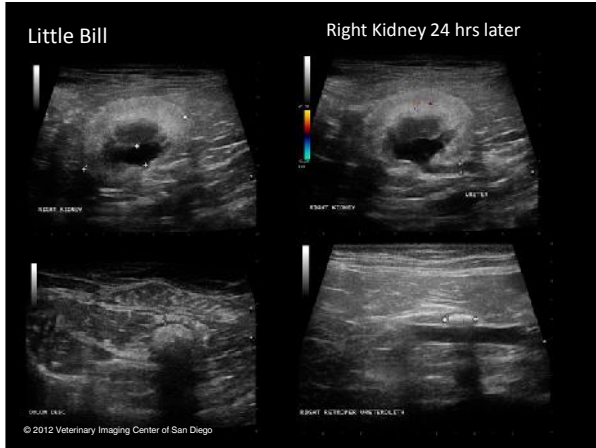
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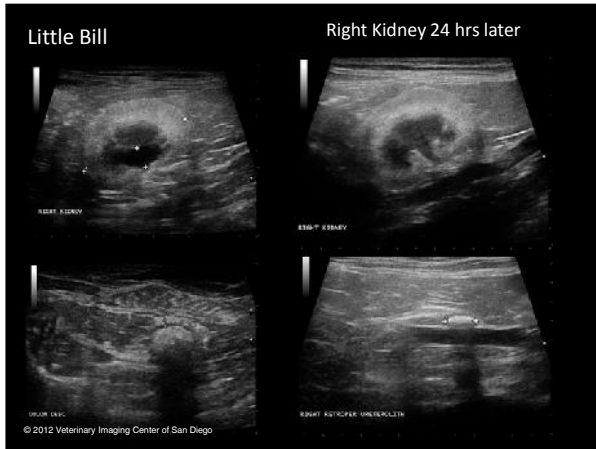
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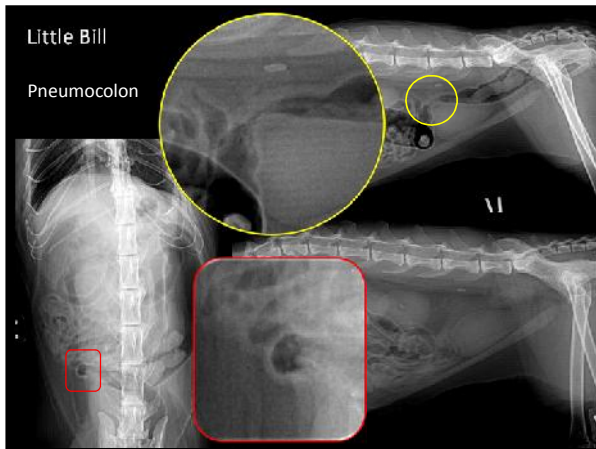
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### Abby

- 12 yr FS JRT
- 3 week history of hematuria, culture positive UTI/MIC
- Hematuria continued despite abx treatment



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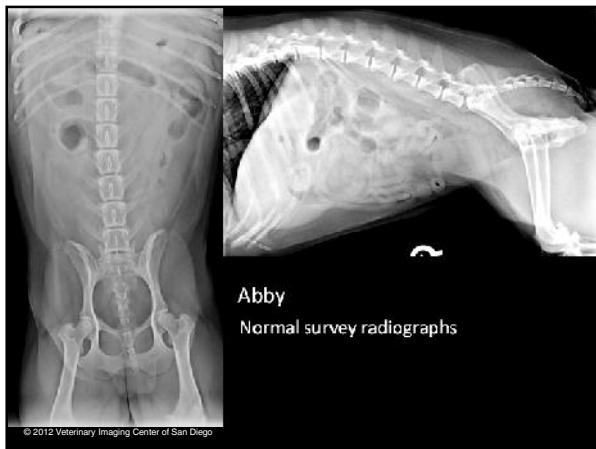
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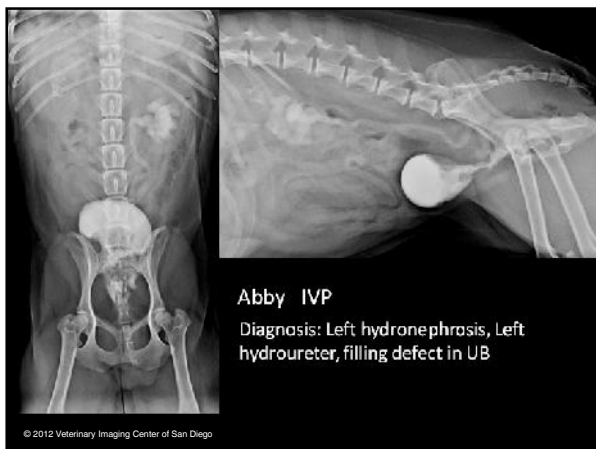
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### Sady

- 10 yr FS Labrador
- 3 week history of lethargy and losing weight
- No vomiting or diarrhea
- CBC/Blood chemistry pending



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Sady

Findings: Slight loss of abdominal serosal detail in the mid abdomen

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**Sady**

- Differentials?
- Small amount of peritoneal effusion
- Focal peritonitis
- Mesenteric lymphadenopathy

Next step?  
ABDOMINAL ULTRASOUND!!!



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**Sady**

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**Sady' Thorax**

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### The Human Side

Recent Trends in Utilization Rates of Abdominal Imaging: The Relative Roles of Radiologists and Nonradiologist Physicians JACR 2008

Daniel G. Levin MD, Vicky M. Saeed MD, Laurence Parker PhD, Andrea J. Frazee MD, Jonathan H. Garafino PhD

- 1000 Medicare patients 1996 to 2005
- Abdominal imaging inc. 25% overall
- Greatest growth in CT/CT contrast (141%)
- Ultrasound had a 12% increase
- Plain abdominal radiography decreased -13%
- Radiologists dominate market share at 90%



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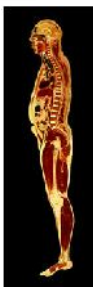
### The Human Side

Int J Emerg Med 2011

Abdominal imaging utilization in the emergency department: trends over two decades

A.S. Raja et al

- 1000 Adults on ED visits from 1990 to 2009
- The number of CT examinations increased 17-fold and US increased 52%
- Radiography decreased 82%
- Conclusion: CT has replaced radiography as the most common imaging modality for ED visits



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### Conclusion

- Abdominal radiography and ultrasound work well together
- Some cases warrant ultrasound examination without X-rays
- Abdominal radiographs infrequently provide a definitive diagnosis
- Save up for a new 64-slice CT scanner

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