Abdominal Radiology 101: Back to Basics

Hock Gan Heng
DVM, MVS, MS,
Diplomate ACVR, ECVDI
Purdue University
hheng@purdue.edu

Abdominal radiology
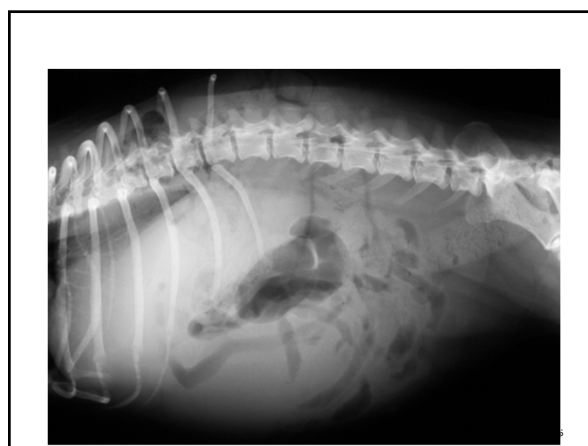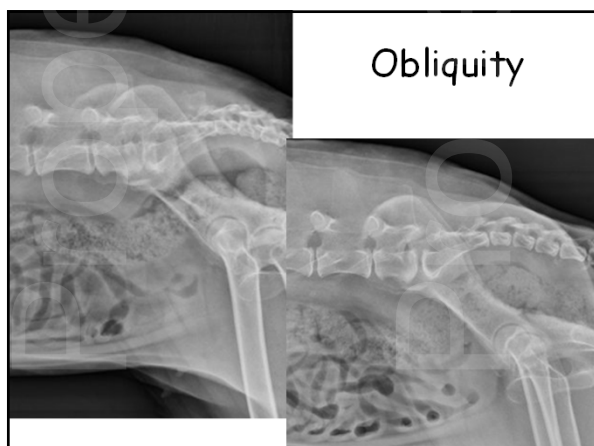
- Findings
  - Abnormal and normal
  - Evaluation and description of abnormalities according to Roentgen signs
  Location
  Margins
  Number
  Opacity
  Size
  Shape

- Interpretation /Impressions
  - Diagnosis
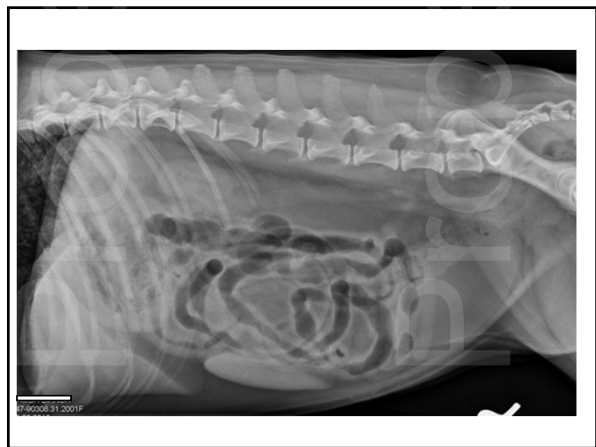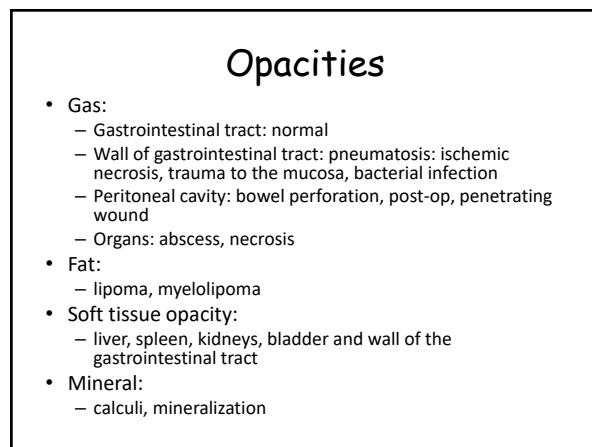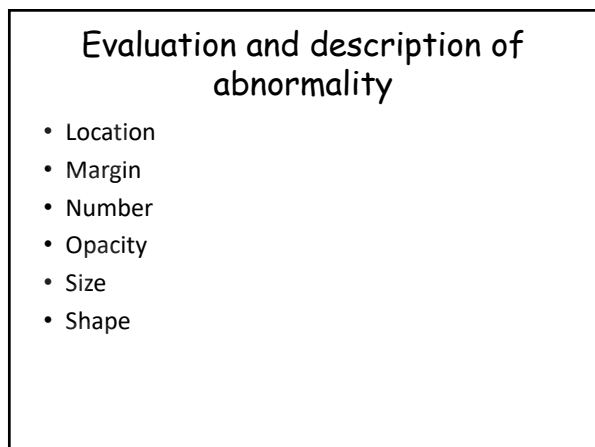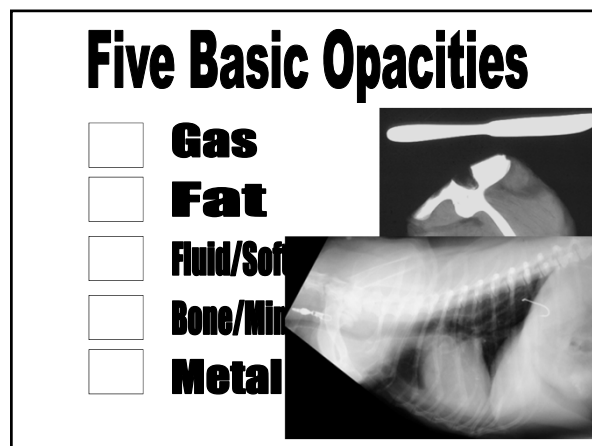 - Differential diagnoses

Common mistakes

- Mistaken normal as abnormal
- Inability to identify normal variation
- Inability to differentiate abnormal from normal
- Inability to interpret the abnormalities meaningfully
  - Good description is needed

Good quality radiographs

- Exposure technique
- Positioning
- At least 2 or more orthogonal views

Obliquity

At least 2 orthogonal views

Five Basic Opacities

- ☐ **Gas**
- ☐ **Fat**
- ☐ **Fluid/Soft**
- ☐ **Bone/Min**
- ☐ **Metal**

Evaluation and description of abnormality

- Location
- Margin
- Number
- Opacity
- Size
- Shape

Opacities

- Gas:
  - Gastrointestinal tract: normal
  - Wall of gastrointestinal tract: pneumatosis: ischemic necrosis, trauma to the mucosa, bacterial infection
  - Peritoneal cavity: bowel perforation, post-op, penetrating wound
  - Organs: abscess, necrosis
- Fat:
  - lipoma, myelolipoma
- Soft tissue opacity:
  - liver, spleen, kidneys, bladder and wall of the gastrointestinal tract
- Mineral:
  - calculi, mineralization
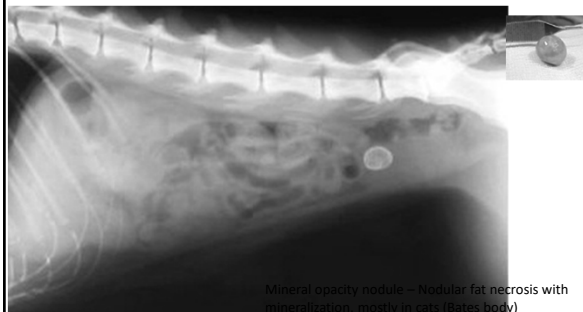

Gas vs fat

8 YO SF American Cocker Spaniel was presented due to abdominal discomfort and a palpable abdominal mass

Transdiaphragmatic extension of retroperitoneal lipoma into intrathoracic extrapleural space through lumbocostal trigone (foramen of Bochdalek)

6 YO SF American DSH was presented due to a 2 days history of hematuria

Mineral opacity nodule – Nodular fat necrosis with mineralization, mostly in cats (Bates body)

Location

- Peritoneal cavity, retroperitoneal cavity, extra-abdominal
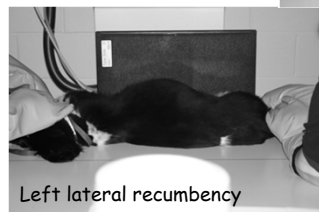- Organ of origin

8 YO MN Mixed breed dog was presented with lumbar pain and right hind limb lameness

6 YO MN Canine Rat Terrier was presented with one history of vomiting and diarrhea. A firm mass was palpated at caudal abdomen.

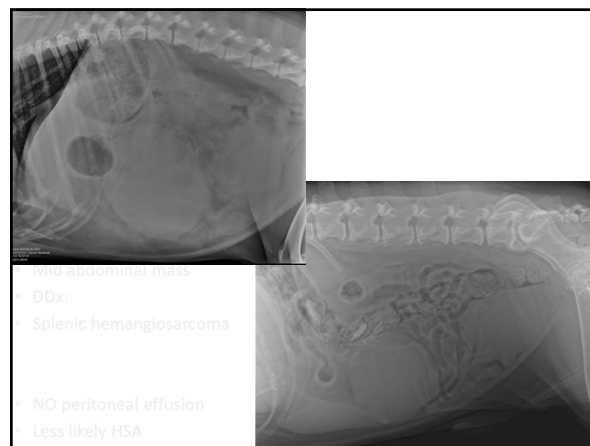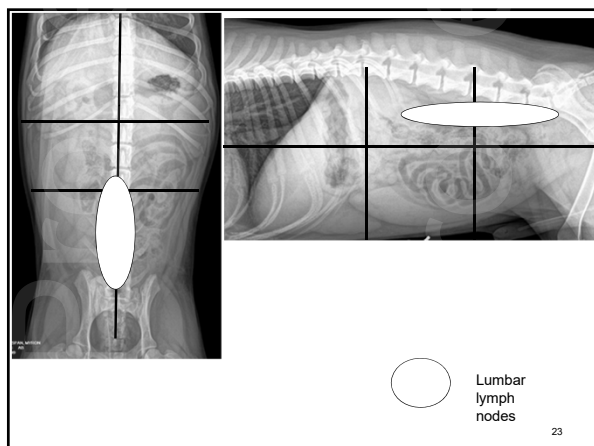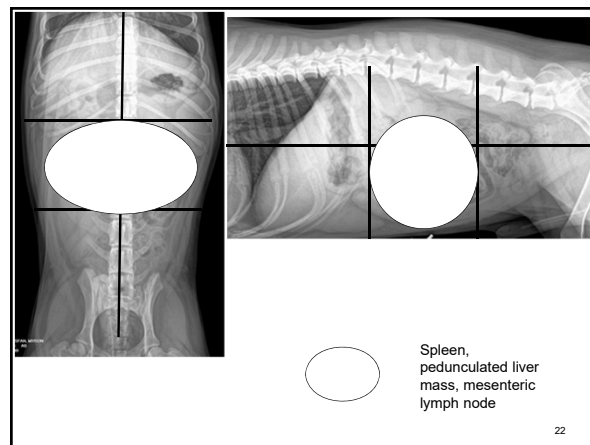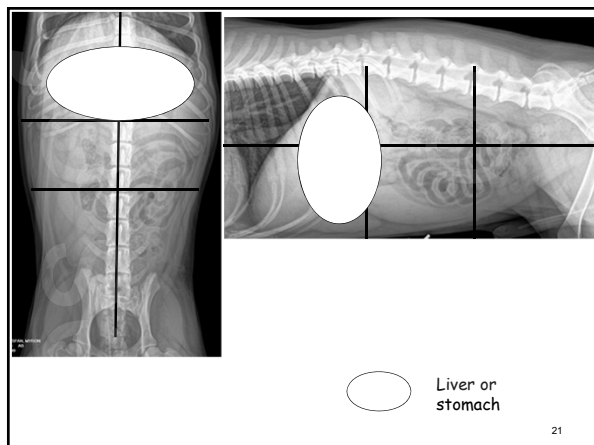Horizontal beam for detection of intra-peritoneal gas

Left lateral recumbency

18

Left lateral horizontal beam

MASS

Identification of mass is by organ of origin, location and failure to identity a particular organ


Liver or stomach

21

Spleen, pedunculated liver mass, mesenteric lymph node

22

Lumbar lymph nodes

23

- Mid abdominal mass
- DDx:
- Splenic hemangiosarcoma

- NO peritoneal effusion
- Less likely HSA

Margins

- Irregular / nodular / rounded
- Size of liver and spleen: rounded margins
- Serosal margins: Well demarcated or ill defined
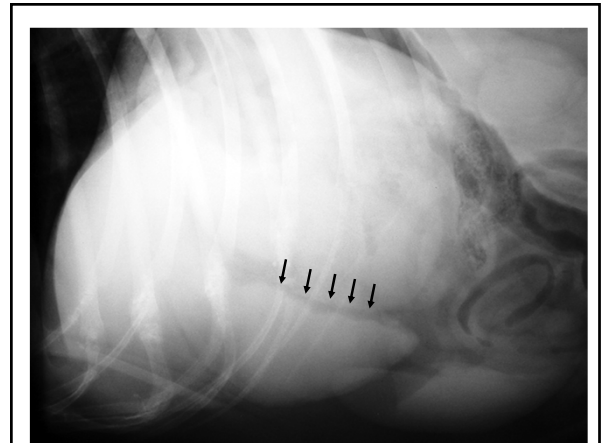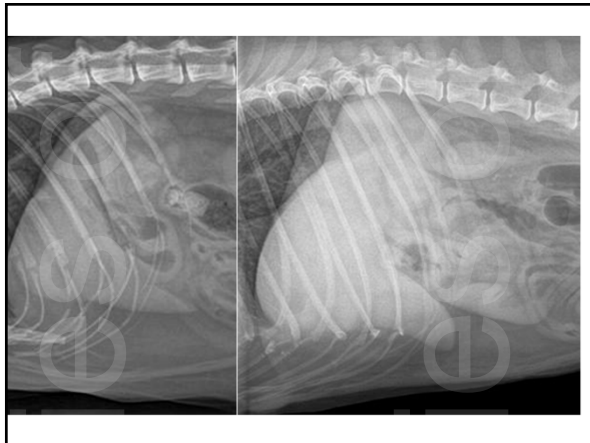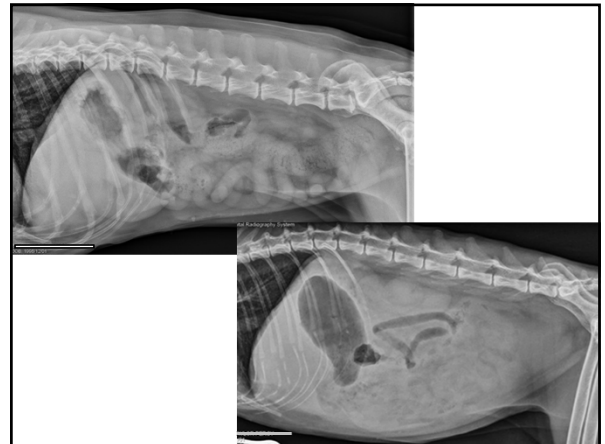
2 YO F American DSH was presented due to suspected pregnancy
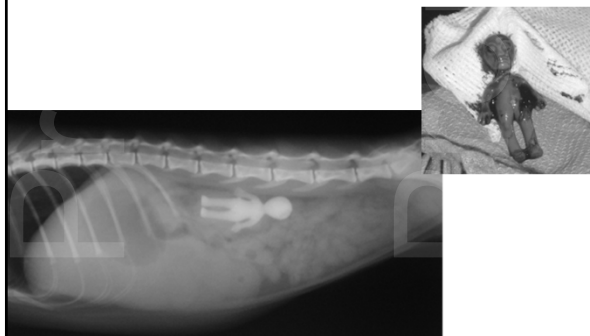
## Number: systematic approach: Identifying of individual organs

- Organs not detected:
- Normal
  - Superimposition with other organs
  - Kidneys, urinary bladder
  - Lack of abdominal fat
- Abnormal
  - Peritoneal effusion
  - Superimposition with abnormal organs
  - Small size
  - Congenital anomaly: number of lumbar vertebrae

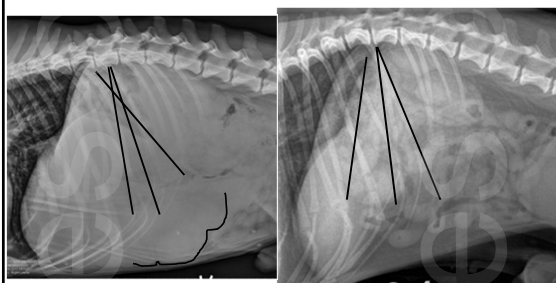## 10 YO MC American DSH was presented due to a chronic history of ADR
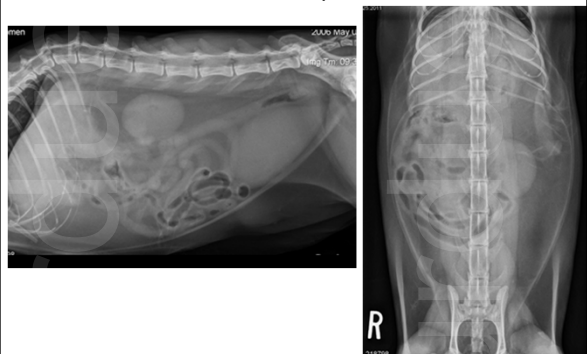
Size: Liver

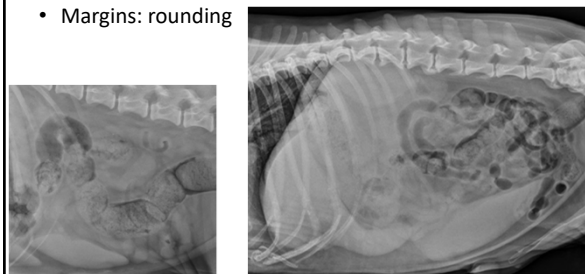- Gastric axis
- Margin: Rounding
- Always clinical correlation
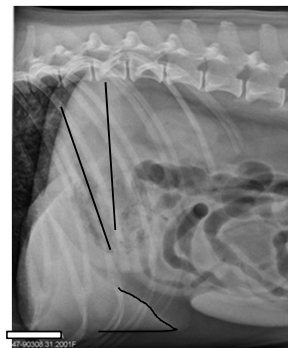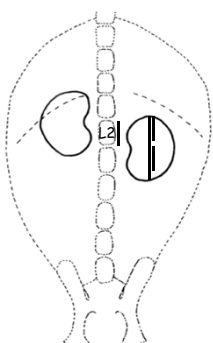

Liver: gastric axis

Size: Spleen

- Spleen:
  Thickness is not reliable
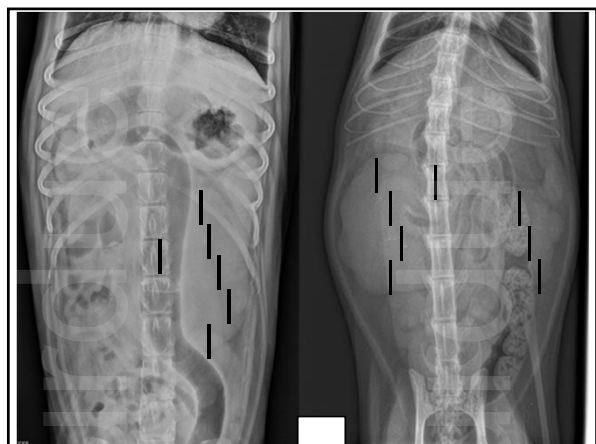- Margins: rounding

Size: Kidney on VD

	Dog	Cat
Length	2.5 – 3.5	2.5 – 3.0

Compare to the length of L2

Neutered cats 1.9 – 2.6

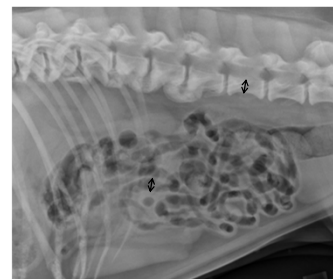## Variation in kidney size and shape

Size

SI diameter ≤ 1.5 x Height of L5
Obstruction ≥ 2.4 x Height of L5

Size

SI diameter ≤ 2 x Height of cranial end plate of L2

SI diameter ≤ 12 mm

Obstruction ≥ 2 x Height of cranial end plate of L2

Take home message

Careful examination of the abnormalities will provide a list of meaningful differential diagnoses

Thank you