Liver, Spleen, & Urinary System
VMB 960
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Objectives

- Radiography
- Ultrasound
- Liver, Spleen, Kidneys & Urinary Bladder
  - Normal
  - Common Patterns of Abnormal
  - Urinary Contrast Procedures
- Reference Reading
  - Chapters 39-44
  - Pages 667-750

Liver

- Normal position
  - Caudal to diaphragm
  - Cranial to stomach
- Liver size influences position of the GASTRIC AXIS
Liver & Gastric Axis

- Cats

- Conformation dependent
  - Note spleen
  - Will not extend cranial to the antrum
- Must look at the VD view to fully evaluate liver
VD View

Ultrasound

- Uniform echogenicity and texture
- Vessels
  - Portal Veins
    - Hyperechoic walls
  - Hepatic Veins
- Size is less reliable

Generalized Hepatomegaly

- Rounding of the margin
- Extends ventrally well beyond the costal arch
- Caudodorsal shift of the gastric axis
Generalized Hepatomegaly

- Hepatic venous congestion
- Neoplasia (Lymphoma)
- Steroid hepatopathy
  - Exogenous
  - Hyperadrenocorticism
- Diabetes mellitus
- Hepatic lipidosis
- Acute hepatitis
Ultrasound

- Variety of appearances
  - Often NONSPECIFIC
- Most commonly seen changes
  - Hyperechoic
  - Fine texture

Focal Hepatomegaly

- Appearance depends on location
- Differentials
  - Neoplasia
  - Abscess
  - Cyst
  - Biloma
  - Nodular regeneration
Focal Hepatomegaly

Ultrasound

- Findings can be nonspecific
- Sample the lesion

Microhepatia

- Decreased liver size
- Difficult to see margins
- Gastric axis upright or cranially deviated
- Stomach adjacent to diaphragm
- May be difficult to evaluate with ultrasound
  - Lungs interfere
Microhepatia

- Differentials
  - Chronic Liver Disease
    - Cirrhosis
    - Hepatitis
  - Portosystemic Shunt
  - Diaphragmatic Hernia
- Consider patient factors

Spleen

- Typically surrounded by fat
- Usually easily seen on rads
  - Head on VD
  - Tail on Lateral
    - Not in cats
- Sedation effects
  - Phenothiazine tranquillizers
  - Anesthetic gases & barbituates
Spleen

• Breed variants
  – German Shepherd Dog, Retrievers, Sighthounds

Spleen - Cats

• Will not see tail on lateral
Splenic Pathology

• Separate into Diffuse and Focal diseases
• Radiographs
  – Diffuse changes and large focal disease
• Ultrasound
  – Can better identify small parenchymal lesions
• Specificity of imaging changes are often nonspecific

Diffuse Splenomegaly

• Neoplasia
  – Lymphoma
  – Mast Cell
• Congestion
  – Sedation
  – Right heart failure
• Splenic Torsion

• IMHA
• Inflammation
• Infarction
• Hyperplasia
• Extramedullary hematopoiesis
Focal Splenomegaly

- Neoplasia
  - Hemangiosarcoma
  - Hemangioma
  - Lymphoma (less common appearance)
- Nodular Lymphoid Hyperplasia
- Hematoma
- Abscess

Solitary Splenic Mass
Kidneys

• Retroperitoneal organs
  – Right kidney cranial to left
  – Left kidney more variable

• Right kidney
  – Difficult to see
  – Silhouettes with the caudate lobe of the liver

• Lack of fat makes either kidney difficult to see

Kidneys - Dog

Kidneys - Cat
Kidneys

- Radiography
  - Dog 2.5-3.5X L2 on VD projection
  - Cat 2.4-3X L2 on VD projection

- Ultrasound
  - Dog 1cm/10 lbs (range 3-9 cm)
  - Cat 3.5-4.5 cm

- These values are just guidelines

Ultrasound

Chronic Renal Disease

- Degenerative changes
  - Poor correlation to clinical signs

- Decreased size
- Infarction / irregular shape
- Mineralization
Renal Degenerative Change

Renal Enlargement
Renal Enlargement

• Differentials
  – Mass lesions
  – Hydronephrosis
  – Compensatory Hypertrophy
  – Perirenal Pseudocysts
  – Nephritis
    • FIP in cats
• Ultrasound can help narrow the differentials

Excretory Urography

• Improves morphologic assessment on rads
• Also allows evaluation of ureters
• Does not evaluate renal function
• Consult the textbook for
  – Patient prep
  – Contrast medium, dosage and procedure details
  – Contraindications & potential complications

T=0 min
Nephrogram

T=5 min
Pyelogram

T=20 min
Pyelogram
Excretory Urography

- Patterns of abnormal

Urinary Bladder

- Variable in size and position
- Soft tissue opacity on radiographs
  - Urine
  - Wall
  - Mass
  - Cysteine & urate calculi
Pelvic Bladder

Cystography

- Positive Contrast
  - Bladder position
  - Rupture
- Negative Contrast
  - CO₂ or N₂O
- Double Contrast
  - Mucosal evaluation
  - Calculi

Conclusion

- Liver size is reflected in stomach position
- Radiographs provide survey
  - Ultrasound better characterize changes
  - Contrast procedures also helpful for urinary tract
- Remember normal variants
  - Correlate findings with clinical signs