Imaging the Urogenital System

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Reading

• Thrall
  Chapters 42-46

Prostate Gland

• Not visible radiographically in normal dogs
  – Enlarges with age, especially if intact
• Causes for enlargement
  – Cysts
  – Infection
  – BPH
  – Cancer
MILD PROSTATOMEGALY

TRIANGULAR REGION OF FAT AIDS IN MAKING THE DIAGNOSIS

SOMETIMES SEE THE PROSTATE GLAND IN THE PELVIC CANAL ON THE VD
Radiographic evidence of mineralization

- Cancer
- Chronic prostatitis
- In castrated male
  - Cancer until proven otherwise

Mineralized prostate tumor with metastasis to medial iliac LN

Normal – Castrated

Enlarged - Castrated

Tumor
Two circular soft tissue opacities in the caudal abdomen

Paraprostatic cyst

Kidneys
- Retroperitoneal Organs
  - Right kidney cranial to the left
  - Left kidney more variable in location.
- Size on VD
  - Dog: 2.5 – 3.5 x length of L2
  - Cat: 2.4 – 3.0 x length of L2

Kidneys
- Cranial pole of the right kidney
  - Difficult to see
  - Silhouettes with caudate lobe of liver
- With lack of fat
  - Difficult to see either kidney
Normal dog

Normal dog

Normal Cat
**Mass Effect - Kidney**

- Kidney masses
  - Ventral displacement of intestine
  - Especially colon
- A normal size kidney
  - Still can have disease

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**Bilateral renal enlargement**

- Lymphoma
- FIP
- Hydronephrosis

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**Small Kidneys + Mineralization**

Line is 2.4x L2


Small Kidneys + Mineralization

Excretory Urography

- Improves morphologic assessment
- Poor test of function
- Iodinated water-soluble contrast medium
  - Blood flow
  - Glomerular filtration
  - Tubular reabsorption of water

Iodine concentration increases in tubule as H₂O is resorbed
Excretory Urogram

• Contrast medium
  – Ionic water soluble
  – Non-ionic if patient is compromised
• Contraindications
  – Azotemia + dehydration
  – Pheochromocytoma, Multiple myeloma
  – Prior allergic reactions to C.M.

Excretory Urogram

Standard Protocol

• Survey radiographs
• Inject contrast medium rapidly
  – 400mg Iodine per pound
  – Approximately 1 ml per pound
  – Usually do not exceed 50 ml

Projections

• Immediate VD radiograph
  – Vascular phase
• Lateral and VD radiographs at 5 min
  – Nephrogram and pyelogram phases
• Lat and VD views at 20 and 40 min
  – Urogram phase
Loss of serosal detail.

Bladder rupture

Left ureter rupture

Dilated left renal pelvis & proximal ureter

Urinary tract rupture
**Pyelonephritis**
- Blunt diverticulae
- Dilated pelvis

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**Ultrasound of hydronephrosis**

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**Vaginourethrogram**

- Requires general anesthesia
- Foley catheter placed inside labia
- Labia clamped to seal outlet
- Contrast medium infused
- Resistance will often be encountered

**Normal Retrograde Vaginogram**

- [Image of a normal retrograde vaginogram showing the anatomy of the vagina, urethra, and vestibule.]

**Ectopic Ureters**

- [Image of an ectopic ureter showing the anatomy of the vagina, urethra, and vestibule.]
Urinary Bladder

• Easier to evaluate with ultrasound
• Very few radiographic urinary tract studies are performed
• If suspect bladder problem
  – Carefully consider relative merits
    • Radiography versus ultrasonography

Urinary Bladder

• To identify significant bladder problems in survey radiographs is unusual
  – Stones
  – Gas in wall; rare

Pulling the legs forward helps look at the penile urethra. Also note the benign prostatic hyperplasia present.
Emphysematous cystitis

- Diabetes (glucosuria) with secondary bacterial infection

Urinary Bladder

- Contrast Examinations
  - Positive contrast cystogram
    - Put contrast medium in bladder
  - Negative contrast cystogram
    - Rarely used
    - Don’t use room air; use CO₂
  - Double contrast cystogram
    - Useful for mucosa assessment

Cystography
Urinary bladder masses

Urinary Bladder – Contrast

- Double Contrast Cystogram necessary to evaluate bladder mucosa.
- Assess:
  - Serosal margin
  - Mucosal margin
  - Bladder wall thickness
  - Luminal filling defects

Ultrasound is better
Positive contrast cystography
• Looking for rupture

Air Embolism
• More common in cats
• Especially those with hematuria

Air Embolism
Air in C.V.C. Air around bladder neck

Air in R.V. Air in P.A.
What to do!

- Put animal in left lateral recumbency
- Elevate the tail
  - This makes the right ventricle the highest point
  - Traps air before getting to lungs

What not to do!

- Scream
- Panic
- Cry

Conclusion

- Normal radiograph of kidney
  - Not necessarily a normal kidney
- Contrast studies
  - Negative contrast cystogram
  - Positive contrast cystogram
  - Double contrast cystogram
  - Excretory urogram
- Ultrasound is slowly replacing these