Imaging the Urogenital System

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&

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Bianca

- 3yo, FS, Persian
- Hx: Owner has noticed cat has a distended abdomen and has been urinating more frequently. She has also been drinking water from the shower and bath.
- PE: BCS 2/5, abdomen is distended by palpable masses

What radiographic findings do we look for in renal radiographs?

- Size
- Margins
- Position
- Opacity

Differential diagnoses for bilateral renomegaly on radiographs:

- Polycystic kidneys
- Pseudo cysts
- Lymphosarcoma
- Bilateral hydronephrosis
- Pyogranulomas FIP
Other radiographic options

• Contrast study
  – Excretory urogram
    • Allows estimate of renal function, measurement of:
      pelvic recesses, renal pelvis
    • Use contrast medium of iodine.
    • Based on other factors whether you can perform excretory urogram
      – What might these be??

You can only successfully perform an excretory urogram if you know the BUN and creatinine of the patient are not severely elevated!

Iodine contrast table
Bianca’s BUN 20 and Crea 250

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Dose of iodine</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUN</td>
<td>8mmol/L</td>
<td>800mg/kg</td>
</tr>
<tr>
<td>Crea</td>
<td>65μmol/L</td>
<td>800mg/kg</td>
</tr>
<tr>
<td>BUN</td>
<td>10mmol/L</td>
<td>1600mg/Kg</td>
</tr>
<tr>
<td>Crea</td>
<td>180μmol/L</td>
<td>1600mg/Kg</td>
</tr>
<tr>
<td>BUN &gt;15mmol/L*</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Crea &gt;200μmol/L*</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

*NB: cannot give iodine contrast as not enough sufficient excretion to be diagnostic

Obtaining images
Will vary depending on position of animal
  – Dorsal recumbency
  – Lateral recumbency

Normal Anatomy - Kidney

Medial Long Axis Sonogram
Bianca’s kidneys on ultrasound

What do we see on radiographs?
What do we see on ultrasound

• Breed predispositions: Persians!!!!
• Autosomal dominant gene PKD1, DNA Testing
• National Registers in other countries

• Due to chronic renal disease
• Drain and recheck in a week to reassess patient
• Can fenestrate capsule to drain fluid
• Can also inject a sclerosing agent
Nodular skin lesions in German Shepherd Dogs
Dermatofibrosis

FIP-granuloma

Differential diagnoses for unilateral renomegaly
- Primary tumour
- Large solitary renal cyst
- Compensatory hypertrophy
- Prenephric abscess
- sarcoma

Small Kidneys
Excretory Urography Technique

- Intravenous bolus administration of 800 to 1600 mg/kg body weight of a Na-iothalamate, Na-diatrizoate or one of the non-ionic positive contrast agents - Omnipaque
- Sequence of radiographic exposures

Urinary incontinence in a young animal
- Easiest to begin with a Retrograde positive contrast Vaginogram

Congenital duplex vagina with strictures
Incontinent Cat

Incontinent 4 month Labrador

Left ectopic ureter into urethra

Double contrast

- Positive contrast - Injection of small volume of undiluted medium into the empty bladder
  - cats 0.5 - 1 ml;
  - dogs <11 kg Body weight 1-3 mls
  - dogs > 11 kg body weight 3-6 mls Thrall
- Negative contrast - distension of the bladder with volume of air equal to volume of urine removed (rare complications), or carbon dioxide or nitrous oxide best

Larger Calculi
Cystitis

Prostatic Enlargement

• Exceeds 2/3 of lateral pelvic diameter
• Moves the bladder forward from the pubic bone
• Displaces colon dorsally
• Benign hypertrophy – smooth well defined borders

Pseudocalculus from adjacent colon
Ultrasonography - Prostate

- Use a sector transducer, 7 or > MHz best
- Advantageous to have a full urinary bladder

Landmarks:
- Locate urinary bladder
- Pubic bone
- Abdominal wall
- Colon

Normal Prostate

characterized by mineralization in the prostate

Neoplasia Prostate
~ 45 days gestation

Full term, ready to be born
Look for tooth buds

Look for carpal / metacarpal, tarsal / metatarsal bones