PRACTICAL ULTRASOUND: RECOGNITION OF SURGICAL DISEASE

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OUTLINE

Pyometra
Urinary bladder calculi
Splenic masses
Intestinal Obstruction
Mucoceles
FRIDAY 5 PM
FEMALE ANATOMY
PYOMETRA

Thick walled uterus
Distended with echogenic material
PYOMETRA

No wall layering = Not small intestine!
Difference of echogenicity indicates settling of cells
PYOMETRA

Pus in uterus
KEY POINTS

Typical signalment, history and bloodwork findings

Uterus appears enlarged between descending colon and urinary bladder

Thick uterus distended with echogenic material (cells)
PYOMETRA: MANAGEMENT OPTIONS

OVARIOHYSTERECTOMY IS TREATMENT OF CHOICE.

Pre-operative stabilization: Can use “Rule of 20”
SIDEBAR: CHECKLIST MANIFESTO!

Atul Gawande, MD

• Complications: A Surgeon’s Notes on an Imperfect Science

• Better: A Surgeon’s Notes on Performance

• The Checklist Manifesto: How to Get Things Right
PYOMETRA: MANAGEMENT OPTIONS

OVARIOHYSTERECTOMY IS TREATMENT OF CHOICE.

Pre-operative stabilization: Can use “Rule of 20”

Medical management only considered if:

- Draining (“open pyo”)
- NOT systemically ill
- Breeding potential
- “Right owner”
PYOMETRA

OVH – additional considerations:

Large incision
Delicate tissue handling
Pack off with Lap Pads.
Avoid clamping uterus; don’t oversew “stump”
Larger suture

Mortality Rate: 0-8%
   worse with septic peritonitis

Prognosis suggested to be better than other causes of SIRS

48 hours: Increased WBC, Decreased %Neut
7d: WBC often normalized.
STRANGURIA
URINARY BLADDER CALCULUS

2 small hyperechoic structures associated with the ventral wall of the urinary bladder
URINARY BLADDER CALCULUS

![Bladder and Stone](image.png)
URINARY BLADDER CALCULUS
URINARY BLADDER CALCULUS
WHICH PATIENT HAS A URINARY BLADDER CALCULUS?
KEY POINTS

Usually mobile
Dependent portion of the bladder
Spherical with a hyperechoic curvilinear interface
Presence of distal acoustic shadow is variable
Can be confused with sediment
CYSTIC CALCULI – MANAGEMENT OPTIONS

Medical

Interventional/Surgical
  Catheter-assisted retrieval
  Voiding hydropropulsion
  Cystoscopy/Lithotripsy
  Laparoscopically Assisted Cystotomy
CYSTIC CALCULI: CYSTOTOMY

Pre-operative evaluation/stabilization

Draping

Should provide access to external genitalia for intra-op catheterization.

Ventral midline celiotomy

Skin and SQ curves parapreputial in males

Start with caudal celiotomy unless needs further exploration

Ventral cystotomy

pack off abdomen

stay sutures

avoid exteriorization
CYSTIC CALCULI: CYSTOTOMY

Culture mucosa and crushed stone
Stone analysis
Catheterize, preferably retrograde.
Closure

various options for pattern – submucosa is critical holding layer!
  2 layer continuous Inverting for normal bladder
  1 layer interrupted for chronic cystitis
suture material
  monofilament
type – consider microbiologic environment
  poliglecaprone 25 (Monocryl)
  polydioxanone (PDS)
  polyglyconate (Maxon)

POST-OP RADS ARE MANDATORY!
SPLENIC DISEASE
NORMAL CANINE SPLEEN
NODULAR HYPERPLASIA
HEMANGIOSARCOMA

0.6 cm, Ill-defined mass of mixed echogenicity replacing most of the normal parenchyma
SPLENIC LYMPHOMA

Diffuse, small hypoechoic nodules; spotted echotexture
SPLENIC LYMPHOMA

Solitary, irregular hypoechoic nodule
KEY POINTS

Variable appearance
Hematomas and nodular hyperplasia can mimic hemangiosarcoma
Indolent splenic lymphoma has a good prognosis for long term survival
SPLENIC NEOPLASIA

Statistics:

**Dogs**

33-66% neoplastic

May be skewed higher with concurrent hemoabdomen (~80%)

~60-90% of neoplastic are hemangiosarcoma

Prognosis (surgery alone)

Old studies 19-65d

Newer studies 14-470d

**Cats**

37-73% neoplastic

lymphosarcoma and mast cell are most common
SPLENECTOMY: CONSIDERATIONS

Considerations:

- Incidental Mass vs. Hemoabdomen in crisis
- OR Equipment: electrocautery, suction, Ligasure, LDStapler, Carmalt
- Facilities: pRBCs, availability of critical care monitoring etc.

Technical Considerations:

- Always complete splenectomy (never partial)
- Always perform liver biopsy (guillotine or biopsy punch)
- Assess pancreas, portal vein
- Monitor for VPCs during and after
- Monitor for DIC

Other Considerations:

- Infection
- Oxygen Transport
THE YELLOW DOG
THE YELLOW DOG

Normal Anatomy

Liver

GB

CB

Stomach
GALLBLADDER MUCOCOELE

Hypoechoic mucus displaces the echogenic biliary sludge centrally
GALLBLADDER MUCOCOELE

Triangular shape of hypoechoic foci = Stellate pattern AKA Kiwifruit pattern
GALLBLADDER MUCOCELE
GALLBLADDER MUCOCELE
GALLBLADDER MUCOCELE

Mucus accumulation leads to overdistension, necrosis and rupture
Hypoechoic mucus borders gallbladder wall
Mucus centrally displaces echogenic biliary sludge
Stellate pattern forms initially
Followed by immobile hyperechoic radiating striations
GALLBLADDER MUCOCELE

In general, a surgical disease

Surgical timing is controversial.

- Higher M&M with EHBDO and/or bile peritonitis

Prognosis:

- Reported perioperative mortality is ~22-32%.
  - In my opinion and personal experience this is lower in relatively healthy patients.
- Long term survival is very good for those that survive the perioperative period.
INTESTINAL OBSTRUCTION
Bright interface associated with a strong acoustic shadow is suggestive
DOG TOY

Must be sure to differentiate FB from colon
WHICH ONE IS THE FOREIGN BODY?
KEY POINTS

Dilated, fluid-filled small intestinal loops oral to obstruction

Bright interface associated with strong acoustic shadowing

Sudden decrease in bowel diameter distal to obstruction

Hyperechoic mesentery, free fluid or free gas

Do not confuse with feces in colon
INTESTINAL OBSTRUCTION

Emergency vs. Scheduled

Pack off abdomen well, Clean vs. dirty field, Flushing options, Reglove and reinstrument

Antimesenteric longitudinal incision: Human “doyens”, Doyens, bobby pins

Subjective evaluation: Color, pinch, palpate

Trim redundant mucosa, 4-0 pd s/c

Linear (cut pyloric anchor first)

R & A: Start at mesenteric side, 4 quadrant s/c

Leak & Poke test

Omentopexy
QUESTIONS?

ELVIS