Gallbladder Mucocoeles

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Gallbladder Mucocoele

An abnormal intraluminal accumulation of inspissated bile and/or mucous

Distends the gall bladder

Can cause extra-hepatic biliary obstruction

Necrosis and rupture of the gallbladder wall can occur
Emergent disease

- Emergent disease syndrome in the last 10 years
- The majority of literature available has been published the last 5 years

Anicteric gallbladder rupture in dogs:
5 cases (2007-2013)

COMPARISON BETWEEN ULTRASONOGRAPHIC AND CLINICAL FINDINGS IN 43 DOGS WITH GALLBLADDER MUCOCELES

Clinical Findings and Prognostic Factors for Dogs Undergoing Cholecystectomy for Gall Bladder Mucocele

Clinical, ultrasonographic, and laboratory findings associated with gallbladder disease and rupture in dogs: 45 cases (1997-2007)

Anatomy

- Gall bladder is located in between the quadrate and right medial liver lobes
- Fundus, body and neck
- Connected via short cystic duct to the common bile duct
Function

- Storage reservoir for bile
- Bile can be concentrated, acidified and modified (addition of mucin and immunoglobulins)
- Bile is then released into the gastrointestinal tract at the major duodenal papilla
- Not essential
  - Cholecystectomy is well tolerated

Signalment

- Middle aged dogs
- Cocker spaniels
- Shetland Sheepdogs
- Miniature schnauzers
Clinical Signs

- Vomiting 69%
- Lethargy 44%
- Anorexia 42%
- Abdominal pain 19%
- Jaundice 16%
- Polydipsia and polyuria 7%

- Average duration of clinical signs 5 days
- Some dogs are asymptomatic (up to 23% has been reported)

Clinical Pathology

- Leukocytosis
- Elevated liver enzymes
- Hyperbilirubinaemia
- Elevated amylase and lipase
- Increased Cholesterol

- Lactate and PCV associated with outcome
• Diagnosed via ultrasound usually during an investigation for acute abdominal pain, vomiting, suspected liver or GIT disease.
• 5 different patterns have been reported (Choi et al. Vet Radiol. 2014) with no significant difference between clinical signs
• Varies between echogenic bile sludge to stellate and kiwifruit like pattern

Besso et al. Ultrasonographic appearance and clinical findings in 14 dogs with gallbladder mucocele. Veterinary Radiology and Ultrasound 2000;41:261-271
Immobile echogenic

Incomplete stellate

Typical Stellate

Kiwi fruit and stellate combination

Kiwi fruit with residual central echogenic bile

Choi et al. Comparison between ultrasonographic and clinical findings in 43 dogs with gallbladder mucoceles. Veterinary radiology and ultrasound 2014;55:202-207
Sensitivity of ultrasonography examination for gallbladder rupture is 78%, specificity 100%

Crews et al. Clinical, ultrasonographic and laboratory findings associated with gallbladder disease and rupture in dogs: 45 cases. JAVMA 2009;234:359-366
Gall Bladder Rupture

- Peri-cholecystic reaction
- Echogenic peritoneal fluid

Crews et al. Clinical ultrasonographic and laboratory findings associated with gallbladder disease and rupture in dogs: 45 cases. JAVMA 2009;234:359-366

Bile Peritonitis

- Rupture of the gallbladder can lead to an acute clinical signs and the need for emergency surgery
- Recent case series of 5 dogs; normal total bilirubin despite rupture
- Perform an abdominocentesis

Abdominocentesis

- Fluid:serum bile concentrations
- Abdominal fluid should have a higher bilirubin concentration than plasma

Modified Wright stain  Diff-Quick stain

Cause

- Unknown??
- Recent studies have tried to determine any histological link to drugs, other underlying diseases, infections etc.
Predisposing Factors

- Hyperlipidaemia
- Hyperadrenocorticism
- Possible hypothyroidism

Gall Bladder Mucocoeles and Endocrinopathies

Gall bladder mucoceles and their association with endocrinopathies in dogs: a retrospective case-control study

- Odds of a mucocele in dogs with Cushing’s were 29 times that of dogs without Cushing’s
- Association with hypothyroidism reported to be 3 times more likely – observational bias

Mesich et al. Gall bladder mucoceles and their association with endocrinopathies in dogs: a retrospective case-control study JSAP 2008;50:630-635
**Lipid Disturbance**

Effects of iatrogenic hypercortisolism on gallbladder sludge formation and biochemical bile constituents in dogs

P.H. Kook\(^a\),\(^b\), S. Schellenberg\(^a\), K.M. Rentsch\(^b\), C.E. Reusch\(^b\), T.M. Glaus\(^a\)

- In a study to create a hyperadrenocorticism state there was no greater incidence of GBM
- There was a change in the composition of bile to cytotoxic, hydrophobic, unconjugated bile acids

Kook et al. Effect of twice daily oral administration of hydrocortisone on the bile acids composition of gallbladder bile in dogs. JAVMR 2011;191:1607-1612

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**Drug Association**


Association of Gallbladder Mucocele Histologic Diagnosis with Selected Drug Use in Dogs: A Matched Case-Control Study


- Focused on flea and tick preventative medications, heart worm prophylaxis, NSAIDs or other oral analgesic drugs and xenobiotics for DJD. New generation drugs
- Possible association between imidacloprid use in Shetland sheepdogs and GBM formation.

In 2010 there was a reported association between GBM formation and ABCB4 mutation. In 2014 this has been disproven – larger case numbers, gold standard case numbers. What we know now – there may be a multifactorial cause for gallbladder dysfunction which ABCB4 mutation is associated with.


Infection of the gallbladder is an inconsistent finding. The use of perioperative antimicrobials may cause false negative culture.
New Research: Mucin Properties

Excess Secretion of Gel-Forming Mucins and Associated Innate Defense Proteins with Defective Mucin Un-Packaging Underpin Gallbladder Mucocele Formation in Dogs

- Epithelium of the GB acquires a mucin secretory phenotype – not due to cystic mucinous hyperplasia as previously thought
- Mucins in GBM are highly glycosylated
- Muc5a predominant mucin in GBM compared to Muc5b

Kesimer et al. Excess secretion of gel-forming mucins and associated innate defense proteins with defective mucin un-packing underpin gallbladder mucocele formation in dogs. Plos one. 2015

Treatment

- Cholecystectomy – patency of the common bile duct must be confirmed
- Histology of the gallbladders commonly finds transmural necrosis
**Survival Statistics**

- Perioperative mortality rate of 21-40%
- Most mortalities in the first 2 weeks
- Hypotension after surgery negative prognosis
- No reported difference between those with rupture or not
- Prognosis after discharge is great

**Concurrent Liver Disease**

- Liver biopsies are often performed at the time of surgical resection
- Malek et al study found
  - Cholangiohepatitis 29%
  - Biliary hyperplasia 29%
  - Cholestasis 29%
- Pike et al
  - Lymphocytic plasmacytic infiltration
  - Vacuolar hepatopathy
Medical Management

• There are no large studies documenting medical management
• Occasional case reports document its use
• May consider in asymptomatic cases which owners decline surgery – monitoring required
• Can result in acute emergency if there is GBM rupture

Nonsurgical resolution of gallbladder mucocele in two dogs
Romanie Walter, et al; Marilyn E. Dunn, et al; Marc-André d’Anjou, et al; Manon Lécuyer, et al

“Hepato-Protectants”

• Ursodeoxycholic acid
  • Naturally occurring hydrophilic bile acid
  • Choleretic and hepatoprotectant
• S-adenosylmethionine
  • Naturally occurring precursor of cysteine which is used in the production of the antioxidant glutathione
Key Points

• Shetland sheepdogs, miniature schnauzers and cocker spaniels
• Consider as a differential for vomiting, abdominal pain, elevated liver enzyme activity
• Recommend Surgery
• Investigate for underlying endocrinopathy when clinically well

Thank You!
References

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