EDITION THREE | Summer 2024

RVC
RANGIORA VET CENTRE
Enhancing Lives Together

CUT & PASTE

A newsletter from our
Companion Animal Referral team

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On-Site Animal Dedicated CT Service

If you would like to learn more about how our onsite animal dedicated CT service can assist you and your patients please let us know so we can make arrangements to catch up with you, either at the CPD evening (right) or at a time that suits you & your team.

Oncology CPD

CT, Cutting & Chemo

7pm Thursday 22nd February

Coffee & Cake Evening

We invite you and your team to join us at Rangiora Vet Centre 181 Lehmans Road, Rangiora to discuss oncology with our vets Ben, Sarah and Liz.

PLEASE RSVP: by 16-02-24
directly to the surgery team
Rangiora Vet Centre
Referral Surgery Team Ph: 03 313 7438

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dentistry@rangvet.co.nz | **medicine**@rangvet.co.nz | **surgery**@rangvet.co.nz | **CTenquiries**@rangvet.co.nz

Bryn Morgan
BSc (hons) BVSc
PGcertSAS MRCVS

CT - It's not just for bones and cancer!

CT is not only useful in planning complex fracture repairs and advanced tumour resections, it can also be extremely useful in what might be considered more simple surgeries as highlighted to us in a recent case:

A 3 year, 11month old female spayed labrador presented with a 4 day history of lethargy, reduced appetite, reflux and dribbling from the mouth.

Physical examination was unremarkable except for a large firm swelling in the neck and a rectal temperature of 39.9 C

CBC, biochemistry and urinalysis were performed.

CBC showed mild lymphopenia and was otherwise unremarkable.

Biochemistry showed mild increase in ALKP (241 U/L) and globulins (46 g/L) and urinalysis was unremarkable.

A conscious ultrasound was performed of the neck. An encapsulated heterogenous mass was identified. A fine needle aspirate of the mass contained purulent material and cocci.

The dog was started on antibiotics and carprofen, however overnight the neck continued to become more swollen and oedematous and a respiratory stertor developed.

We elected to perform a CT scan of the area the next day in order to try to rule in or out a foreign body and to plan for surgery.

The CT showed a fluid filled mass with contrast enhancing rim dorsal to the larynx and trachea, and ventral to the vertebral canal. The mass extended from ventral to the tympanic bullae cranially to the cranial tip of C4 caudally. The larynx and trachea were displaced ventrally and there was disruption to the subcutaneous tissue planes in the region. The findings were consistent with a large abscess and subcutaneous oedema.

Using multi-planar reconstructions (MPRs) of the scan we were able to ascertain that a ventral approach, displacing the trachea would be challenging and that a lateral approach on the left side would give us the safest window with minimal damage to surrounding structures.

Using the MPRs we were able to measure the distance from the tip of the nose and from the dorsal aspect of the neck to the area where the abscess came closest to the overlying tissues and skin

At surgery we marked this point with a surgical marker and used this to centre our incision.

We were then able to bluntly disect between tissue planes to reach the abscess. Ultrasound (probe inside a gel filled surgical glove) was used during dissection to make sure we were on the right track. The abscess was drained and flushed and the cavity digitally explored to feel for any foreign body too small to be seen on CT.

Muscle and skin were closed routinely, the dog was repositioned and a tracheostomy tube was placed in case further swelling caused a constriction of the airway.

The tracheostomy tube was removed after 3 days and the dog discharged on antibiotics and non-steroidal anti-inflamatories. At the time of writing she is doing well.

It was felt that CT aided greatly in this case, as it allowed us to see the extent and extact location of the abscess resulting in a far better, more targetted surgical approach, also, as no foreign body was seen on CT, we did not feel the need to perform a more extensive dissection resulting in reduced morbidity and greater post-surgical patient comfort.

Our CT is available to patients from any clinic, you do not need to send a vet or nurse with your patient as our team onsite perform the CT. We can give you access to the images via a link to our PACs system and we will arrange for specialist interpretation of the images unless specifically stated that this isn't required.

We are more than happy to discuss any cases with you that you feel may benefit from CT prior to referral.

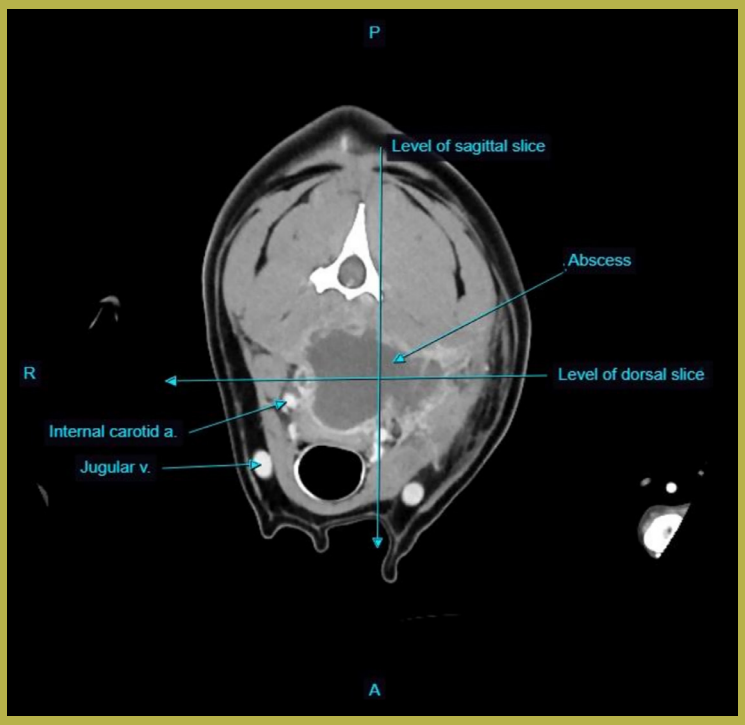

Figure 1. Axial soft-tissue, post-contrast reconstruction at level of C2.

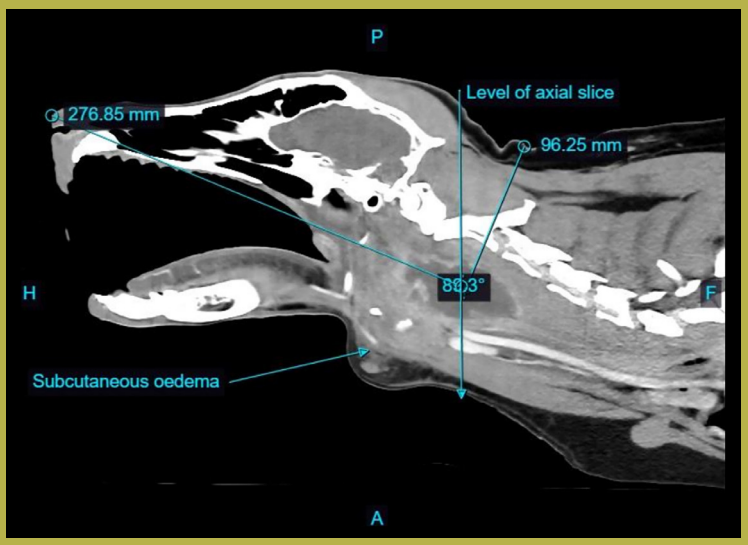

Figure 2. Saggital reconstruction including measurements.

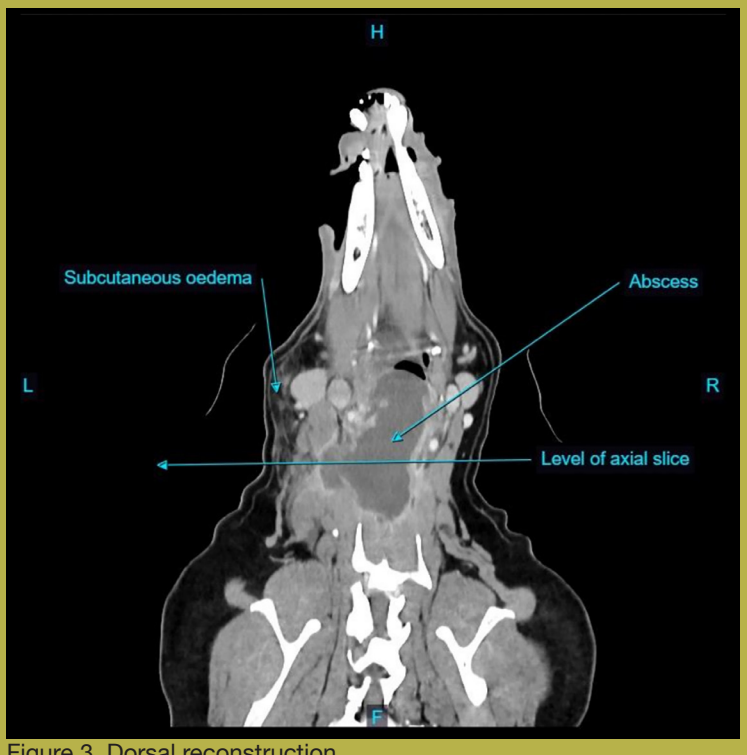

Figure 3. Dorsal reconstruction.

Thoracolumbar Intervertebral Disc Extrusion in Dogs: Do onset of clinical signs, time of surgery, and neurological grade matter? Compagnone et al, VCOT 2023;36:287-293.

The findings of this paper indicate that the delay to surgery is not a significant factor. Rapid onset and significant neurological deficits typically went to surgery faster but the poor prognosis of significant neurological damage is more predictive to outcome than surgical delay. Disc fenestration as well as laminectomy was associated with a faster return to ambulation.

Determination of Isometric Points in the Stifle of a dog using a 3D model. Yair et al, VCOT 2023;36:324-330

This paper presented 3D modelling to confirm the isometric points previously determined on 2D models for the placement of lateral fabellotibial sutures for cruciate surgery. The limitations of the paper were the fact that only one cadaver was studied. A broader base will help define isometric landmarks but they still seem to indicate that the lateral femur just distal to the lateral fabella and the proximal extent of the long digital extensor groove are isometric points for placement of extracapsular implants.

Owner-assisted recovery and early discharge after surgical treatment in dogs with brachycephalic obstructive airway syndrome. Camarasa et al, JSAP (2023);64, 680-686.

This paper found that there were fewer post-op complications when dogs were discharged on the same day of surgery (2%) versus hospitalized overnight (28%). These dogs were also recovered from surgery with owners present. No dogs discharged early required further veterinary intervention. It makes for interesting discussions about whether owners should be present in vet clinic recovery wards and whether hospitalization is always in the pets' best interests!

And for the medicine minded:

Mild to moderate increases in activity are associated with increased seizure incidence in dogs with idiopathic epilepsy receiving anti-epileptic drugs. Cameron et al, JSAP (2023);64,611-618.

This paper found increasing activity above a dog's normal baseline by up to 30% was associated with increased seizure risk in the following 24hrs. This risk was less when higher levels of activity were undertaken. This activity effect may be another factor for owners to monitor to better control seizure activity.

CASE DISCUSSION

A Neutropenic Schnauzer

A 6 year old female speyed Schnauzer presented to our clinic with a 4 month history of intermittent anorexia, lethargy and pyrexia.

She had visited various clinics multiple times throughout this period and would improve after a course of co-amoxyclav and then relapse again a few days after the antibiotics finished. At a few of these vet visits a haematology panel was performed and showed a consistent neutropenia (0.86 x10^9/L) which was documented on a number of occasions but no further investigations were performed.

On presentation to us the dog was bright, alert and responsive. Her mucous membranes were pink and her capillary refill time was <2s. Her lung fields sounded clear and no cardiac abnormalities were auscultated. Her abdomen was relaxed with nothing abnormal palpable. Her rectal temperature was 38.3°. She had visited an emergency clinic over the weekend for another episode of anorexia, lethargy and pyrexia with a temperature of 40.3°. She was given an injection of carprofen and another course of co-amoxyclav which she had been on pretty consistently for the last 7 weeks.

Problem list
- Intermittent pyrexia
- Intermittent anorexia
- Intermittent Neutropenia

Differentials for Neutropenia
- Consumption - e.g severe inflammation, endotoxemia
- Immune Destruction - e.g Immune mediated neutropenia
- Bone marrow diseases - e.g myelofibrosis, neoplasia

We took a haematology sample to see if she was still neutropenic and a biochemistry to see if she had any other organ dysfunction. We did survey imaging of her chest and abdomen. We also sent a urine sample to the lab for culture and a blood smear for examination.

On the haematology the dog's neutrophil count was within the normal reference range, her platelet count was low (11K/uL) but this was disproved by the smear exam which showed large platelets and platelet clumps. Her biochemistry and urinalysis were completely unremarkable. Her abdominal ultrasound revealed mild hepatomegaly with an irregular nodular heterogeneity of the echotexture. The hepatic and para-aortic lymph nodes were enlarged (7mm x22mm) with cystic lesions. No other abnormalities were seen. Chest radiographs revealed a mild generalised bronchointerstitial pattern, cardiac silhouette was unremarkable and no other abnormalities were found.

The hepatic pathology was sampled and returned as benign nodular hyperplasia.

The urine culture was negative for any growth.

The antibiotics were stopped to see if she would relapse again which would hopefully make our tests more sensitive.

Our next steps were to repeat the blood samples in a week to see if she had repeatable neutropenia. The next week the dog's neutrophil count was $1.17x10^9$. We elected to investigate further with a CT scan to rule out possible sources of neoplasia or infection that we may have missed, then to perform a bone marrow aspirate to take samples for cytology and histology.

Her CT scan showed no evidence of neoplasia, inflammation or infection, no cause of her neutropenia was found.

The bone marrow aspirate showed that the cell density was reasonably high and there was appropriate maturation of the erythroid and granulocytic cell lines as well as adequate megakaryocytes meaning that the bone marrow has no overt abnormalities.

After all the work up we were left with the presumptive diagnosis of immune mediated neutropenia. Presumed immune-mediated neutropenia is diagnosed based on a neutrophil concentration $<1{\cdot}5\times10^9$ cells/L on a minimum of two complete blood counts, exclusion of other causes of neutropenia based on a diagnostic bone marrow aspirate or biopsy, and exclusion of secondary immune-mediated neutropenia (Devine 2017).

It would have been ideal to perform testing for other infectious diseases such as tick-borne diseases (Ehrlichia, Anaplasma and Borrelia) but given our geographical location these causes were considered unlikely. We also would have liked to measure anti-neutrophil antibody but unfortunately we couldn't find a lab that offered it in New Zealand.

After discussing the risks with the owners and feeling that we had taken all reasonable steps to rule out the other differentials we elected to start immunosuppressive doses of glucocorticoids. She was given 2mg/kg of prednisolone once daily and her neutrophil count was measured a week later. Her owners were attentive and knew to take her to a vet if she started to deteriorate.

A week later she was doing well, she displayed typical signs of a high dose steroid administration such as polyphagia, PU/PD etc. but was otherwise in good form. Her neutrophil count had increased to 4.4x10^9/L, which showed a great response to the prednisolone.

The limited studies show that most patients will respond to immunosuppression within 10 days (Devine 2017)

We continued to closely monitor her, taking blood samples every week to check her neutrophil count. Once her count was stable and within normal range for 3 weeks we started to reduce her prednisolone dose by 25% every 3-4 weeks.

The patient's neutrophil counts have stayed within normal range

Sarah Montgomery
BVMedSci, BVM, BVS, PGCertSAM, MRCVS
Head of Internal Medicine

for the past 4 months and she has had no further episodes of anorexia, lethargy or pyrexia. We are still monitoring her neutrophil counts and gradually reducing her prednisolone dose.

Immune-mediated neutropenia is a primary disorder or may occur secondary to infection, neoplasia, or the effects of certain drugs. It results when antibodies directed against neutrophil surface antigens or against growth regulators of granulopoiesis develop.

Immune-mediated neutropenia represents the least common cause of neutropenia and results primarily from increased destruction of neutrophils when they become coated with anti-neutrophil antibodies.

Persistent fever is the most frequently reported physical examination finding in dogs and cats with immune-mediated neutropenia. In case reports, joint effusion, conjunctivitis, facial oedema, oral ulcerations, epistaxis, pyoderma, abdominal pain, mucoid vaginal discharge, and scrotal inflammation have all been reported.

Lacking tests to prove an immune-mediated cause, the diagnosis is determined by excluding other causes and by receiving a positive response to immunosuppression. Concurrent detection of other immune-mediated diseases, such as immune-mediated haemolytic anaemia also gives support to the neutropenia being immune-mediated.

This was an interesting case to work up. After reviewing her history I had a strong feeling that it was an immune-mediated disease that we were dealing with but without having a definitive test for it, we would need to rule out a lot of other causes to reach a diagnosis. The treatment seemed almost paradoxical to the problem and it was scary starting immunosuppressants in an already immunosuppressed animal but I felt confident that we had ruled out all the other main differentials and the timeline fitted. Overall, I was thrilled that the treatment worked so quickly allowing us to achieve such a great outcome for the patient and her family.

References: Devine L, Armstrong PJ, Whittemore JC, et al. Presumed primary immune-mediated neutropenia in 35 dogs: a retrospective study. J Small Anim Pract. 2017;58(6):307-313. doi:10.1111/jsap.12636

If you'd like Sarah to visit your clinic's team, do not hesitate to reach out to us: medicine@rangvet.co.nz

Billy Fitzgerald
BVSc, MANZCVS (ECC)

Xenotransfusion

Maybe cats are small dogs?

Blood transfusions can be a challenging and scary thing to do in practice. Not only do you often have a patient who is very unwell, but the transfusion itself has the ability to make them even more unwell should an adverse reaction occur. This is especially true for cats, who can have fatal reactions to incompatible blood, even during their first transfusion. Feline blood products are also not easy to obtain or store, making the anaemic feline quite the tricky case!

Xenotransfusion (transfusion of blood from one species to another) has been around since 1667, when lamb blood was successfully transfused into a human.

While the technology and understanding of transfusions has improved a great deal since the 17th century, controversy still exists around the practice of xenotransfusion in veterinary medicine. The transfusion of canine blood to felines has been studied since the 1960s,[1] and recent studies have been published looking further into the efficacy and risks of the practice.[2–4]

Does it work?

Long term outcome seems to be associated more with the underlying disease than it is with the type of transfusion received,[5] and one study found that xenotransfused cats had a greater increase in PCV than those who received feline blood products.[4] Comparisons of survival to discharge are challenging because of the variety of underlying conditions that can be present, however successful short and long term outcomes for xenotransfused patients are reported in many of the previous studies. Further prospective studies are needed to truly compare success rates of xenotransfusion to allotransfusion.

What can go wrong?

One major problem with xenotransfusion from dogs to cats is the relatively short amount of time that canine red blood cells remain in circulation. Haemolysis occurred in 64% of cats in one study between 1 and 6 days after transfusion,[3] and in 25% of cats within 24 hours in another study.[2] Canine blood is therefore 'used up' much faster than feline blood, which typically lasts around 30 days. The rapid breakdown of red blood cells can also lead to icterus and pigment nephropathy causing acute kidney injury, as well as morbidity associated with a substantial inflammatory reaction.

No acute severe anaphylactic reactions have been reported in the veterinary literature, however there are anecdotal reports of this phenomenon occurring, even in transfusion naïve cats.[5] This risk should be seriously considered, and xenotransfusions should be carefully monitored. Other adverse events (febrile non-haemolytic reactions, acute respiratory reactions and allergic transfusion reactions) can also still occur, and should be treated as for any other transfusion. In the recent studies cited, the occurrence of a transfusion reaction (including haemolysis), did not affect survival to discharge.[3,4]

So should we be doing it?

The short answer to this question is "only if we need to". The ISFM consensus guidelines suggest the acceptable indications for xenotransfusion are: "previous transfusion reaction to feline blood products, insufficient time to blood type the recipient, unavailability of suitable feline blood products in sufficient quantities, or financial constraints".[5] Another recent consensus statement also agreed that this practice was reasonable as long as informed owner consent was obtained, and all reasonable efforts to obtain compatible feline blood had been made.[6] Given these parameters, xenotransfusion can be a life-saving treatment for severely anaemic cats.

The most important things to remember if going ahead with a xenotransfusion are:

- **It won't last long:**

  The majority of the transfused red blood cells will be haemolysed within 1-6 days of transfusion.

- **One and DONE:**

  Antibodies form within 4-7 days, so subsequent xenotransfusion is likely to result in fatal anaphylactic reaction and should not be attempted, and owners should be made aware of this.

- **Monitor, monitor, monitor**

  Xenotransfusions are at least as dangerous as any other transfusion, and careful monitoring for changes in temperature, demeanour, heart rate, respiratory rate, mucous membrane colour, and blood pressure should be undertaken throughout the transfusion

  It is worthwhile to monitor creatinine and USG from pre-transfusion to several days following transfusion, as acute kidney injury is a risk.

In summary:

Canine to feline xenotransfusion should only be performed if there is a strong reason that feline to feline transfusion cannot. When it is performed, owners should be well informed about the risks, and the attending vet should be able to both identify and treat transfusion reactions as they arise. When these guidelines are followed, xenotransfusion can be a pragmatic and lifesaving approach to treatment of the severely anaemic cat.

References
1. Hohenhaus AE. Importance of blood groups and blood group antibodies in companion animals. Transfus Med Rev 2004; 18: 117–126.
2. Tinson E, Talbot CT, Humm K. Incidence of acute haemolysis in cats receiving canine packed red blood cells (xenotransfusions). J Feline Med Surg 2022; 24: e628–e635.
3. Le Gal A, Thomas EK, Humm KR. Xenotransfusion of canine blood to cats: a review of 49 cases and their outcome. J Small Anim Pract 2020; 61: 156–162.
4. Elkin M, Amichay-Menashe N, Segev G, et al. Retrospective study of canine blood xenotransfusion compared with type-matched feline blood allotransfusion to cats: indications, effectiveness, limitations and adverse effects. J Feline Med Surg 2023; 25: 1098612X231183930.
5. Taylor S, Spada E, Callan MB, et al. 2021 ISFM consensus guidelines on the collection and administration of blood and blood products in cats. J Feline Med Surg 2021; 23: 410–432.
6. Davidow EB, Blois SL, Goy-Thollot I, et al. Association of veterinary hematology and transfusion medicine (AVHTM) transfusion reaction small animal consensus statement (TRACS) part 2: prevention and monitoring. J Vet Emerg Crit Care 2021; 31: 167–188.

Gall Bladders

Ben Leitch
BVSc MVS(hons), MANZCVSc (Small Animal Surgery)
Head of Surgery

Choleliths are often an incidental finding in liver studies. While human choleliths are typically cholesterol based, in dogs they are most commonly calcium bilirubinate and in cats calcium carbonate. Predisposing factors include biliary stasis, increased cholesterol, increased calcium and infection. They can cause cholelithiasis or choledocholithiasis depending on whether they occlude the gall bladder or a bile duct. Surgical retrieval and blockage relief is performed by either cholecystotomy or choledochotomy however attempts should be made to manipulate the stone into either the gall bladder or duodenum for removal to reduce risks of leakage or stricture from a choledochotomy. The decision making process is whether to remove them prophylactically. If there is no obvious disease process associated with the stones ongoing monitoring can be considered. Medical resolution of choleliths is not expected due to the composition of the stones.

Biliary Mucocoeles are an increasingly common finding with the more widespread use of diagnostic ultrasound in pets with anorexia, lethargy, and other GI signs. Traditionally they were given the description of 'kiwifruit' gallbladders due to the characteristic cross-sectional imaging seen on ultrasound with advanced mucocoeles. Now we are seeing changes typical of mucocoele development earlier in their course with swirling sludge and increased wall thickness, with or without bile duct stasis or distention. With no clinical signs attributable to these 'incidentalomas' is it best to monitor, treat medically or treat surgically early?

The bile that fills the affected gallbladder is mucinous, due to excess production of mucus by the epithelial bladder lining believed to be caused by increased exposure of the bladder lining to more concentrated bile salts from bile stasis and increased water absorption from bile. The mucus further thickens the bile, exacerbating the stasis and can lead to bile duct blockage. This can result in Extra hepatic biliary tract obstruction (EHBO) causing significant liver and systemic disease or surgical emergencies via gall-bladder or bile duct rupture.

Infection is present in up to 40% of cases. Mural necrosis is present histologically in up to 80% of patients at surgery though many have no gross signs of rupture.

Attempts to treat medically should be limited to incidentalomas by increasing biliary fluid levels and reducing viscosity using Ursodeoxycholic acid, SAMe and antibiotics. Regular biochemical and ultrasound monitoring at least 6 weekly is required and surgery should be considered if signs of progression / deterioration are seen.

Due to the significant health risks from EHBO, coagulopathies or bile peritonitis following gall bladder rupture, early surgical treatment is becoming the recommendation.

There are breeds with increased risk of biliary mucocoeles – Cocker Spaniels, Miniature Schnauzers and Shetland Sheepdogs. It is more common in older dogs (9+yrs).

Surgical treatment is by cholecystectomy. This is preferred over cholecystoenterostomy as it removes the mucus producing bladder lining. Cholecystoenterostomy should be reserved for cases of common bile duct blockage that can not be resolved (eg due to neoplasia, injury or choleliths). It requires a healthy gall bladder and cystic artery blood supply. It is critical that the common bile duct be patent before performing a cholecystectomy. This can be determined by squeezing the gall bladder or catheterizing the common bile duct via the gall bladder or duodenal papilla.

Surgery of the gall bladder and bile ducts is not without risk. Prognosis is worse when septic peritonitis, pancreatitis and neoplasia are involved. However uncomplicated cases of cholecystectomy have a good prognosis. This emphasizes the importance of surgery before significant clinical signs or end stage mucocoeles are detected and ideally before significant liver enzyme changes, WBC increases or signs of sepsis are present. Coagulation profiles should be assessed prior to surgery for chronic obstructions as vit K deficiency abnormalities can occur.

Liver biopsies are recommended at surgery and the placement of feeding tubes should be considered if the patient has pancreatitis, anorexia or is significantly unwell and may not eat well post-op.

If you have any questions regarding surgical treatment of biliary mucocoeles at RVC please get in touch with the surgery team directly.

Rangiora Vet Centre
Referral Surgery Team Ph: 03 313 7438

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