



BESTPRACTICE
New Zealand Veterinary Association
ACCREDITED HOSPITAL



CUT & PASTE

A newsletter from our
Companion Animal Referral team

Head Radiographs

Those of you who attended the recent Winter CPD evening held by VSA would have heard Angela Hartmann talk. I found it interesting that Angela recommends CT over radiographs for head studies. Certainly the data provided in the 3D reconstructions is much superior to standard radiographic orthogonal views.

If you have a case that you need to work-up you can book in a CT with us at RVC as an outpatient or full referral.

IN THIS EDITION:

- Surgical considerations in neoplasia
- Rusty and the missing kebab stick
- Anaphylaxis - More than just a swollen face
- Chemotherapy in practice

Grass Seeds

All vets know the frustrations of trying to find grass seeds in abscesses and sinus tracts in dogs. Over the years I have retrieved them from odd places including anal glands of scooting dogs to deep in paralumbar muscles and even poking into the liver. RVC are very happy to help you get an answer to those persistent cases where you are sure there is a grass seed or similar foreign body causing the problem.

We have in-house access to ultrasound and contrast CT to help locate the foreign body and can then use that information to get a positive outcome in surgery. But even with this technology it can still be a challenge for us.

Give us a call if you want assistance in these cases.

Surgical considerations in NEOPLASIA



Ben Leitch

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Head of Surgery

It is a well-known statement that the first surgery provides the best chance of curative intent. Surrounding tissues planes are undisturbed, and planning can allow for margins and closure.

My mentor during my residency used to say – cut first, close second. Meaning cut with the intent to remove the mass then worry about how to close the resulting wound. Aggressive resection, even if it requires prolonged open wound management and second intention healing or grafting offers the best chance of cure.

It is important to remember that the edge of the tumour contains the cells with the most aggressive growth behaviour. This means that incomplete resection, especially where a marginal excision is attempted, can result in rapid regrowth of the tumour.

Tumour resection / biopsies are classified as intracapsular, marginal, wide and radical. Limb amputation for an osteosarcoma is radical, most excisions should be wide, biopsies can be intracapsular (wedge, Tru-cut etc.) or marginal. FNAs have a high predictive value for diagnosing neoplasia (90%), biopsies give a histological diagnosis and can grade the tumour.

Two common skin tumour types - Mast cell tumours and Mammary tumours can be approached in different ways. Mast cell tumours can be graded with incisional biopsies. Currently they are graded as low or high grade based on mitotic index, with corresponding prognoses and treatment recommendations with generally a 2-3cm margin including a fascial plane considered a good margin. Mammary tumours are a bit different. Incisional biopsies will never give the full answer to histological type as most mammary tumours are mixed cell type. The recommendation for mammary tumours is to remove them and perform histology once removed rather than before. Guidelines on margins for removal are in textbooks and range from marginal excision, gland removal to full mammary strips. Mammary strips are aggressive surgeries and can have complications particularly with wound closure and dehiscence due to skin tension. For this reason, most surgeons recommend not doing a bilateral strip but staging about 4-6 weeks apart once the skin has stretched and relaxed and circulation recovered. Owners may be concerned about delays in removing all the tumours so this can require good communication.

Soft tissue sarcomas on distal limbs can be challenging. Radical margins (amputation) are not always necessary, and it can come down to a compromise between animal quality of life and complete tumour removal. Soft tissue sarcomas are like boiling an egg in a pot of water where wisps of egg escape and trail out through the water. We can easily see and feel the egg/tumour but getting rid of the wisps is a challenge and we don't often have the freedom for big margins in the limb without considering

extensive reconstruction. Informing owners that local recurrence does occur and looking out for early masses is an important part of pre-treatment discussions.

Regional lymph node metastasis is a risk that generally increases the bigger any tumour gets. Palpation of lymph nodes is a blunt tool for assessing spread. Epithelial tumours tend to spread via the lymphatics, mesenchymal tumours via the blood vessels. It is often recommended to remove the local lymph node, such as the inguinal node in mammary tumours, especially if it palpates enlarged. The recommendation increases with size of tumour as this is related to duration of tumour presence and number of cells that could have metastasised in that time.

Fine needle aspirates of lymph nodes are useful if neoplasia is found but a negative FNA does not rule out nodal involvement.

Sentinel nodes are now the flavour of the month. These may not be the closest nodes to the tumour as nodes can be skipped but are the node(s) that the tumour of interest is draining to. Recent articles have been published that describe ways to determine the sentinel node. They generally involve injecting radiographic contrast around the mass into the surrounding tissues and imaging the area to find the lymphatic drainage and sentinel node. At RVC we have started doing this and are refining the technique utilising our CT for diagnosis and guiding the surgical planning to find the lymph node as most nodes hide in fat in flexor surfaces of joints or between muscle planes.

Drains in oncological surgery.

Drains can increase the area of second resection required if histology reports incomplete resection, dirty or close margins and a second surgery is required. However, in cases when a wide resection has been performed and a closed suction drain will help reduce dead space (Halsted's principles) and seroma formation then I utilise them. Just be sure to place the drain exit tract in an area that can be resected if a second surgery is required. Second surgeries or revision surgeries must include the scar from the first surgery, and the tract of the drain with margins calculated around these including sufficient depth around them. This is what makes them more challenging as normal anatomy has been altered and often less tissue is available than you thought.

We are happy to discuss any cases you have and can perform sentinel node imaging for any cases you would like worked up.

Cheers, Ben and the RVC surgery team.

Rusty, the case of the MISSING KEBAB STICK



Liz Miller
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Small Animal Veterinarian

Rusty a 6yo, MN Spoodle, was a challenging case who first presented in January 2023 with vague signs consistent with Gastroenteritis; a combination of vomiting, inappetence and soft stools. He was sent home on symptomatic care – probiotics, anti-emetics and bland food but represented 3 days later lethargic, dull, reduced appetite, vomiting and a left forelimb lameness. He had passed a faeces with considerable plastic content at home. He was pyrexia with abdominal pain and a reluctance to flex his left elbow. He tended to stand with scoliosis away from his left side. Bloods showed an inflammatory leucogram. Foreign body was elevated up the differential list.

AFAST and TFAST ultrasound and thoracic radiographs (3 views) were performed. AFAST was normal. Changes (pleural fluid) within the left hemithorax were noted on radiographs and ultrasound. No spinal issues identified. Thoracocentesis obtained a serosanguinous fluid with increased neutrophils and intracellular rods and some yeast.

For the customer, CT was not an option at this time, and treatment of pyothorax, cause unknown, begun with four quadrant IV antibiotics, fluid therapy and pain management. He was discharged on oral medication after 48hrs doing much better though still lame on the LF with no cause yet identified. Lab cultures identified E.coli and candida.

Rusty was doing well at 3 week check up, AFAST and TFAST were normal. He still had Left fore lameness and a reluctance to jump. His owner rated him at 95% normal.

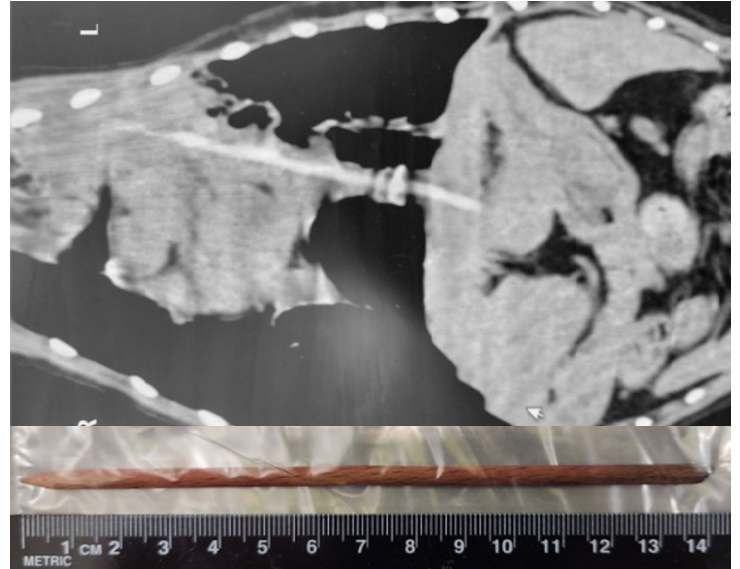
Two weeks after antibiotics Rusty was dull, lethargic and losing weight. TFAST found a small amount of pleural and pericardial fluids and culture identified E.coli and candida again. CRP was elevated at 46(ref 0-10mg/L) A six week course of antibiotics (Clavulox and fluconazole) as well as meloxicam and paracetamol was instituted.

At the end of 6 weeks CRP was 3, Rusty was normal in owners' eyes except for still not jumping and occasional discomfort when picked up.

But the story has only begun!

Rusty represented 6 weeks after completing his extended antibiotic course, 3 months after his initial presentation; dull, depressed, lethargic, pyrexia, coughing, pain on abdominal palpation and lame on the left fore. Bloodwork indicated a left shift neutrophilia, abdominal ultrasound unremarkable, thoracic ultrasound – B-lines bilaterally, and thoracic radiographs revealed bilateral low-grade pleural effusion. With concerns there must be a migrating foreign body Rusty went to CT.

CT findings were remarkable! A 14cm linear FB (believed to be a kebab stick) extended from the ventral left cranial lung lobe adjacent the ribcage to the dorso-caudal aspect of the central liver lobes with 3cm liver penetration, perforating the pericardium on the left on the way. The owners were able to place this to a Christmas/new years BBQ held at their house!



With the owners' keen to proceed the surgical risks were advised and surgical planning initiated. Blood typing and cross-matching was performed prior to surgery. Surgery involved two surgeons and multiple nurses. A ventral cranial celiotomy and median sternotomy to the 3rd sternebra was performed. The stick was first extracted from the liver by careful cranial distraction before withdrawing caudally from the pericardium and lung lobe. Thankfully top quality kebab sticks were used with smooth splinter-free surface. Gel foam was used to plug the liver perforation and the chest was flushed copiously assessing for lung lobe leaks (none found) before closure of the small diaphragm hole and sternotomy with placement of bilateral closed suction chest drains and an oesophageal feeding tube. He was then transferred to ICU for intensive medical care.

Rusty made a rapid recovery and only spent 72 hours in hospital post-surgery before being discharged eating, drinking, defaecating and urinating well. The feeding tube was left in for two weeks as he hated tablets and so was medicated this way.

A follow-up CT a month after surgery showed good resolution of the lung pathology and the owners report that Rusty was at that time, and still is,

100% Rusty!



CHEMOTHERAPY

in practice



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

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

I wanted to talk about chemotherapy in general practice. Chemotherapy can have a lot of negative associations in the veterinary industry. I used to be scared of administering chemotherapy, I didn't feel that I understood enough about the drugs or their side effects to feel confident enough to recommend it to owners.

I remember my first experiences seeing chemotherapy being given in practice and I look back and cringe at how unsafe it was - drawing up doxorubicin with a needle and giving it into a regular IV line wearing no PPE apart from gloves! I didn't know any better we were just trying to do the best we could for our patients.

When I started working in a referral setting I learnt how to administer chemotherapy safely and it is worlds apart from my first experiences. The most important part about giving chemotherapy is the safety of the staff.

Cytotoxic drugs can be carcinogenic, teratogenic, mutagenic, abortifacient and increase the risk of stillbirth (Smith 2018). Chronic low level exposure, as seen in health workers, is associated with a higher risk. Human healthcare workers that routinely handle cytotoxic agents have an increased chromosomal variability compared to that of the general population (Kopjar 2009) meaning that they may be at a higher risk of developing certain types of cancer.

The safety of staff during administration of chemotherapeutic agents should be of the highest priority and staff training is important so that all team members understand the risks involved.

I wanted to use a real case to show the safety precautions we have in place when we administer chemotherapy. Nala is a 4 year old huntaway cross who was diagnosed with Stage 4b Lymphoma 10 weeks ago. She is in the middle of a CHOP protocol and this week she is receiving a vincristine dose.

She arrives for her consultation with our medicine nurse, who asks the owner how things are going, takes Nala's TPR and makes a note of her lymph node size. A CBC is taken and her neutrophil counts are checked - we ensure that her neutrophil count is above $2 \times 10^9/L$ to ensure her immune system can cope with another chemotherapy dose.

Nala is feeling good, her TPR is within normal limits, her neutrophil count is good and her lymph nodes are small. We're good to go ahead with chemo.

We use her weight to calculate her body surface area - I use an

online calculator (<https://chemopet.co.uk/bsa-calculator/>). Most chemotherapy drugs are dosed on the animals body surface area. Chemotherapy drugs have a narrow safety margin so correct dosing is very important as over dosing can be fatal. We always get 2 people to check our doses before giving it to the animal. There are companies who will compound the medications for you so that you don't have to draw up the drugs in practice which can help to minimise the potential for exposure of staff.

To give intravenous chemotherapy in our practice we use an empty room with no thoroughfare that no one is likely to accidentally walk in. Ideally a designated chemotherapy room should be used but this is not practical for many vet practices. Cytotoxic warning signs are placed on the door. A spill kit is brought into the room in case of accidental spills and staff are trained in its use. The floor is covered with a large drape and absorbent pads placed on top for easy clean up if there is a spill. Chemotherapy specific purple bins are brought into the room for quick disposal.

The administration of chemotherapy is carried out by a veterinary surgeon and a nurse, both trained in administration of cytotoxic drugs.

An important prerequisite of giving chemotherapy is that the patients temperament is assessed to establish whether they will be a viable candidate for chemotherapy administration. The patient needs to allow an intravenous catheter to be placed cleanly so they should be well behaved and easily handled. It is important that a clean stick intravenous catheter is placed each time and the limb used recorded in a chemotherapy log book to allow for vein rotation.

We attach a closed-system transfer device to the catheter. The catheter is copiously flushed and the limb checked for any swelling to minimise risk of extravasation.

The staff involved wear personal protective equipment - full length sleeved gowns, face masks with built in eye shields and chemotherapy-rated gloves. Another closed system device is placed onto the bottle of the drug being used for safe withdrawal.

Nala is monitored throughout administration to check for any signs of discomfort or irritation that could be suggestive of extravasation.

The intravenous catheter is removed immediately after administration of the drug and flushing. Once finished the sharps are disposed of in a purple topped sharps bin and everything else in purple clinical waste bags. Nala is then taken back to her kennel which is labelled with cytotoxic warning signs.



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Each chemotherapy administration is recorded in the chemotherapy log book along with the patient details, what drug was given and the dose, which vein was used, which staff were present and details of who cleaned the area afterwards. This helps to monitor staff exposure to cytotoxic drugs.

If the patient remains in the hospital after chemotherapy administration they are taken to a separate area to urinate and defecate away from where other patients are taken.

Chemotherapy can be daunting to try, I always recommend getting the advice of an oncologist in each case who can help guide you through the process and give advice of the medications used, I tend to use Vet-CTs tele-consulting service to help me design patient protocols.

RVC is accepting oncology referrals, if you have a case that would benefit from chemotherapy or if you have questions don't hesitate to contact us: medicine@rangvet.co.nz

Kopjar, N., Kašuba, V., Rozgaj, R., Želježić, D., Milić, M., Ramić, S., Pavlica, V. and Milković-Kraus, S., 2009. The genotoxic risk in health care workers occupationally exposed to cytotoxic drugs—a comprehensive evaluation by the SCE assay. *Journal of Environmental Science and Health Part A*, 44(5), pp.462-479.

Smith, A.N., Klahn, S., Phillips, B., Parshley, L., Bennett, P., Flory, A. and Calderon, R., 2018. ACVIM small animal consensus statement on safe use of cytotoxic chemotherapeutics in veterinary practice. *Journal of veterinary internal medicine*, 32(3), pp.904-913.



Win

a celebration box

Email us: surgery@rangvet.co.nz
the answers to the following questions
and go in the draw to win.

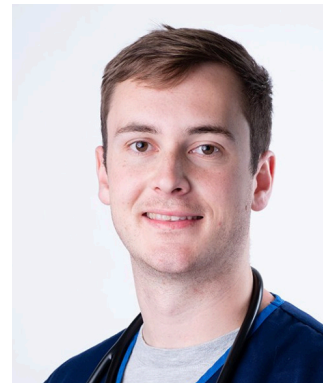
- 1 What area of tumour contains the most aggressive growth cells?
- 2 What is something we ensure for our patient before going ahead with their chemo treatment?
- 3 What dose of adrenalin is recommended IM for Anaphylaxis?

Make sure to include your name, and the name of your Vet Clinic so we know where to send the celebration box!

ENTRIES CLOSE MONDAY 20th NOVEMBER

ANAPHYLAXIS

- more than just a swollen face



Billy Fitzgerald
BVSc, MANZCVS (ECC)

We've all seen those dogs that have got a bit too excited around a bee. They come in with a face almost as swollen as it is remorseful, and in the vast majority that is as bad as it gets, and they recover very quickly (often without treatment). While these cases are examples of type 1 hypersensitivity reactions, they cannot be accurately designated as anaphylaxis.

True anaphylaxis is uncommonly seen in clinical practice. It is a systemic IgE mediated hypersensitivity reaction involving at least 2 organ systems, usually including the dermatologic, respiratory, cardiovascular or gastrointestinal system.

Many anaphylactic animals will present collapsed and in shock. Exposure to an allergen is helpful to increase suspicion, with insect stings or recent exposure to medications such as vaccines being some of the more common causes, but lack of a known exposure should not remove anaphylaxis from our differentials list. The cardinal signs of shock, including tachycardia, depressed or obtunded mentation, pale mucous membranes, prolonged capillary refill time and weak peripheral pulses, will likely be present.

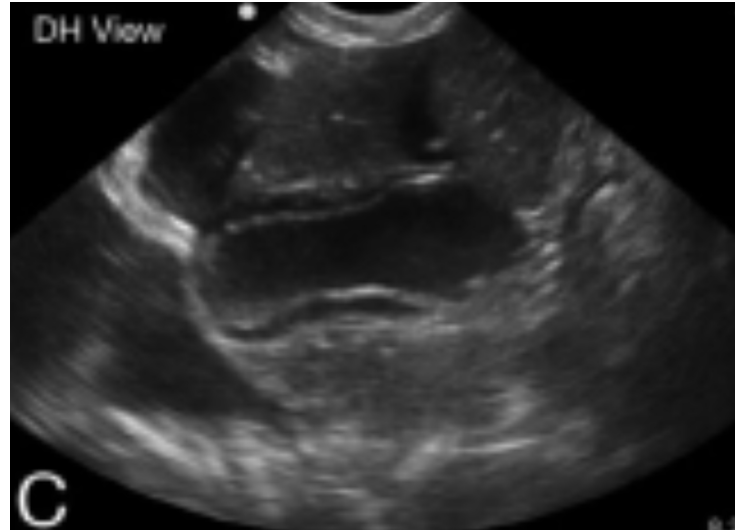
Treatment is supportive initially, and patients that present in shock require repeated fluid boluses between 10-20ml/kg of crystalloid (such as LRS) over 10-15 minutes, up to a total of about 60ml/kg, to improve perfusion. The primary end points are a systolic blood pressure greater than 90mmHg or a mean arterial pressure greater than 60mmHg. Oxygen therapy is almost never contraindicated in collapsed patients and flow by oxygen can be easily administered.

During fluid volume resuscitation, a minimum database including a complete blood count, serum biochemistry, electrolytes and lactate or blood gas (if available) should be run, followed immediately by an AFAST and TFAST. The combination of gastrointestinal signs, an increased ALT and gallbladder wall oedema, particularly with dermatologic signs or a history of exposure to an allergen should raise a strong suspicion of anaphylaxis. The pathophysiology of these signs are mainly due to severe constriction of the post-hepatic venules, leading to portal hypertension and massive decrease in venous return as well as hepatic and gastrointestinal congestion.

Once anaphylaxis is strongly suspected and other causes of collapse are ruled out, further treatment with adrenaline can commence if it is needed. A low dose (0.01mg/kg) of adrenaline can be given intramuscularly initially, however a CRI running at 0.05 micrograms per kilogram per minute is what is recommended. This should be run until a stable blood pressure and cardiovascular parameters are achieved, and then maintained over a weaning period of several hours while the patient is carefully monitored. Adrenaline is not a benign drug, and it causes substantial vasoconstriction and cardiac effects, so minimum effective doses should always be used.

Dexamethasone and antihistamines can and should be used in the case of pruritis secondary to angioedema and urticaria, but we cannot rely on these medications to correct the cardiovascular state of the patient.

Reference for picture: Lisciandro, G. R., Gambino, J. M., & Lisciandro, S. C. (2021). Thirteen dogs and a cat with ultrasonographically detected gallbladder wall edema associated with cardiac disease. *Journal of Veterinary Internal Medicine*, 35(3), 1342-1346



Lisciandro et al (2021), p1344



IN SUMMARY

- If a patient comes in collapsed or hemodynamically unstable, particularly if they have a history of exposure to a potential allergen, anaphylaxis should be considered
- Be sure to rule out other causes of cardiovascular collapse, and treat the shock with crystalloid boluses first.
- Look out for gastrointestinal, cardiovascular and dermatological abnormalities, as well as an increased ALT and gallbladder wall oedema. These make anaphylaxis far more likely.
- If anaphylaxis is suspected and conventional treatment is not adequate, begin an adrenaline CRI at 0.05 micrograms per kilogram per minute
- Dexamethasone and antihistamines can be used to treat pruritis that will likely develop, but should not be presumed to treat the cardiovascular instability.