



GET IN THE KNOW ABOUT CHEMO: A GUIDE FOR THE GP SETTING

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DISCLOSURE SLIDE

This session is sponsored by IDEXX – honorarium provided

Current President of The British Veterinary Nurse Association

Specialist Oncology Senior RVN at AURA Veterinary, Specialist Oncology Hospital in UK

2025- set up The Oncology Veterinary Nurse and Veterinary Technician Group

SESSION OBJECTIVES



Establish the most frequently used chemotherapy protocols



Outline chemotherapy adverse effects and how to support patients

Such as oncology emergencies and how to manage them



Discover health and safety associated with safe cytotoxic agent handling including practical skills to safely administer chemotherapy in a practice setting

COMMON CANCERS

**Specie variation



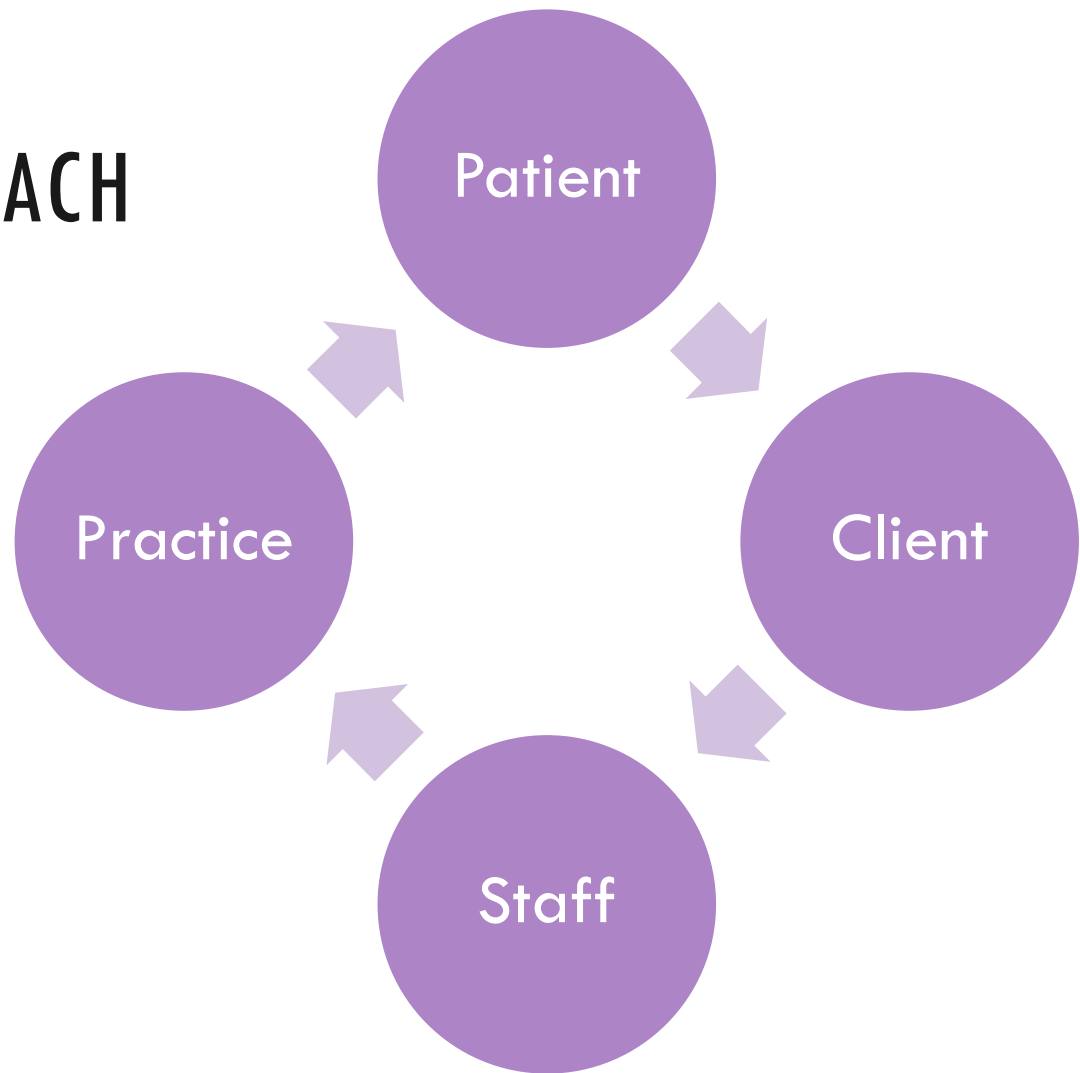
Canine	Feline
Lymphoma- Multicentric	Lymphoma- Alimentary
Mast cell tumour	Mammary carcinoma
Osteosarcoma	Squamous Cell Carcinoma
Hemangiosarcoma	Fibrosarcoma
Urothelial cell carcinoma	Mast cell tumour



HOLLISTIC CARE APPROACH



Photo: Sarah Holliday



PATIENT ASSESSMENT



EXAMINATION

CBC= PLT, RBC, NEUT,
+/- BIOCHEMISTRY

Physical examination
Collect full clinical history**
Demeanour on presentation
Temperature
Heart rate and auscultation
Respiratory rate and auscultation
Weight, body condition score and muscle condition score
Rectal examination
Hydration status
Skin/ Fur quality
Mucous membrane colour, CRT
Lymph node palpation
Mass measurements

BCS, MCS, WEIGHT

- Calorie intake
- Cancer cachexia
- Response to treatment
- Calculate accurate doses
- Steroids



CANINE BODY AND MUSCLE CONDITION SCORE

1-5 Scale

	UNDERWEIGHT		IDEAL WEIGHT		OVERWEIGHT
	1	2	3	4	5

1-9 Scale

	1	2	3	4	5	6	7	8	9
Ribs	Easily felt; visible from a distance		Easily felt; little fat cover		Easily felt; slight fat cover		Difficult to feel; moderate fat cover		Difficult to feel under fat cover
Spine	Easily felt; visible from a distance		Easily felt; little fat cover		Easily felt; slight fat cover		Difficult to feel; moderate fat cover		Difficult to feel under fat cover
Hips	Easily felt; visible from a distance		Easily felt; little fat cover		Easily felt; slight fat cover		Difficult to feel; moderate fat cover		Difficult to feel under fat cover
Muscle Mass	Marked/moderate muscle wasting		Easily felt; little fat cover		Easily felt; slight fat cover		Difficult to feel; moderate fat cover		Difficult to feel under fat cover
Side View	Severe abdominal tuck		Marked hourglass		Well-proportioned waist		Less obvious waist		Distended abdomen
Overhead View	Accentuated hourglass		Marked hourglass		Well-proportioned waist		Less obvious waist		No obvious waist

MUSCLE CONDITION SCORE

Normal muscle mass	Mild muscle loss	Moderate muscle loss	Severe muscle loss

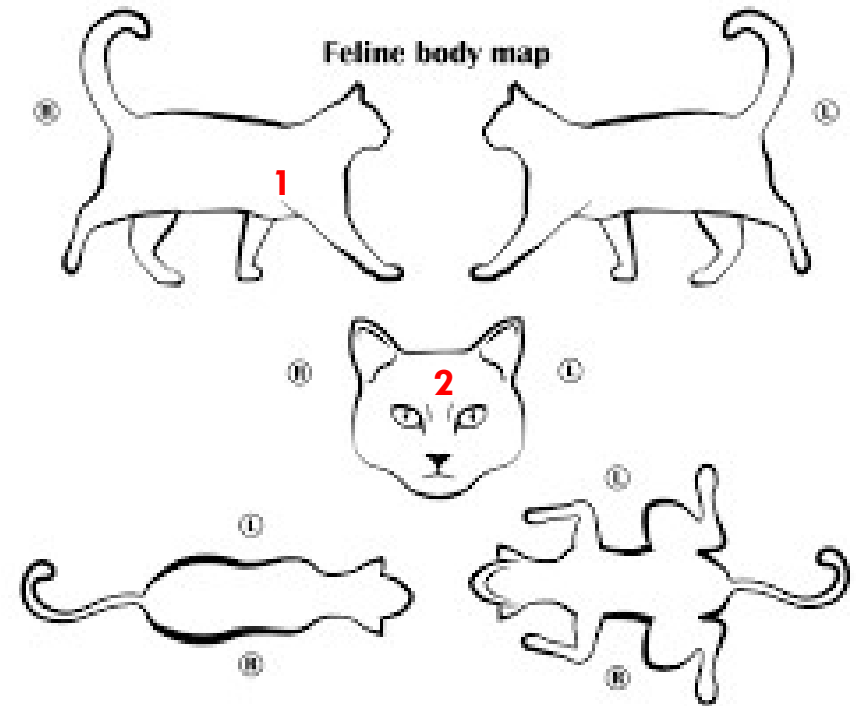
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Photos: Google images

TUMOUR MONITORING



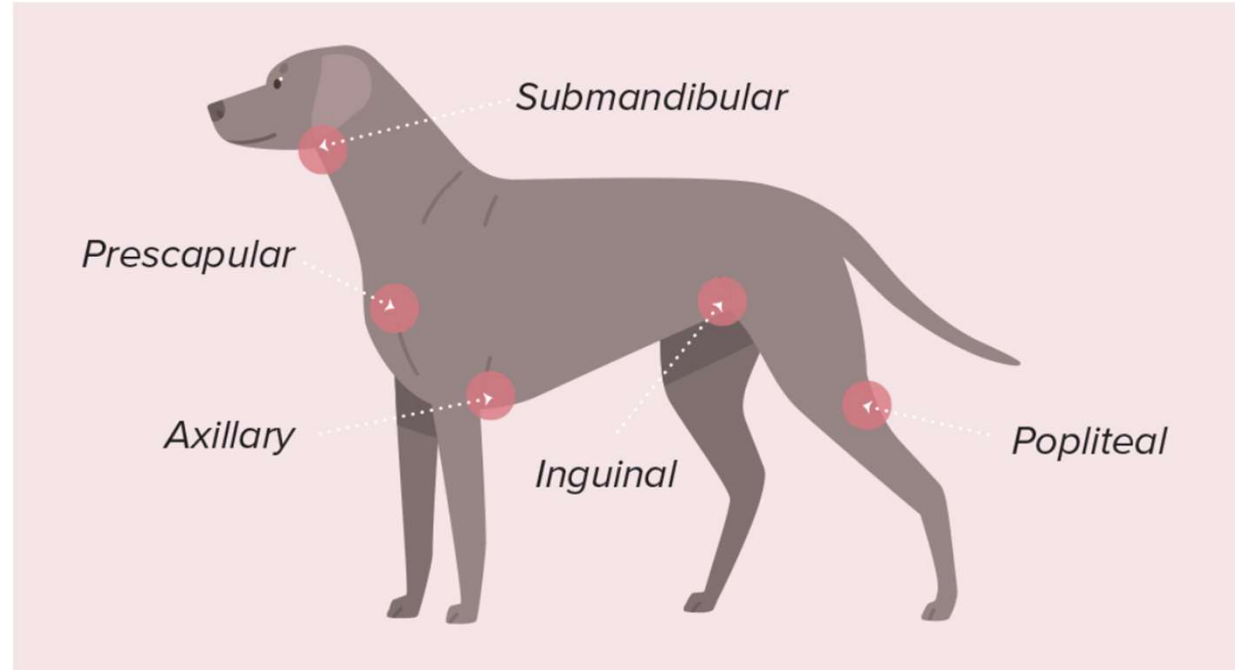
Photo: Sarah Holliday



Response evaluation criteria for solid tumours in dogs (v1.0): a Veterinary Cooperative Oncology Group (VCOG) consensus document



Photo: Sarah Holliday





Response evaluation criteria for peripheral nodal lymphoma in dogs (v1.0) – a veterinary cooperative oncology group (VCOG) consensus document

LYMPH NODE MONITORING

COMMON PROTOCOLS



Cancer type	Protocol
Lymphoma	25-week CHOP Protocol 19-week CHOP Protocol Single agent Lomustine High dose COP  
Mast cell tumour	Vinblastine + Steroid Single agent Lomustine
Hemangiosarcoma	Single agent doxorubicin
Osteosarcoma	Single agent carboplatin

Comparison of CHOP-19 and CHOP-25 for treatment of peripheral nodal B-cell lymphoma in dogs: A European multicenter retrospective cohort study

25-WEEK CHOP PROTOCOL

25 weeks total

Consists of 4 cycles

3 cytotoxic agents- **vincristine, cyclophosphamide, doxorubicin**

+ steroids

Cycle 1 and 2 weekly treatments with 2 weeks gap after doxorubicin

Cycle 3 and 4 fortnightly

Week number/ date	Agent
Week 1	VINCRIStINE
Week 2	CYCLOPHOSPHAMIDE
Week 3	VINCRIStINE
Week 4	DOXOURIBICIN
Week 5	No treatment
Week 6	VINCRIStINE
Week 7	CYCLOPHOSPHAMIDE
Week 8	VINCRIStINE
Week 9	DOXORUBICIN
Week 10	No treatment
Week 11	VINCRIStINE
Week 12	No treatment
Week 13	CYCLOPHOSPHAMIDE
Week 14	No treatment
Week 15	VINCRIStINE
Week 16	No treatment



HIGH DOSE COP PROTOCOL

- 6 months of treatment +/- additional 6 months
- First cycle weekly for 4 treatments
- Then every 3 weeks
- Cytotoxic agents; **vincristine** and **cyclophosphamide**
- + steroids
- +/- re-staging after 1st cycle

Week number/ date	Agent
Week 1	VINCRIStINE + CYCLOPHOSPHAMIDE
Week 2	VINCRIStINE
Week 3	VINCRIStINE
Week 4	VINCRIStINE + CYCLOPHOSPHAMIDE
Week 5	No treatment
Week 6	No treatment
Week 7	VINCRIStINE + CYCLOPHOSPHAMIDE
Week 8	No treatment
Week 9	No treatment
Week 10	VINCRIStINE + CYCLOPHOSPHAMIDE
Week 11	No treatment
Week 12	No treatment
Week 13	VINCRIStINE + CYCLOPHOSPHAMIDE

VINBLASTINE SINGLE AGENT PROTOCOL

8 doses (MCT)

First 4 doses weekly intervals (MCT)

Then doses 5-8 at fortnightly intervals

+/- Staging at beginning, mid protocol and end of protocol

Steroids throughout protocol

Week number/ date	Agent
Week 1 02/03/26	VINBLASTINE
Week 2 09/03/26	VINBLASTINE
Week 3 16/03/26	VINBLASTINE
Week 4 23/03/26	VINBLASTINE
Week 5 30/03/26	No treatment
Week 6 06/04/26	VINBLASTINE
Week 7 13/04/26	No treatment
Week 8 20/04/26	VINBLASTINE
Week 9 27/04/26	No treatment
Week 10 04/05/26	VINBLASTINE
Week 11 11/05/26	No treatment
Week 12 18/05/26	VINBLASTINE

STEROIDS



Lymphoma, MCT

Feline – ongoing throughout protocol

Canine- first cycle of CHOP, taper dose down then stop- side effects,

VBL + pred- reduce dose then continue throughout protocol

Consider geriatric patients and NSAIDs



HEALTH AND SAFETY



PERSONAL PROTECTIVE WEAR

- ✓ Non-permeable long-sleeved gowns
- ✓ Nitrile gloves
- ✓ Protective eye wear
- ✓ Absorbent mat under patient
- ✓ +/- face mask

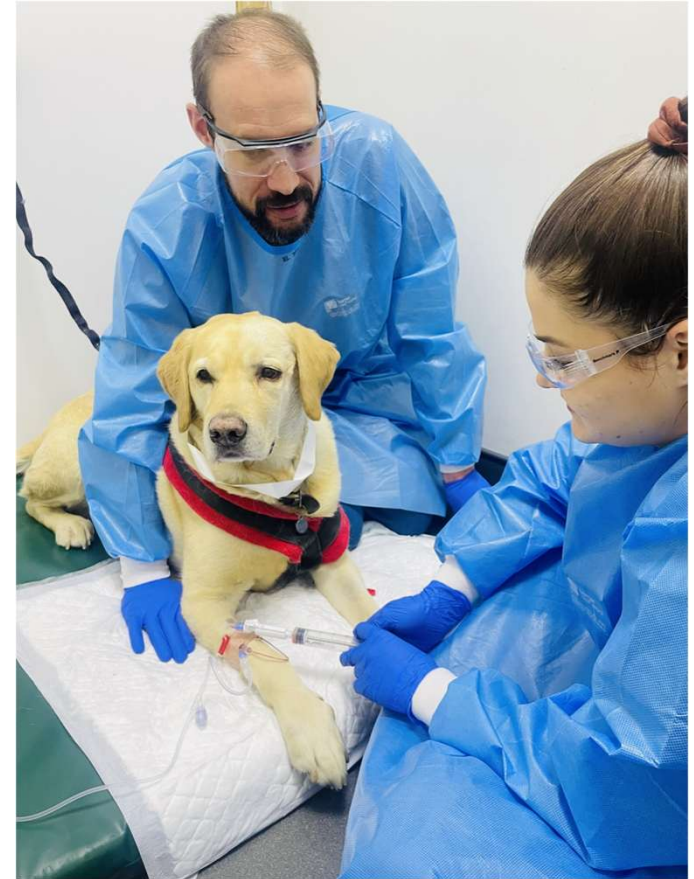


Photo: Sarah Holliday

SAFE STORAGE

***Staff safety- Immunocompromised / Pregnant/
conceiving/ breast-feeding / Under 16**

- ✓ Locked away
- ✓ Clearly labelled “CYTOTOXIC”
- ✓ Correct temperature
- ✓ Label breach date
- ✓ Trained staff only



Photo: Sarah Holliday

DRUG PREPARATION



Photos: Sarah Holliday

IV ADMINISTRATION

- ✓ Clean stick IVC
- ✓ Flush IV
- ✓ Blood flash back
- ✓ Infusion / Bolus
- ✓ Monitoring during administration
- ✓ Suitable restraint
- ✓ Extravasation protocol



Photo: Sarah Holliday

PO ADMINISTRATION

- ✓ Controlled environment
- ✓ No splitting/ crushing
- ✓ Tasty snacks
- ✓ Manually administer
- ✓ Absorbent layer
- ✓ Respiratory protection**
- ✓ Monitor for vomiting post administration



Photo: Sarah Holliday

TREATMENT ROOM

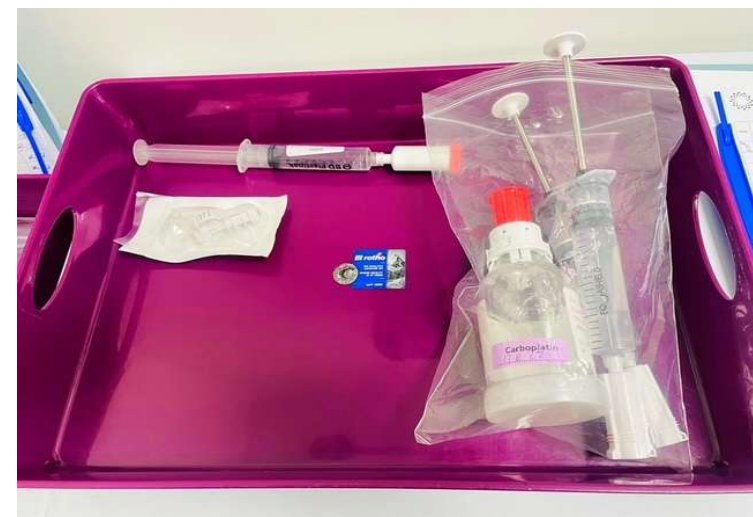
- ✓ Quiet/ no traffic
- ✓ Minimal furniture
- ✓ Easy to clean
- ✓ Correct PPE
- ✓ Cytotoxic bins/ Pedal bin
- ✓ Music
- ✓ Treats
- ✓ Comfort



Photos: Sarah Holliday



CYTOTOXIC PATIENTS

- ✓ Label medication “cytotoxic” warning
- ✓ Label room
- ✓ Label all drugs prepared
- ✓ Warning for staff post administration
- ✓ Different location in hospital? (SOP)
- ✓ Different location to toilet (SOP)
- ✓ PPE post chemotherapy
- ✓ Cleaning



Photos: Sarah Holliday

RECORD KEEPING

Date	Wt (kg)	BSA (m ²)	Agent	Dosage (mg/m ²)	Dose (mg)	Total dose (mg or ml)	Route	Double signature	Neut	PE	Oncologist sign off
14/02/26	24kg	0.84	Carboplatin	300mg/m ²	252 mg	25.2ml	IV		5.22	YES	

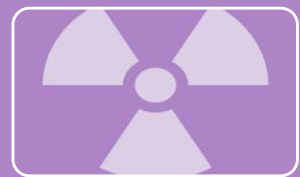
[Body Surface Area quick reference link: BSA Calculator | Chemopet](#)



Storage of cytotoxic agents



Handling cytotoxic agents



Waste Disposal



Administration of chemotherapy



Handling of cytotoxic patients

SOPS

CHECK LISTS

PRE-CHEMO CHECK LIST	TICK
Clean stick IV	
Adequate neutrophil count	
Physical examination	
Double checked calculation	
Correct patient	
Correct agent	
Correct volume	
All paperwork complete	
All personal present and full PPE worn	

ADVERSE EVENTS



Common Adverse events

1) **Gastrointestinal**

Dioarrhoea

Nausea

Vomiting

Changes to appetite

2) **Immunosuppression**

Neutropenia

Thrombocytopenia

3) **Other**

Hair/fur changes



Photos: Sarah Holliday

GENERAL ADVERSE EVENTS

AGENT SPECIFIC ADVERSE EVENTS

Specie variation

Breeds- MDR mutations

Cytotoxic agent	Drug-specific adverse event
Cyclophosphamide	SHC
Doxorubicin	Cardiomyopathy- dose dependant 150mg/m ² Nephrotoxicity
Lomustine	Hepatic toxicity
Vincristine	Ileus Neuropathy?
Mitoxantrone	Green urine

GI TOXICITY

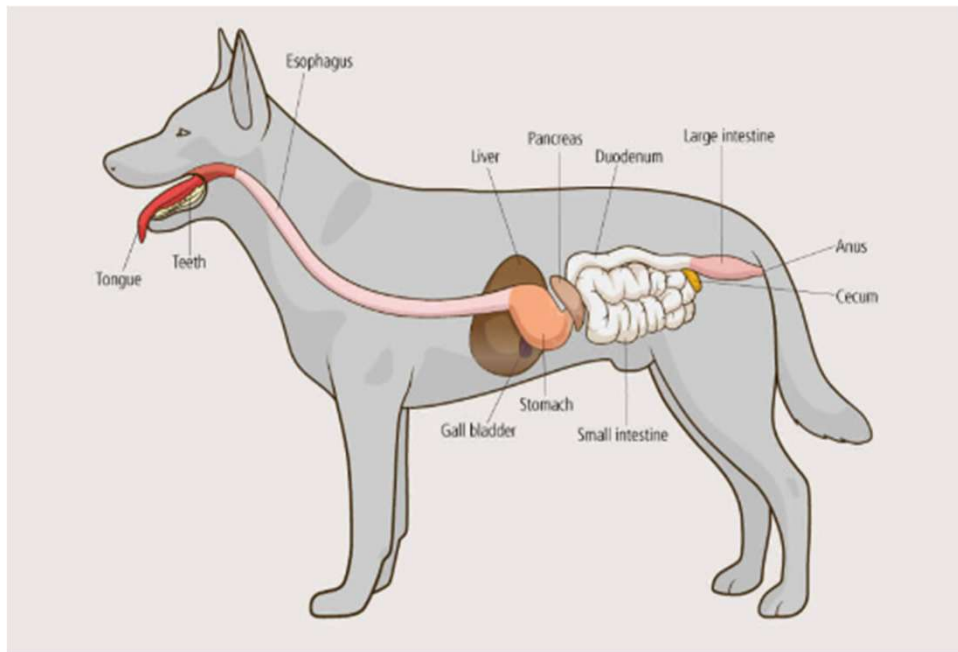


Photo: google search

- Severe V/D
- Circumstances, history
- Blood in V/D
- Owner threshold
- Anorexia/ inappetence
- Unable to keep fluids down or take medication
- Dehydration
- Collapse

PREVENTION

First dose = maropitant

Send home with supportive medication

Accurate dosing

Consider conservative dose if co-morbidities or hx of GI sensitivity

Care with diet – no raw

Photo: google search



TREATMENT- VOMITING

- Maropitant +/- Ondansetron 0.7-1 mg/kg PO BID
- Metoclopramide with vincristine (Dogs/cats: 0.3-0.5 mg/kg PO q12-8h)
- +/- Hospitalization

Prophylactic medication

-Doxorubicin– maropitant D0 1mg/kg IV and 4d 2mg/kg PO SID

-Vinc, cyclo, carbo- maropitant D0 and 3d

-?Fasting 24h before and 6h after chemotherapy administration?

TREATMENT- DIARRHOEA

- Discuss and consider diet
- Probiotics:
 - VBS clay® at 1 scoop/kg daily divided in 2-3 times.
 - Probiotic sachets Sivomixx
 - Avoid omeprazole
 - +/- Hospitalization

A dark, grayscale microscopic image of intestinal tissue, showing various cell types and structures. The image is used as a background for the slide. A vertical blue line is positioned to the left of the text.

TREATMENT- APPETITE

Appetite stimulants

- Mirtazapine (Dogs: 0.6mg/kg PO q24h, Cats: 2mg PO q24h)
- Capromorelin (Entyce®) (Dogs: 0.1ml/kg PO q24h; Cats: 0.07ml/kg PO q24h)

ONCOLOGICAL EMERGENCIES



BONE MARROW SUPPRESSION GRADING SYSTEM

Adverse event	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Neutropenia	1500/ μ L- <LLN	1000- 1499/ μ L	500-999/ μ L	<500 μ L	Death

Veterinary Cooperative Oncology Group—Common Terminology Criteria for Adverse Events (VCOG-CTCAE v2) following investigational therapy in dogs and cats

[Amy K. LeBlanc](#) ✉, [Matthew Atherton](#), [R. Timothy Bentley](#), [C. Elizabeth Boudreau](#), [Jenna H. Burton](#), [Kaitlin M. Curran](#), [Steven Dow](#), [Michelle A. Giuffrida](#), [Heidi B. Kellihan](#), [Nicola J. Mason](#) ... See all authors ▾

MOST COMMON- FEBRILE NEUTROPENIA

Cause = myelosuppression from cytotoxic agent

- *Sepsis is common cause of death in human oncology patients
- Educate owners BEFORE dose
- Caused by patient's own gut bacteria
- Veterinary patients = non-verbal communicators
- Treat patient + emotional needs of owners



HIGH RISK PATIENTS

Long-term hospital patients/ visiting the hospital;

- IVC
- Bloods
- Non-ambulatory patients
- Advanced devices; urinary catheters
- Splenectomy patients



Photo: AURA Veterinary

CLINICAL SIGNS

Neutrophils below reference range

VCOG grade 1 = $1.5 \times 10^9/L$

+/- signs of infection

- Pyrexia
- Lethargy
- Tachycardia
- GI signs- anorexia
- Altered mentation
- Signs of septic shock

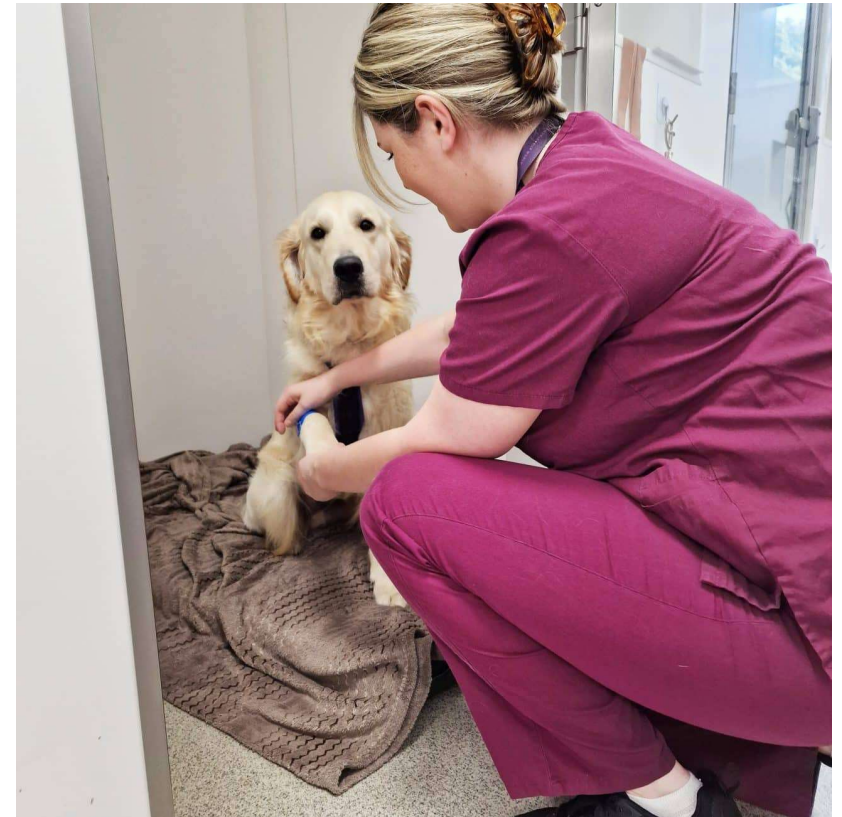


Photo: AURA Veterinary

TREATMENT



Photo: google search

- ✓ Prompt PE ****TEMPERATURE****
- ✓ Collect accurate history- date of chemotherapy?
- ✓ Nadir most agents 4-7d, carbo 1-2w
- ✓ IV access
- ✓ CBC +/- biochemistry
- ✓ Supportive care: IVFT, anti-emetics, broad-spec Abs
- ✓ Temperature (dogs)

ASYMPTOMATIC NEUTROPENIA



Neutrophils $\geq 0.75 \times 10^9/L$

NO THERAPY



• **Neutrophils $< 0.75 \times 10^9/L$**

Trimethoprim/sulfamethoxazole
(TMPS) 15mg/kg PO q12h x 3-5d
(stop if neutrophils $\geq 0.75 \times 10^9/L$)

FEBRILE NEUTROPENIA



Neutrophils $\geq 0.75 \times 10^9/L$

Consider investigation (CXR + urinalysis); treat accordingly

BARRIER NURSE



Neutrophils $< 0.75 \times 10^9/L$

Hospitalization; IVFT, anti-emetics,

IV antibiotics

BARRIER NURSE

penicillin + fluoroquinolone⁴ (e.g

Amoxicillin clavulanic acid 20mg/kg

IV q8h and marbofloxacin 3 mg/kg iv
q24h)



Train clinical team



**Educate owners
+/- temp**



**Minimise
hospitalisation**



Barrier nurse

PREVENTION

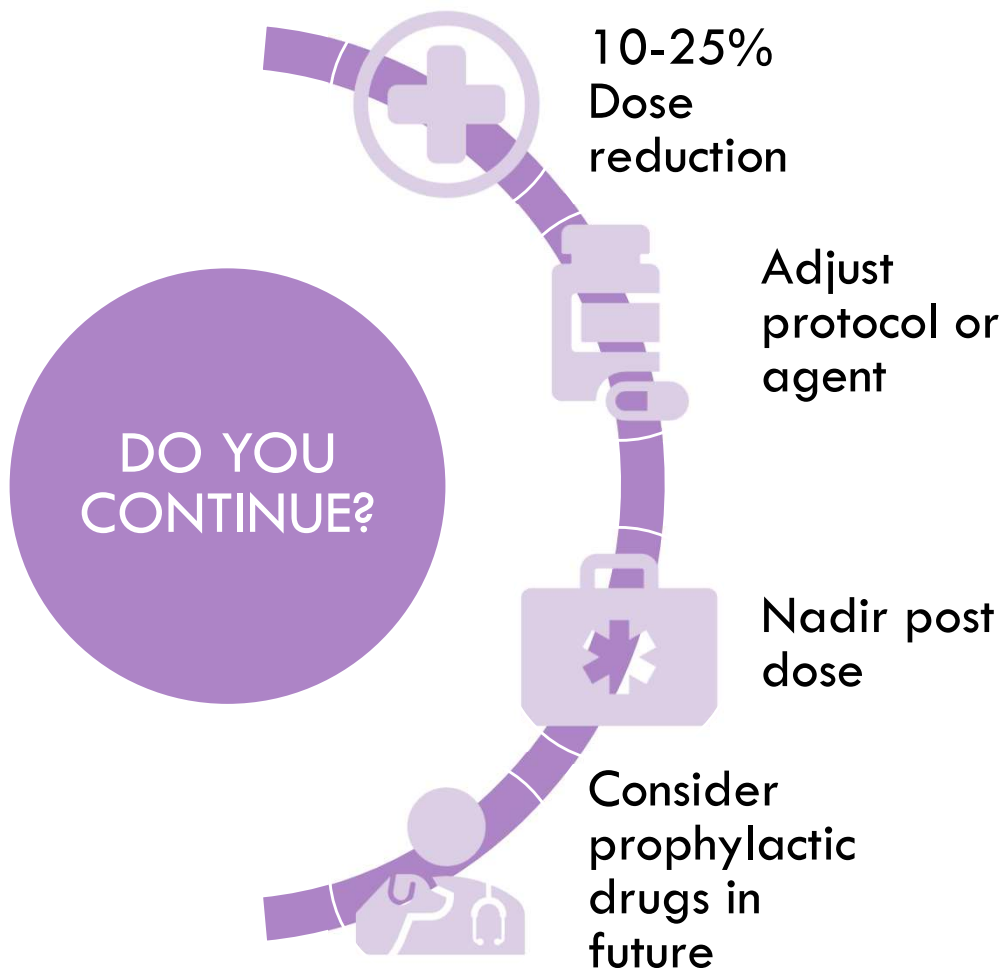


Photo: Sarah Holliday

CLIENT SUPPORT AND EDUCATION



CLIENT EDUCATION



Photo: google search

Simple to follow, written format

Include:

Patient monitoring – Adverse events

Signs of extravasation – risks and monitoring

Handling bodily fluids

PPE, Litter tray, location to toilet outside

Medications

Appointments

IVC pressure bandage

OOH contact

EXCRETIONS

VINCRISTINE

Half life
13 min- 75 min

Bile/ faeces,
less in urine

VINBLASTINE

Half life 13
min- 75 min

Bile/ faeces,
less in urine

CYCLO

Injectable half
life 4-72 hours

Urine, vomit

LOMUSTINE

Half life 15
mins in humans

Primarily in
urine, care with
vomit

CARBO

Some evidence
to say 21
days??

Mainly in urine,
environment

USEFUL RESOURCES

- AAHA Oncology Guidelines 2026
- WITHROW Small Animal Clinical Oncology book
- VSSO- Veterinary society of veterinary oncology
- VCS-Veterinary cancer society
- Chemopet – remote chemotherapy service
- BSAVA Library
- Contact local oncology referral service- advice call/
visit centre





THANK YOU



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