Get in the Know About Chemo

Danielle D. DeCormier, LVT, VTS (Oncology), CFE
MedVet, Inc., Columbus, OH
Alyssa C. Mages, BS, CVT, FVTE
CVO/Co-Founder, Empowering Veterinary Teams®, Philadelphia, PA
Co-Founder/Director, nurtur, Malvern, PA
Co-Founder/Advisory Board Member, Project Sticker, Chicago, IL
Director, MentorVet Tech, Lexington, KY

Introduction

Veterinary oncology has advanced dramatically over the past few decades, with chemotherapy emerging as one of the most important treatment options for companion animals diagnosed with cancer. Unlike human oncology, where the emphasis often lies in aggressively extending survival time, veterinary oncology prioritizes the **quality of life** for patients. Pets cannot describe their symptoms, so the role of the veterinary team—particularly technicians—is to monitor closely, minimize side effects, and advocate for comfort while supporting the family through the process.

This session integrates foundational knowledge of chemotherapy pharmacology with the practical, day-to-day responsibilities of technicians working in both general practice and specialty settings.

Goals of Chemotherapy in Veterinary Medicine

The overarching goals of chemotherapy differ significantly from those in human medicine. While cure is ideal, veterinary oncology most often seeks:

Remission: The aim of many protocols is to induce remission, where no cancer is detectable clinically or on diagnostic tests. While remission is not synonymous with cure, it provides pets with valuable time during which they can feel well and live comfortably with their families.

Palliation: In cases where remission is not possible, the goal becomes reducing symptoms such as pain, difficulty breathing, or poor appetite. Palliative protocols are designed to improve comfort, even if they do not significantly extend life expectancy.

Quality of Life Preservation: Above all else, veterinary oncology prioritizes maintaining a pet's day-to-day comfort and happiness. Treatment protocols often use lower doses or modified regimens to minimize distress. Owners are guided through shared decision-making to ensure the treatment plan reflects what's best for both the pet and the family.

Chemotherapy 101: What It Is and What It Does

Chemotherapy refers to the use of **cytotoxic drugs** that interfere with the ability of cells to divide and reproduce. Because cancer cells grow rapidly, they are particularly vulnerable to these drugs. However, other normal cells that divide quickly—such as those in the **bone marrow, gastrointestinal tract, and hair follicles**—are also affected, which explains common side effects.

Veterinary technicians should be comfortable with key oncology terminology:

- **Remission**: A state where cancer cannot be detected, though microscopic disease may remain.

- **Myelosuppression**: Suppression of bone marrow activity leading to low red cells, white cells, or platelets, and corresponding clinical risks like anemia, infection, or bleeding.
- **Nadir**: The lowest point of blood counts, usually occurring 7–10 days after treatment, which is a critical monitoring period.
- **Extravasation**: Leakage of chemotherapy drugs outside the vein during administration, which can cause severe local tissue injury.

Pharmacokinetics Through a Technician's Lens

Pharmacokinetics—the movement of drugs through the body—is highly relevant to chemotherapy because it determines how drugs are absorbed, distributed, metabolized, and excreted.

- **Absorption**: Most chemotherapy is delivered intravenously to ensure precise dosing and rapid onset, though some oral agents are available for at-home use.
- **Distribution**: Once in the bloodstream, chemotherapy drugs disperse widely. Some agents, like lomustine, cross the blood-brain barrier and are useful in treating CNS tumors.
- **Metabolism**: Many drugs are processed by the liver, which means pre-treatment liver function tests are essential to avoid toxicity.
- **Excretion**: Drugs and their metabolites are often excreted through urine or feces. This has safety implications for technicians and owners, who must handle waste with protective precautions.

Timing is particularly critical. Because many agents suppress bone marrow activity, the technician must anticipate when the nadir will occur and ensure appropriate **CBC monitoring both before administration and at the expected low point**.

Veterinary Chemotherapy Versus Human Medicine

In **human oncology**, chemotherapy is often dosed aggressively, pushing to the maximum tolerated level to maximize the chance of cure, even if severe side effects occur. Advanced supportive interventions (e.g., transfusions, growth factor injections, hospitalization) are used to manage complications.

In **veterinary oncology**, the guiding principle is balance. Protocols are intentionally designed to limit severe toxicity, focusing instead on maintaining a patient's daily comfort. For example, while the **CHOP protocol** (Cyclophosphamide, Doxorubicin, Vincristine, Prednisone) is common to both human and veterinary lymphoma patients, veterinary doses and schedules are often adjusted downward to improve tolerability. This difference highlights the core ethical priority in animal care: preserving quality of life.

Key Chemotherapeutic Agents

Veterinary technicians need to be familiar not just with drug names but also their uses, monitoring needs, and unique toxicities.

- **Carboplatin**: Widely used for carcinomas, melanomas, and sarcomas. It is generally safer than cisplatin but still requires monitoring of CBC and renal function. Myelosuppression is the most significant risk, especially in small dogs.

- **Doxorubicin**: A cornerstone drug for lymphoma, leukemia, sarcomas, and mammary tumors. It is highly effective but carries risks of cardiotoxicity in certain dog breeds and nephrotoxicity in cats. Careful ECG or echocardiogram screening is often required.
- **Vincristine & Vinblastine**: These vinca alkaloids are effective for lymphoma, mast cell tumors, and transmissible venereal tumors. They require dose reductions in MDR1-mutant dogs and must be administered carefully to avoid extravasation. Neuropathy is a concern at high doses.
- **L-asparaginase**: Used for lymphoma and leukemia, often as part of a multi-drug protocol. It does not typically cause myelosuppression but can lead to hypersensitivity reactions or pancreatitis.
- **Cyclophosphamide**: Common in lymphoma protocols and sarcomas, with a unique risk of sterile hemorrhagic cystitis due to toxic metabolites. Monitoring urine and using protective strategies (like furosemide co-administration) may reduce risk.
- **Lomustine (CCNU)**: An oral drug used for lymphoma, mast cell tumors, and CNS neoplasia. It carries a high risk of hepatotoxicity, so concurrent liver protectants (e.g., Denamarin®) are often prescribed.
- **Toceranib (Palladia®)**: A targeted therapy (tyrosine kinase inhibitor) used for mast cell tumors and other cancers. While oral and convenient, it requires extensive monitoring for GI upset, myelosuppression, and renal changes.

Safe Administration of Chemotherapy

Because chemotherapy drugs are cytotoxic, they pose risks not only to the patient but also to staff. Technician safety depends on strict adherence to protocols:

- Drugs should be prepared in **biological safety cabinets** with **closed-system transfer devices** to reduce aerosolization or leaks.
- **Personal protective equipment (PPE)**—including chemotherapy-rated gloves, impermeable gowns, and eye/face protection—is non-negotiable.
- Confirm **vein patency** before injection to avoid extravasation. If extravasation occurs, stop immediately, attempt drug aspiration, and apply the recommended hot or cold compresses. In some cases, antidotes such as dexrazoxane may be used.

Daily Management of the Oncology Patient

The technician's work extends far beyond the infusion room. Day-to-day patient management is where quality of life is truly preserved.

- **Monitoring**: Regular checks of CBC and chemistry panels, paired with careful observation of appetite, hydration, energy levels, and elimination.
- **Supportive care**: Antiemetics such as maropitant or ondansetron control nausea; appetite stimulants help maintain nutrition; subcutaneous or IV fluids may support hydration.
- **Early warning signs**: Even mild fever or lethargy in a patient undergoing chemotherapy may indicate neutropenia or sepsis risk and must be acted upon promptly.

Troubleshooting and Damage Control

Even with careful planning, complications will arise:

- **GI upset**: One of the most common side effects. Typically managed with antiemetics, bland diets, and hydration support.
- **Myelosuppression**: Recognized through lethargy, fever, or infection risk. Depending on severity, patients may require antibiotics, hospitalization, or transfusions.
- **Home hazards**: Dropped oral chemotherapy pills should never be handled barehanded clients should be instructed to wear gloves and return pills to the clinic. Pet waste may also contain metabolites and should be handled with protective measures.

The Technician's Role in Client Education

Client education is one of the most impactful technician responsibilities. Owners must understand:

- Chemotherapy in pets is about **quality of life, not cure**.
- Safety at home matters: gloves should be worn when handling waste, toilets should be double-flushed, and medications stored securely.
- Keeping a **daily symptom diary** can provide invaluable information at rechecks and helps clients feel empowered in their pet's care.

Technicians must also provide emotional support. Oncology is an emotional journey for families, and technicians who listen with empathy and guide clients compassionately can profoundly shape the experience.

General Practice and Specialty: Bridging the Gap

Veterinary technicians in **general practice** often serve as the first line of cancer detection. They may notice enlarged lymph nodes, weight loss, or non-healing wounds during routine exams, and they help explain referral options to owners.

Technicians in **specialty settings** focus on drug preparation, administration, and advanced monitoring. They collaborate closely with oncologists, pharmacists, and the GP team to ensure protocols are followed safely and consistently.

When general practice and specialty teams communicate effectively, patients benefit from seamless continuity of care, and clients feel supported by a united veterinary team.

Conclusion

Chemotherapy in veterinary medicine represents a balance between aggressive cancer treatment and compassionate care. Veterinary technicians are central to this balance. Their expertise in drug safety, patient monitoring, supportive care, and client education ensures that pets undergoing chemotherapy not only live longer, they live well.

By bridging the gap between science and empathy, between general practice and specialty, technicians transform cancer treatment from a daunting challenge into a process rooted in comfort, safety, and hope.