

Chemotherapy Safety in Clinical Veterinary Oncology



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KEYWORDS

- Chemotherapy • Safety • Veterinary oncology • Closed-system transfer device
- Personal protective equipment • NIOSH

KEY POINTS

- Exposure to chemotherapy occurs both at the clinic and in the pet owner's home through direct contact and environmental contamination.
- Health care workers who handle chemotherapy have measurable levels of chemotherapy in urine, mutagenicity of urine, increased DNA damage, and an increased risk of reproductive failure and cancer development.
- Multiple levels of hazard control and appropriate handling techniques must be used to minimize contamination and the risks associated with exposure.
- Oral, at-home cancer therapies carry additional management and safety concerns.
- Several states have passed laws to mandate implementation of the National Institute for Occupational Safety and Health guidelines for handling hazardous drugs; veterinary clinics that handle chemotherapy are affected by these laws.



Videos of proper donning of personal protective equipment, proper technique before, during, and following administration, and proper doffing and waste disposal accompany this article at <http://www.vetsmall.theclinics.com/>

HISTORY OF CHEMOTHERAPY SAFETY

Chemotherapy as a treatment of cancer in pets began in earnest in the early 1970s, a mere 25 years after the birth of human medical oncology. In 1979, a letter in *The Lancet* documented mutagenicity of the urine of nurses handling cytotoxic chemotherapy.¹ This letter sparked a new field of interest in cancer chemotherapy: chemotherapy safety for health care personnel. Studies were launched investigating the existence of exposure, routes of exposure, methods to determine and monitor exposure, and the mutation frequency, reproductive failures, and risk of cancer

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development associated with exposure. Limitations in detection methods and confounding factors such as genetic predisposition, lifestyle, level and duration of exposure, and the impact of safety measures makes interpretation and comparison of studies difficult. The mission to identify chemotherapy as an occupational hazard and determine the acceptable level of risk is complex and cost-prohibitive. To detect a 2-fold increase in the risk of cancer, it would be necessary to follow tens of thousands of exposed individuals and an equal number of nonexposed persons over a 20- to 30-year time period.² The consensus is that prudence is indicated; in the absence of definitive data, chemotherapy safety practice should mirror the guidelines for laboratory workers who handle hazardous drugs.

A provocative review published in 1987 gave voice to the unanswered questions of the time (**Box 1**).² Although 35 years of research and more than 150 publications have sought to provide answers, the strongest answer to most of them is still “maybe.” The single question to which there is a definitive answer is whether veterinary oncologists should be appraised of drug-handling safety concerns. The answer is a resounding “yes.” Furthermore, awareness of drug-handling safety concerns must extend beyond those that specialize in veterinary oncology.

RELEVANCE TO VETERINARY MEDICINE

In human medicine, advances in the diagnosis and treatment of cancer have led to living with cancer rather than dying from it. This paradigm shift has led to greater focus on quality of life and convenience. Cancer treatments are administered mainly within the local outpatient setting and there is an increase in the use of oral, at-home

Box 1

Unanswered questions regarding chemotherapy safety (1987)

- Does low-level exposure to cytotoxic agents on a long-term basis lead to significant absorption?
- Does low-level exposure cause acute or long-term side effects?
- Should personnel actively attempting to conceive handle cytotoxic agents?
- Are pharmacists at risk in packaging oral cytotoxic agents through aerosols generated during the preparation process?
- Do all antineoplastic agents pose a risk?
- Which pose the greatest risk?
- Do sweat tears, saliva, and other body fluids contain significant amount of cytotoxic metabolites that require safety precautions?
- Does septic system disposal of excreta pose a risk to the general public?
- Do soiled linen and items not capable of being laundered pose a hazard?
- What is the safest carcinogenic waste destruction method?
- Should morticians and pathology staff handle expired patients and specimens with special precautions?
- Should veterinarian oncologists be appraised of drug handling safety concerns as they treat household pets with cytotoxic agents?
- Do these questions reflect valid concerns or are they an overreaction to what some consider an emotional issue?

Data from Miller SA. Issues in cytotoxic drug handling safety. Semin Oncol Nurs 1987;3(2):133–41.

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