

## **Safe Handling of Chemotherapy Drugs**

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With an increased interest in veterinary oncology in recent years, more and more general practitioners are administering and prescribing antineoplastic agents for their patients. In order to avoid unnecessary human exposure to these toxic agents, it is important to educate clinic employees and pet owners on how to safely handle antineoplastic drugs and animal waste products while the pet is undergoing chemotherapy. Since these products are all approved for human use only, the product package inserts do not mention some of the safety issues unique to veterinary clients and patients associated with use of these drugs, such as cleaning a litter box or cage.

In 1979 the British journal *Lancet*, first reported the risk to humans handling antineoplastics. In a letter to the editor, Finnish researchers reported mutagenic activity in the urine of nurses working in a human oncology unit, and proposed that the cause was related to exposure to antineoplastic agents. Subsequent studies have shown increased chromosomal alterations, hepatotoxicity, and abnormal reproductive outcomes thought to be associated with exposure to various antineoplastics. For these reasons, it is very important that written safety protocols be established and followed in the veterinary clinic. The veterinarian must also provide clear instructions to pet owners for at-home administration and handling of the drugs and for drug-contaminated urine and feces.

In 1985, a summary of published safety guidelines appeared in the American Journal of Hospital Pharmacy's (ASHP) Technical Assistance Bulletin on Handling Cytotoxic Drugs in Hospitals. Following that report, the Federal Occupational Safety and Health Administration (OSHA) released recommendations for the safe handling of cytotoxic drugs by medical personnel. Although various adaptations of these and other guidelines have been published in the veterinary literature, a recent survey of veterinary referral institutions revealed considerable variation in chemotherapy safety protocols and lack of uniformity among practices. A similar situation likely exists in general practices. Videotapes may be obtained from the American Animal Hospital Association (1-800-252-2242) for in-house training of clinic employees. Your ACVP pharmacist can also help you obtain copies of safety protocols and provide information for client education.

The risk of exposure to antineoplastic agents is greatest during drug preparation and administration, with the primary routes being inhalation of aerosols, direct contact, and ingestion of spilled or improperly handled drugs. Two other routes of exposure important to veterinarians and their clients include handling of discarded items that have come in contact with chemotherapy (e.g. syringes, catheters, gloves, etc. and contact with excreta from patients treated with antineoplastic agents). Animal care workers in the veterinary clinic are at particular risk for exposure as they clean the cages where these animals are housed and should be adequately trained in special handling procedures for these patients. Pregnant workers should avoid any exposure to antineoplastics. It is also important for veterinarians to provide information to veterinary clients regarding appropriate drug and animal waste handling.

Most antineoplastics are expensive and should be prepared in a biological safety cabinet, which most veterinary clinics do not have. Also, their preparation may be complex and may require other equipment or supplies not readily available in the veterinary clinic. Compounding may be especially hazardous if done without proper technique and safety equipment. For these reasons, pharmacists are frequently asked to prepare chemotherapy for administration in the veterinary clinic and to compound and/or dispense prescriptions for at-home administration by the client. When a pharmacist prepares an antineoplastic agent for administration by a veterinarian in his/her clinic, the veterinarian should ask that a Material Safety Data Sheet (MSDS) and the drug package insert accompany the medication. The pharmacist is also a valuable resource for providing information regarding emergency procedures in the event of accidental exposure or extravasation of the drug, as well as potential side effects, drug interactions, precautions or contraindications, etc. associated with a particular drug.

Chemotherapy safety should be discussed with clients prior to discharge of the pet. While it is important to point out potential hazards associated with human exposure to these drugs, it is also important to avoid frightening clients. When antineoplastics are dispensed for at-home administration, medication vials, syringes, and bags must always be identified clearly with chemotherapy labels. The prescription label should also contain clear

directions for use and disposal instructions. A procedure for safe disposal should be established between the veterinarian and pharmacist prior to dispensing. Medication should always be dispensed in a child-resistant container unless the client requests otherwise. Follow-up with the clients is very important to make sure that the medicine is being given correctly and handled safely. Often these prescriptions are filled at a local pharmacy, and the client may pick them up directly from the pharmacy. Let the pharmacist know that you want to be alerted to any compliance or other problems he or she discovers when filling or refilling these medications.

### ***Drug Metabolism and Elimination***

Antineoplastic drugs commonly used in pets are eliminated primarily in the urine and/or feces. In general, a twenty-four hour post-treatment period for special handling of chemotherapy patients has been recommended. This is the time frame when urine or feces are most likely to contain excreted drug and metabolites. Some drugs, however, are metabolized and eliminated more slowly than others. Also, individual animals may be slower to metabolize some drugs due to other factors such as concurrent drug therapy interactions, an altered physiological state of the patient, as well as other reasons; therefore, a seventy-two hour special handling of patients receiving chemotherapy (and longer for some drugs such as carboplatin) may be more appropriate. Labeling of the medication should include a specified time period for special handling of animal waste.

Clients should be given written educational materials. A one-page "frequently asked questions" flyer accompanying their prescriptions serves as an easy to read, easily prepared, inexpensive, and effective means of communicating information. The questions and answers should be reviewed with the client face to face (either by the veterinarian or pharmacist) to make sure there is a clear understanding of hazards and precautions.

#### References:

1. Plumb, Donald C. *Veterinary Drug Handbook*, 3rd Edition. Ames: Iowa State University Press, 1999.
2. Sherding, RG, ed. *The Cat: Diseases and Clinical Management*, 2nd ed. Philadelphia: WB Saunders, 1994.