Chemotherapy Extravasation Management

Extravasation is a term that describes a drug inadvertently or accidentally leaking into surrounding tissue or the subcutaneous space during IV infusions. The volume, contact time, and drug properties are all factors that have to be considered when assessing an extravasation event. Chemotherapeutic agents are at highest risk for complications due to the nature of the agents and the potential to cause high cellular damage when extravasated. The severity of tissue damage can be limited by quick detection of extravasations and swift treatment. A chemotherapeutic extravasation is considered an oncologic emergency.

When assessing a chemotherapy extravasation, it is important to understand the classification of the chemotherapeutic agent in terms of its potential to cause cellular damage if extravasated. Chemotherapeutics can be classified into three categories: vesicants, irritants, and non-irritants.

Vesicants can cause pain, edema, and erythema, and potentially lead to blisters and tissue necrosis when extravasated. Irritants have been described in human medicine as a burning sensation, pain, and/or erythema during injection and extravasation. Non-irritants do not usually produce local reactions to surrounding tissue; however, mild inflammation has been reported. Among veterinary patients, careful monitoring of the patient and injection site for manifestations of erythema and drug leakage during an injection/infusion would be prudent practice.

Unfortunately at this time, there is not a consensus concerning the management of chemotherapy extravasation in human medicine. Despite a large amount of published literature on this topic, most recommendations are based upon empirical, or anecdotal, evidence. The lack of strength and large variability in management practices in case reports make it difficult to standardize and rank management practice in terms of efficacy. Consequently, this toolkit serves only as a guide for potential treatment options.

Many chemotherapeutic agents do not have known antidotes that are safe to use in order to neutralize their toxic activity. The algorithm on the opposite page should aid in the decision-making process when handling a chemotherapeutic extravasation. It is important to note that the first goal of treatment is to immediately either localize the extravasated agent or disperse the agent. The choice of localization or dispersion depends on the chemotherapeutic agents. Cold compress will help to constrict local blood vessels and localize tissue damage. Warm compress will act in the opposite, aiding to disperse the chemotherapeutic into surrounding tissues. The second goal of treatment is to neutralize the chemotherapeutic once localized or dilute the agent to allow it to be absorbed and consequently metabolized.

For the purposes of this document, we will focus upon five commonly used chemotherapeutics and their antidotes: doxorubicin, vincristine, vinblastine, carboplatin, and L-asparaginase.

TABLE 1. MANAGEMENT OF EXTRAVASATION

Treatment Goal: Localize and Neutralize		**Treatment Goal: Disperse and Dilute**	**Treatment Goal: Monitor for Mild Inflammation**
Vesicants	***Irritants***	***Vesicants***	***Non-Irritants***
Dactinomycin*	Carboplatin*	Vinblastine§	L-Asparaginase
Docetaxel*	Cisplatin*	Vincristine§	Bleomycin
Doxorubicin†	Dacarbazine*	Vinorelbine§	Cyclophosphamide
Mitomycin‡	Fluorouracil*		Cytarabine
Mitoxantrone*	Ifosfamide*		Gemcitabine
Paclitaxel*	Melphalan*		Methotrexate
1. Localize Apply dry cold compresses for 20–30 min at a time, 4 times a day for the first 24–48 hr following extravasation. **2. Neutralize** Use the antidote specific to the agent.		**1. Disperse** Apply dry warm compresses for 20–30 min at a time, 4 times a day for the first 24–48 hr following extravasation. **2. Dilute** Use the antidote specific to the agent.	Apply dry cold compresses for about 20–30 min, then as needed.

*No recommended antidote. †Recommended antidote: dexrazoxane or dimethyl sulfoxide (DMSO). ‡Recommended antidote: DMSO. §Recommended antidote: hyaluronidase.
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