



The Pet Oncologist

Helping Vets With Pet Cancer Care

Extravasation

Extravasation is the accidental delivery of any substance outside the blood vessel into the surrounding subcutaneous or dermal tissue. When the substance is an irritant or vesicant, extravasation injury results. The resulting extravasation injury may range from local pain, discomfort, mild erythema to local tissue damage, moist dermatitis and extensive life-threatening necrosis.

Chemotherapy agents classified as vesicants:

- Anthracyclines (such as doxorubicin, epirubicin, actinomycin-D)
- Vinca alkaloids (such as vincristine, vinblastine, vinorelbine)
- Dacarbazine (DTIC)
- Streptozotocin
- Mechlorethamine

Doxorubicin is the most potent vesicant and can lead to severe irreversible tissue necrosis that often results in amputation of the affected limb.

Extravasation injuries may initially start to appear as redness and blistering, but in several days severe skin damage may be evident. Clinical signs may occur 1 to 7 days following extravasation of an irritant, or 7 to 10 days following extravasation of a vesicant such as doxorubicin. The full extent of the injury may not be seen for several weeks. The extent of damage depends on the concentration, volume, and vesicant nature of the extravasated agent.

EXTRAVASATION OF ANY CHEMOTHERAPY DRUG (PARTICULARLY DOXORUBICIN) IS TREATED AS A MEDICAL EMERGENCY, AND IMMEDIATE ACTION MUST BE TAKEN.

Clinical findings during treatment if suspect extravasation:

- Agitation or pain
- Pruritis
- Erythema around the injection site
- Swelling
- Resistance to infusion of the drug
- Reduced flow rate
- Inadequate flashback of blood

Clinical findings after treatment:

- Moist dermatitis
- Skin necrosis

Clinical features – client complaint post-treatment:

- Agitation
- Licking at the injection site
- Painful to touch
- Limping
- Redness in area of injection
- Swelling in area or limb of injection

Extravasation kit

- Hyaluronidase (Hylase®)
- Bottle of dexamethasone
- Hydrocortisone 1% cream
- DMSO (dimethyl sulfoxide) topical or solution
- Sterile gauze or cotton balls (to apply DMSO)
- 10% sodium thiosulfate (if administering mechlorethamine)
- 10 mL syringes
- 3 mL syringes
- 1L bag of 0.9% NaCl
- Distilled water (if administering mechlorethamine)
- 25 G needles
- Black permanent marker
- Cold packs (in the freezer)
- Heat packs

Extravasation Protocol

Initial steps

- 1) Stop administering the drug immediately.
- 2) Notify the veterinarian on duty immediately.
- 3) Leave IV catheter in place.
- 4) Drawback as much of the drug from the IV catheter as possible.
 - Try to remove at least 5 mL of blood from a cat and 10 mL of blood from a dog.
- 5) Mark extravasation site with a black permanent marker.
- 6) Then refer to the respective drugs below.

Doxorubicin

AIM = restrict as much drug as possible.

- 1) After a veterinarian has inspected the area and initial steps, remove the IV catheter.
- 2) Apply ice compresses as soon as possible for at least 20 minutes, as often as possible. This should be repeated at least four times daily for at least 72 hours.
- 3) Within 3 hours of the extravasation event, place a new IV catheter in a different limb. Administer dexrazoxane (Zinecard® – if available) IV over 15 minutes at 10 x the mg dose of doxorubicin, 30 mg for every 1 mg of doxorubicin administered, or between 400 and 1000 mg/m² IV.
- 4) Repeat the above step at 24 and 48 hours after extravasation.
- 5) Locally apply topical DMSO or hydrocortisone cream every 6 to 8 hours for two weeks (controversial whether this helps).
- 6) Place a light wrap over the area or an Elizabethan collar. Very important to prevent the pet from licking, chewing and/or traumatising the area.
- 7) If tissue damage is extensive, debridement surgery, skin grafting, or even amputation may be required to stop destruction and resultant pain.

Do not use warm compresses, and do not inject the area with saline because these will disperse doxorubicin into surrounding tissue and cause more harm!

Vincristine (or vinca alkaloids)

AIM = dilute and disperse as much drug as possible.

- 1) Leave IV catheter in place.
- 2) Administer intralesional hyaluronidase as soon as possible.
 - Dilute 300 units of hyaluronidase with 3 to 6 mL of 0.9% NaCl. The solution is injected circumferentially using 6 subcutaneous injections using a 25 G needle in and around the extravasation site and into the IV catheter. The patient may require sedation for this treatment. The optimal treatment interval is unknown. However, it should be repeated once weekly until all symptoms resolve. If hyaluronidase is

unavailable, 4 mg dexamethasone diluted in sterile 0.9% NaCl can be used instead of hyaluronidase. It may also help reduce the severity of the reaction.

- 3) Infiltrate with 5 to 20 mL of 0.9% NaCl (25 G needle) (as much as the patient will tolerate).
- 4) Apply warm compresses for 15 minutes every 6 hours for at least 24 hours.
- 5) Locally apply topical DMSO or hydrocortisone cream every 6 to 8 hours for two weeks (controversial whether this helps).
- 6) Place a light wrap over the area or an Elizabethan collar. Very important to prevent the pet from licking, chewing and/or traumatising the area.
- 7) If tissue damage is extensive, debridement surgery, skin grafting, or even amputation may be required to stop destruction and resultant pain.

DTIC, streptozotocin

- Similar to doxorubicin, except it does not require dexrazoxane.

Mechlorethamine

- 1) After a veterinarian has inspected the area and initial steps, remove the IV catheter.
- 2) Administer sodium thiosulfate as soon as possible.
 - Dilute 4 mL of 10% sodium thiosulfate with 6 mL of distilled water. The solution is then injected circumferentially using 6 subcutaneous injections using a 25 G needle in and around the extravasation site. The patient may require sedation for this treatment.
 - If sodium thiosulfate is unavailable, use hyaluronidase. Refer to above under 'Vincristine'.
- 3) Locally apply topical DMSO or hydrocortisone cream every 6 to 8 hours for two weeks (controversial whether this helps).
- 4) Place a light wrap over the area or an Elizabethan collar. Very important to prevent the pet from licking, chewing and/or traumatising the area.
- 5) If tissue damage is extensive, debridement surgery, skin grafting, or even amputation may be required to stop destruction and resultant pain.

Delayed perivascular damage or slough

- Daily wound treatment
- Antibiotics
- Pain relief
- Surgical
 - Debridement of tissues
 - Skin grafting
 - Possible amputation