DoveLewis

Guidelines for Use of **Canine** Blood Components

Cryoprecipitate

This product is prepared by a controlled thaw of fresh frozen plasma, resulting in a concentration of Factor VIII, Factor XIII, vWF and some fibrinogen.

Storage

Must be stored at < -18 C (< 32 F). A common household freezer is sufficient for storage.

Indications

Used for pretreatment of vWF or Hemophilia A before invasive procedures or as a topical hemostatic in surgery

Dosage

vWF: 5mL/kg administered over 1 hour
Hemophilia A: 1-5mL/kg
(additional amounts may be required to actively bleeding hemophiliacs)
Amount can be repeated every 12 hours as needed

Thawing Procedure

1. Maintain cryo in its frozen state until ready to use.
2. Double wrap the cryo in a waterproof bag (ziplock bags are sufficient) and place in a warm water bath (30 – 37 C). A light weight can be used over the bag to keep it submerged in the warm water (we use a separate unused IV fluid bag).
3. Do not place the cryo unprotected under hot or scalding tap water or try to manipulate the bag to decrease the thawing time, as this can destroy certain proteins or factors of the cryo.
4. Average thawing time is roughly 20 minutes.

Infusion

Be sure that the transfusion is NOT administered in conjunction with any other IV fluids. Thoroughly flush a catheter containing other fluids/medication before use with blood products.

1. Roll the dial to close the clamp on the administration filter. Attach extension sets, if necessary.
2. Spike the unit of cryo with the filter. Squeeze the filter chamber and allow the chamber to fill ½ way with plasma. Unclamp the line and gradually flush the cryo until it reaches the recipient. If using a pump run the *extension set* through the pump.

Initial Transfusion Rate = 1ml/kg/hr (for at least the first 30 minutes)

3. Obtain a TPR on the recipient every 15 minutes for at least the first hour of the transfusion to monitor for signs of a reaction (Rise in temp, HR, RR. Drop in BP. Hives or facial swelling).
4. Gradually increase the rate of transfusion to as fast as the recipient can safely tolerate so that the entire transfusion is administered within 1 hour. Maximum infusion time should be no more that 4 hours to prevent bacterial contamination.
5. When transfusion is finished, flush the remaining cryo in the extension sets with 20mls of sterile saline.

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Guidelines for Use of **Canine** Blood Components

Fresh Frozen Plasma

This product is obtained from centrifugation of CPDA-collected whole blood that is separated and frozen within 6 hours of collection. It contains all components of the coagulation cascade, including the labile factors vWF, Factor V, Factor VIII (antihemophilic) and Factor II (prothrombin). It also contains oncotic proteins (albumin), immunoglobulins, lipids and electrolytes.

Storage

Must be stored at -18 C (32 F) and is viable for up to 1 year from the collection date. A common household freezer is sufficient for storage.

Indications

Fresh frozen plasma contains both labile and non-labile coagulation factors and plasma proteins. It can be used to treat factor related coagulopathies including rodenticide toxicity, liver failure, DIC, and most factor deficiencies including Factors VIII, IX and Von Willebrands. Fresh frozen plasma cannot be used to treat coagulopathies related to severe thrombocytopenia as it does not contain active platelets. It does contain albumin and can be useful in some types of hypoproteinemias.

Dosage

Plasma in canines is not DEA type specific, however, all of our donor canines are screened for acquired serum antibodies against known DEA types.

10-20 ml/kg every 12-18 hours
Severe coagulopathies may require 20ml/kg

Thawing Procedure

1. Maintain plasma in its frozen state until ready to use.
2. Double wrap the plasma in a waterproof bag (ziplock bags are sufficient) and place in a warm water bath (30 – 37 C). A light weight can be used over the plasma to keep it submerged in the warm water (we use a separate unused IV fluid bag).
3. Do not place the plasma unprotected under hot or scalding tap water or manipulate the frozen plasma to decrease the thawing time, as this can destroy certain proteins or factors of the plasma.
4. Average thawing time in a warm water bath is roughly 30 – 40 minutes.

Infusion

Be sure that the transfusion is NOT administered in conjunction with any other IV fluids. Thoroughly flush a catheter containing other fluids/medication before use with blood products.

1. Roll the dial to close the clamp on the administration filter. Attach extension sets, if necessary.
2. Spike the unit of plasma with the filter. Squeeze the filter chamber and allow the chamber to fill ½ way with plasma. Unclamp the line and gradually flush the plasma until it reaches the recipient. If using a pump run the *extension set* through the pump.

Initial Transfusion Rate = 1ml/kg/hr (for at least the first 30 minutes)

3. Obtain a TPR on the recipient every 15 minutes for at least the first hour of the transfusion to monitor for signs of a reaction (Rise in temp, HR, RR. Drop in BP. Hives or facial swelling).
4. Gradually increase the rate of transfusion to as fast as the recipient can safely tolerate so that the entire transfusion is administered within 4 hrs (to prevent any bacterial contamination).
5. When transfusion is finished, flush the remaining plasma in the extension sets with 20mls of sterile saline.

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Canine Transfusion Record

Patient Name _____ Patient ID# _____ Date _____

Blood Type: Negative Positive Not Typed **Crossmatched?** Yes No

Type of Product Delivered

[ ] Packed Red Blood Cells [ ] Fresh Whole Blood [ ] Matched Unit

[ ] Fresh Frozen Plasma [ ] Frozen Plasma [ ] Cryoprecipitate

[ ] Albumin [ ] Cryo-Poor Plasma [ ] Platelet Concentrate

Unit ID# _____ **Unit Split?** Yes No

Blood Type _____ **Patient's WT.** _____

Exp. Date _____ **Duration of Transf.** _____

Tech Initials _____ **Vol. Delivered** _____

Change in current fluid therapy?

_____

_____

Start Time _____ **End Time** _____

Hour	Time	Rate (ml/hr)	Temp (˚F)	HR (bpm)	RR (bpm)
0 min					
15 min					
30 min					
45 min					
1 hour					
2 hour					
3 hour					
4 hour					

Reaction?

Time _____

Clinical Signs _____

TX _____

Outcome _____

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Guidelines for Use of **Canine** Blood Components

Packed Red Blood Cells

Blood collected from canine donors contains CPDA as an anticoagulant and 100mls of Optisol as a red blood cell preservative. Platelets and white blood cells are present; however, these cells are not viable. The donor PCV is obtained after the Optisol is added and is indicated on the donor label.

Storage

Must be stored at 1-6 C (34 – 42 F). Can be stored using a regular household refrigerator.

Indications

Symptomatic deficit of oxygen carrying capacity due to red blood cell loss, without substantial hypovolemia or coagulopathy.

Dosage

mls of blood for transfusion =
[wt. of recipient (kg) x 90] [desired PCV – recipient PCV]
Donor PCV

1.5mL/kg should raise the recipient's PCV by 1%

Infusion

Be sure that the transfusion is NOT administered in conjunction with any other IV fluids. Thoroughly flush a catheter containing other fluids/medication before use with blood products (Ca and other additives in IV fluids can have adverse effects on the donor's red blood cells).

1. Roll the dial to close the clamp on the administration filter. Attach extension sets, if necessary.
2. Spike the unit of red blood cells with the filter. Squeeze the filter chamber and allow the chamber to fill ½ way with blood. Unclamp the line and gradually flush the blood until it reaches the recipient. Red blood cell products can only be used with pumps certified for use with blood. If using a pump run the *extension set* through the pump.

Initial Transfusion Rate = 1ml/kg/hr (for at least the first 30 minutes)

3. Obtain a TPR on the recipient every 15 minutes for at least the first hour of the transfusion to monitor for signs of a reaction (Rise in temp, HR, RR. Drop in BP. Hives or facial swelling).
4. Gradually increase the rate of transfusion to as fast as the recipient can safely tolerate so that the entire transfusion is administered within 4 hrs (to prevent any bacterial contamination).
5. When transfusion is finished, flush the remaining blood product in the extension sets with 20mls of sterile saline.

Side Effects

Mismatch of major blood types can lead to acute or delayed transfusion reactions. In canines, acute transfusion reactions occur in mismatches involving DEA 1 and can prove fatal. Blood typing should always be performed before the administration of any blood products.

Circulatory overload is the most common adverse side affect to transfusion administration, but can be avoided by following the proper dosage and recognizing any underlying disease processes that may be present in the recipient.

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Canine Transfusion Record

Patient Name _____ Patient ID# _____ Date _____

Blood Type: Negative Positive Not Typed **Crossmatched?** Yes No

Type of Product Delivered

[ ] Packed Red Blood Cells [ ] Fresh Whole Blood [ ] Matched Unit

[ ] Fresh Frozen Plasma [ ] Frozen Plasma [ ] Cryoprecipitate

[ ] Albumin [ ] Cryo-Poor Plasma [ ] Platelet Concentrate

Unit ID# _____ **Unit Split?** Yes No

Blood Type _____ **Patient's WT.** _____

Exp. Date _____ **Duration of Transf.** _____

Tech Initials _____ **Vol. Delivered** _____

Change in current fluid therapy?

_____

_____

Start Time _____ **End Time**_____

Hour	Time	Rate (ml/hr)	Temp (˚F)	HR (bpm)	RR (bpm)
0 min					
15 min					
30 min					
45 min					
1 hour					
2 hour					
3 hour					
4 hour					

Reaction?

Time _____

Clinical Signs _____

TX _____

Outcome _____

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Guidelines for Use of **Canine** Blood Components

Whole Blood

Blood collected from canine donors contains CPDA as an anticoagulant. Platelets and white blood cells are present; however, white blood cells are not viable. Platelets are only viable within 6 hours of collection and if the product has not been refrigerated. The donor PCV is obtained before collection and is indicated on the donor label.

Storage

May be stored at room temperature for up to 6 hours. Whole blood must be gently agitated at least every half hour to keep platelets viable. Must be stored at 1-6 C (34 – 42 F) after 6 hours. Can be stored using a regular household refrigerator.

Indications

Provides blood volume expansion and increased oxygen carrying capacity. Delivers viable platelets (when collected within 6 hours and not refrigerated), coagulation factors and plasma proteins.

Dosage

Mls of blood for transfusion = [wt. of recipient (kg) x 90]
[desired PCV – recipient PCV]
Donor PCV

2mL/kg should raise the recipient's PCV by 1%
10mL/kg = 10k/mL increase in platelets

Infusion

Be sure that the transfusion is NOT administered in conjunction with any other IV fluids. Thoroughly flush a catheter containing other fluids/medication before use with blood products (Ca and other additives in IV fluids can have adverse effects on the donor's red blood cells).

1. Roll the dial to close the clamp on the administration filter. Attach extension sets, if necessary.
2. Spike the unit of red blood cells with the filter. Squeeze the filter chamber and allow the chamber to fill ½ way with blood. Unclamp the line and gradually flush the blood until it reaches the recipient. Red blood cell products can only be used with pumps certified for use with blood. If using a pump run the *extension set* through the pump.

Initial Transfusion Rate = 1ml/kg/hr (for at least the first 30 minutes)

3. Obtain a TPR on the recipient every 15 minutes for at least the first hour of the transfusion to monitor for signs of a reaction (Rise in temp, HR, RR. Drop in BP. Hives or facial swelling).
4. Gradually increase the rate of transfusion to as fast as the recipient can safely tolerate so that the entire transfusion is administered within 4 hrs (to prevent any bacterial contamination).
5. When transfusion is finished, flush the remaining blood product in the extension sets with 20mls of sterile saline.

Side Effects

Mismatch of major blood types can lead to acute or delayed transfusion reactions. In canines, acute transfusion reactions occur in mismatches involving DEA 1 and can prove fatal. Blood typing should always be performed before the administration of any blood products. Circulatory overload is the most common adverse side affect to transfusion administration, but can be avoided by following the proper dosage and recognizing any underlying disease processes that may be present in the recipient.

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Canine Transfusion Record

Patient Name _____ Patient ID# _____ Date _____

Blood Type: Negative Positive Not Typed **Crossmatched?** Yes No

Type of Product Delivered

[ ] Packed Red Blood Cells [ ] Fresh Whole Blood [ ] Matched Unit

[ ] Fresh Frozen Plasma [ ] Frozen Plasma [ ] Cryoprecipitate

[ ] Albumin [ ] Cryo-Poor Plasma [ ] Platelet Concentrate

Unit ID# _____ **Unit Split?** Yes No

Blood Type _____ **Patient's WT.** _____

Exp. Date _____ **Duration of Transf.** _____

Tech Initials _____ **Vol. Delivered** _____

Change in current fluid therapy?

_____

_____

Start Time _____ **End Time** _____

Hour	Time	Rate (ml/hr)	Temp (˚F)	HR (bpm)	RR (bpm)
0 min					
15 min					
30 min					
45 min					
1 hour					
2 hour					
3 hour					
4 hour					

Reaction?

Time _____

Clinical Signs _____

TX _____

Outcome _____

Guidelines for Use of **Feline** Blood Components

Fresh Frozen Plasma

This product is obtained from centrifugation of ACD-A collected whole blood and separated and frozen within 6 hours of collection. It contains all components of the coagulation cascade, as well as oncotic proteins (albumin), immunoglobulins, lipids and electrolytes.

Storage

Must be stored at -18 C (32 F) and is viable for up to 1 year from the collection date. A common household freezer is sufficient for storage.

Indications

Fresh frozen plasma contains both labile and non-labile coagulation factors and plasma proteins. It can be used to treat factor related coagulopathies including rodenticide toxicity, liver failure, DIC, and most factor deficiencies including Factors VIII and IX. Fresh frozen plasma cannot be used to treat coagulopathies related to severe thrombocytopenia as it does not contain active platelets. It does contain albumin and can be useful in some types of hypoproteinemias.

Dosage

Plasma in felines is type-specific. All recipients should receive a blood type before the administration of any plasma product.

6 – 10 ml/kg every 12-18 hours
Severe coagulopathies may require 20ml/kg

Thawing Procedure

1. Maintain plasma in its frozen state until ready to use.
2. Double wrap the plasma in an airtight or waterproof bag (ziplock bags are sufficient) and place in a warm water bath (30 – 37 C). A light weight can be used over the plasma to keep it submerged in the warm water (we use a separate unused IV fluid bag).
3. Do not place the plasma unprotected under hot or scolding tap water or manipulate the frozen plasma to increase the thawing procedure, as this can destroy certain proteins or factors of the plasma.
4. Average thawing time in a warm water bath is roughly 10 – 15 minutes.

Infusion

Be sure that the transfusion is NOT administered in conjunction with any other IV fluids. Thoroughly flush a catheter containing other fluids/medication before use with blood products.

1. Roll the dial to close the clamp on the administration filter. Attach extension sets, if necessary.
2. Spike the unit of plasma with the filter. Squeeze the filter chamber and allow the chamber to fill ½ way with plasma. Unclamp the line and gradually flush the plasma until it reaches the recipient. If using a pump run the *extension set* through the pump.

Initial Transfusion Rate = 1ml/kg/hr (for at least the first 30 minutes)

3. Obtain a TPR on the recipient every 15 minutes for at least the first hour of the transfusion to monitor for signs of a reaction (Rise in temp, HR, RR. Drop in BP. Hives or facial swelling).
4. Gradually increase the rate of transfusion to as fast as the recipient can safely tolerate so that the entire transfusion is administered within 4 hrs (to prevent any bacterial contamination).
5. When transfusion is finished, flush the remaining plasma in the extension sets with 10mls of sterile saline.

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Feline Transfusion Record

Patient Name _____ Patient ID# _____ Date _____

Blood Type: **A** **B** **AB** **Crossmatched?** Yes No

Type of Product Delivered

[ ] Packed Red Blood Cells [ ] Fresh Whole Blood [ ] Matched Unit

[ ] Fresh Frozen Plasma [ ] Frozen Plasma

Unit ID# _____ **Unit Split?** Yes No

Blood Type: **A** **B** **Patient's WT.** _____

Exp. Date _____ **Duration of Transf.** _____

Tech Initials _____ **Vol. Delivered** _____

Change in current fluid therapy?

_____

_____

Start Time _____ **End Time** _____

Hour	Time	Rate (ml/hr)	Temp (˚F)	HR (bpm)	RR (bpm)
0 min					
15 min					
30 min					
45 min					
1 hour					
2 hour					
3 hour					
4 hour					

Reaction?

Time _____

Clinical Signs _____

TX _____

Outcome _____

Guidelines for Use of **Feline** Blood Components

Packed Red Blood Cells

Blood collected from feline donors contains ACD-A as an anticoagulant and 10mLs of AS-3 solution as a red blood cell preservative. Platelets and white blood cells are present; however, these cells are **not viable**. The donor PCV is obtained after the AS-3 solution is added and is indicated on the donor label.

Storage

Must be stored at 1-6 C (34 – 42 F). Can be stored using a regular household refrigerator.

Indications

Symptomatic deficit of oxygen carrying capacity due to red blood cell loss, without substantial hypovolemia or coagulopathy.

Dosage

mls of blood for transfusion =
[wt. of recipient (kg) x 90] [desired PCV – recipient PCV]
Donor PCV

1.5mL/kg should raise the recipient's PCV by 1%

Felines must be blood typed before the administration of any blood products due to the presence of naturally occurring alloantibodies. It is also strongly recommended all feline recipients be cross-matched to a compatible unit before any transfusion.

Infusion

Be sure that the transfusion is NOT administered in conjunction with any other IV fluids. Thoroughly flush a catheter containing other fluids/medication before use with blood products (Ca and other additives in IV fluids can have adverse effects on the donor's red blood cells).

1. Roll the dial to close the clamp on the administration filter. Attach extension sets, if necessary.
2. Spike the unit of red blood cells with the filter. Squeeze the filter chamber and allow the chamber to fill ½ way with blood. Unclamp the line and gradually flush the blood until it reaches the recipient. Red blood cell products can only be used with pumps certified for use with blood. If using a pump run the *extension set* through the pump.

Initial Transfusion Rate = 1ml/kg/hr (for at least the first 30 minutes)

3. Obtain a TPR on the recipient every 15 minutes for at least the first hour of the transfusion to monitor for signs of a reaction (Rise in temp, HR, RR. Drop in BP. Hives or facial swelling).
4. Gradually increase the rate of transfusion to as fast as the recipient can safely tolerate so that the entire transfusion is administered within 4 hrs (to prevent any bacterial contamination).
5. When transfusion is finished, flush the remaining blood product in the extension sets with 10mls of sterile saline.

Side Effects

In felines, mismatch of blood types can lead to immediate immune mediated transfusion reactions and have been proven fatal *even for first-time transfusions*. Blood typing should **always** be performed before the administration of any blood products. Circulatory overload is the most common adverse side affect to transfusion administration, but can be avoided by following the proper dosage and recognizing any underlying disease processes that may be present in the recipient.

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Feline Transfusion Record

Patient Name _____ Patient ID# _____ Date _____

Blood Type: **A** **B** **AB** **Crossmatched?** Yes No

Type of Product Delivered

[ ] Packed Red Blood Cells [ ] Fresh Whole Blood [ ] Matched Unit

[ ] Fresh Frozen Plasma [ ] Frozen Plasma

Unit ID# _____ **Unit Split?** Yes No

Blood Type: **A** **B** **Patient's WT.** _____

Exp. Date _____ **Duration of Transf.** _____

Tech Initials _____ **Vol. Delivered** _____

Change in current fluid therapy?

_____

_____

Start Time _____ **End Time** _____

Hour	Time	Rate (ml/hr)	Temp (˚F)	HR (bpm)	RR (bpm)
0 min					
15 min					
30 min					
45 min					
1 hour					
2 hour					
3 hour					
4 hour					

Reaction?

Time _____

Clinical Signs _____

TX _____

Outcome _____

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How to Perform a Major Crossmatch

A major crossmatch is utilized to avoid immune mediated transfusion reactions. The crossmatch does not take the place of blood typing, however, it does allow you to pre-screen for antibody that the recipient may have in his/her body that will lyse the donor red blood cells. It is especially important to crossmatch cats as they possess natural antibodies to other red blood cell types. You should also crossmatch any canine that has a previous transfusion or pregnancy.

This procedure takes approximately 40 minutes to perform.

1. Collect 1ml of SERUM from the recipient.
2. Obtain 2mls of donor red blood cells (from an aliquot provided by the donor bag or an EDTA preserved sample).
3. Place the donor red blood cells in an empty red top tube (or sterile tube) and centrifuge for 2 minutes at regular blood tube setting (3400rpm).
4. Using a clean pipette, pull off and discard the donor serum from the red blood cells.
5. Wash the donor's red blood cells by adding 3mls of 0.9% NaCl to the tube, resuspending the cells and then centrifuging again for 1 minute at 3400 rpm.
6. After centrifuging, pull off and discard the supernatant with a clean pipette and repeat STEP 5 two more times.
7. Prepare a 4% red blood cell suspension by adding 4.8mls 0.9% NaCl to 0.2mls of the washed donor's red blood cells in a clean red top tube and label it with the donor's ID #.
8. Place 2 drops of the recipient serum and 1 drop of the 4% donor red blood cells in a clean red top tube.
9. Make a control tube by placing 2 drops of 0.9% NaCl and 1 drop of donor's red blood cells in a separate red top tube.
10. Both the control tube and the crossmatching tube should be incubated for 15 minutes in a warm water bath (37 C), but can be incubated for 25 minutes at room temp (25 C).
11. After incubating, centrifuge both tubes for 1 minute.
12. Observe for any agglutination or hemolysis in the tubes. If agglutination or hemolysis is noted, it is a POSITIVE crossmatch and that donor is not compatible with the recipient.

NOTE: 1 drop of the donor/recipient mixture may be placed on a slide and viewed under a microscope for complete determination of agglutination.

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Canine Transfusion Record

Patient Name _____ Patient ID# _____ Date _____

Blood Type: Negative Positive Not Typed **Crossmatched?** Yes No

Type of Product Delivered

[ ] Packed Red Blood Cells [ ] Fresh Whole Blood [ ] Matched Unit

[ ] Fresh Frozen Plasma [ ] Frozen Plasma [ ] Cryoprecipitate

[ ] Albumin [ ] Cryo-Poor Plasma [ ] Platelet Concentrate

Unit ID# _____ **Unit Split?** Yes No

Blood Type _____ **Patient's WT.**_____

Exp. Date _____ **Duration of Transf.**_____

Tech Initials _____ **Vol. Delivered** _____

Change in current fluid therapy?

_____

_____

Start Time _____ **End Time**_____

Hour	Time	Rate (ml/hr)	Temp (˚F)	HR (bpm)	RR (bpm)
0 min					
15 min					
30 min					
45 min					
1 hour					
2 hour					
3 hour					
4 hour					

Reaction?

Time _____

Clinical Signs_____

TX _____

Outcome _____