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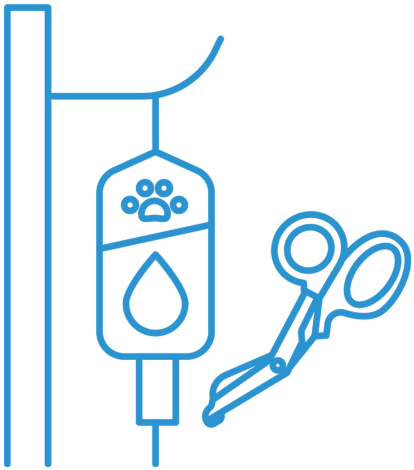

Transfusion Medicine for Veterinary Techs

DRIP 2

May 10, 2022

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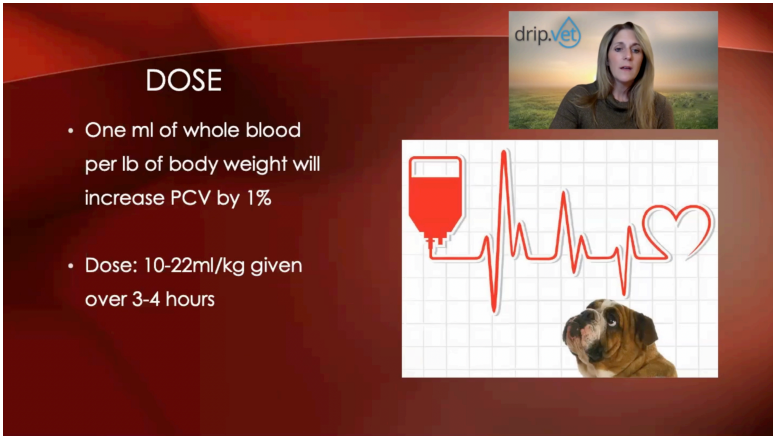
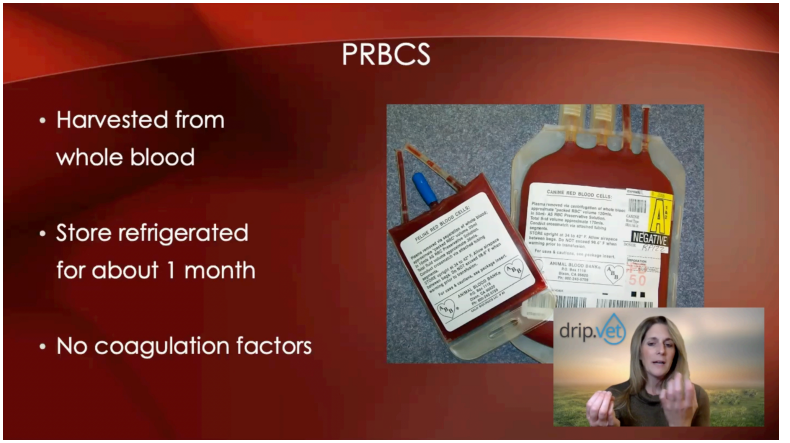
So whole blood is the only red blood cell product that retains most of its clotting factors for up to 24 hours. So if your patient was struggling with coagulation issues and was anemic, then whole blood is the preferred choice. There is really nothing that contains platelets, except for platelet-rich plasma, and that is a very expensive product that you have to special order from a blood bank. It's not something that we can just get. It takes a long time to harvest those platelets, and so really in whole blood, it's considered that platelets are pretty nonexistent.

After 24 hours, it does lose the labile coagulation factors, and that's factors V and factor VIII. You can store it refrigerated in depending on the anticoagulant used for about 21 to 42 days.

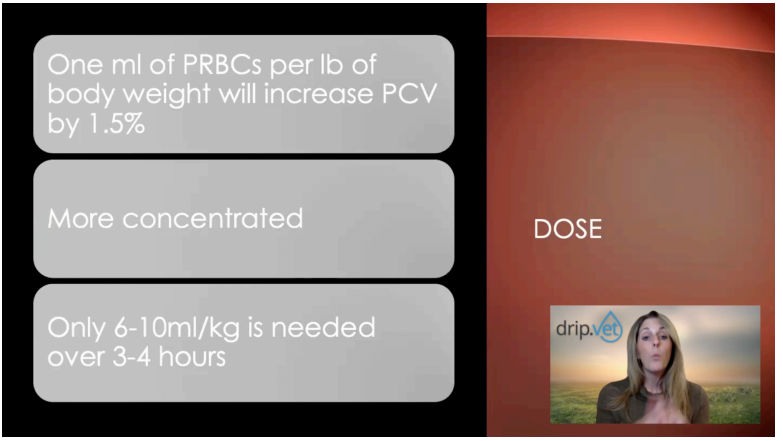


The dose of it, about 1 milliliter of whole blood per pound of body weight will increase PCV by 1%. 10 to 22 mls per given-- mls per kilogram is given about over three to four hours. Some of you are thinking, can you bolus blood? We're going to get to that. Don't you worry we'll discuss that.

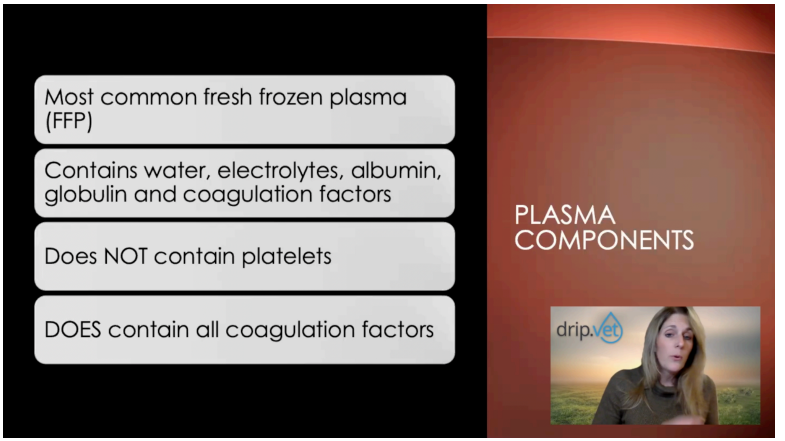


So packed blood cells, these are harvested now from whole blood. There is no coagulation factor. So this is the difference from our whole blood. Whole blood contains packed red blood cells and coagulation factors.

Packed red blood cells are just what it says. They're packed red blood cells. You can store it refrigerated for about a month.

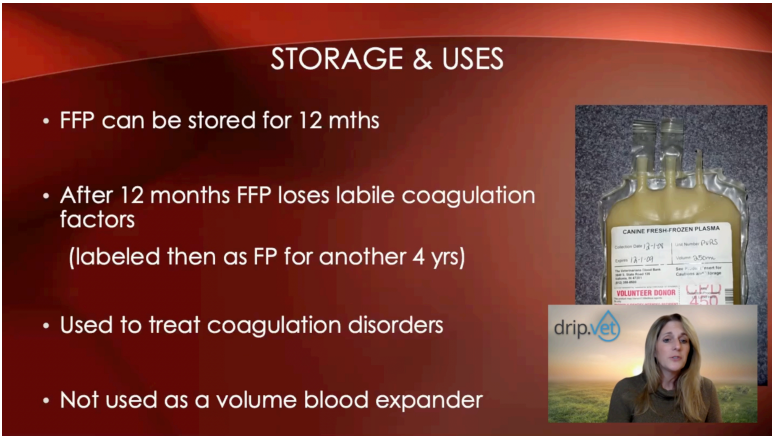


1 ml of packed red blood cells per pound of body weight will increase PCV by 1.5%. So you get extra 0.5% because you use a packed concentrated of the thing. It's more concentrated, and therefore the doses weigh less. You only need 6 to 10 mls per kilogram needed for that three to four hours.



We are going to talk very quickly a little bit about plasma components because I think that's important. When we think about blood, obviously plasma is there as well. So we don't want to ignore it.

I think a lot of people only think about whole blood or packed red blood cells, but plasma is part of blood, people. It's the most common fresh frozen-- the most common that we're going to use is fresh frozen plasma. It contains water, electrolytes, albumin, globulins, and the reason really why we're giving it is coagulation factors, no platelets, as previously mentioned. Really, nobody's got platelets. But it does contain all the coagulation factors.



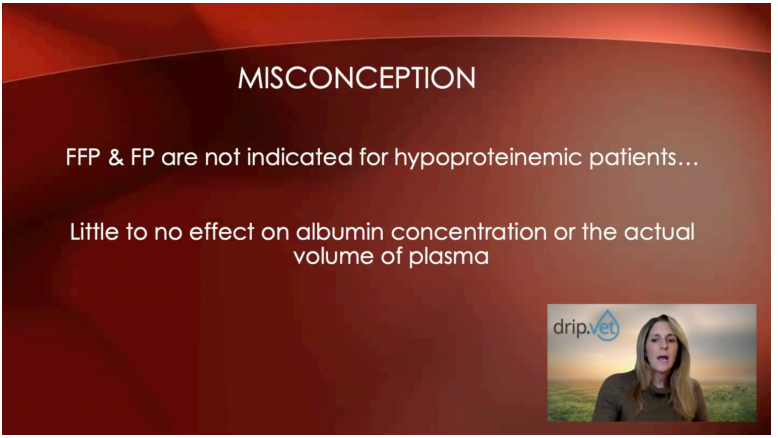
When do we want to use it? And where do we store it? How do we store it? It can be used for up to 12 months.

And after 12 months, please don't throw this product out. It just loses its labile-- the labile factors, again, factors V and VIII. And it's labeled then as frozen plasma for another four years. So you still get most of your coagulation factors.

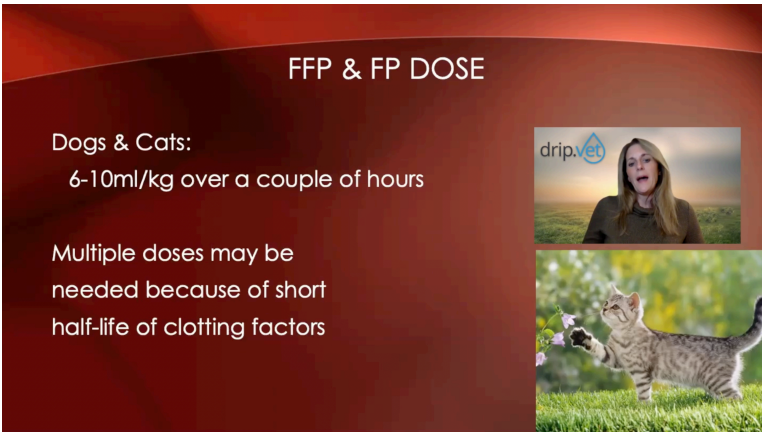
Even if it expires, just keep it in your freezer. I feel like most general practices at some point potentially would have an application to use a fresh frozen or frozen plasma. It's used to treat coagulation disorders.

So in your patients that are suffering from DIC, disseminated intravascular coagulopathy, or acute traumatic coagulopathy, which is a little bit of a difference. It's very acute stage of bleeding, then this would be the product for sure. It's not used as a volume blood expander. And so it will expand the blood to some level, but it's not going to change or shift really albumin per se because the amount of albumin that's in this product really isn't going to increase total cells or total protein.

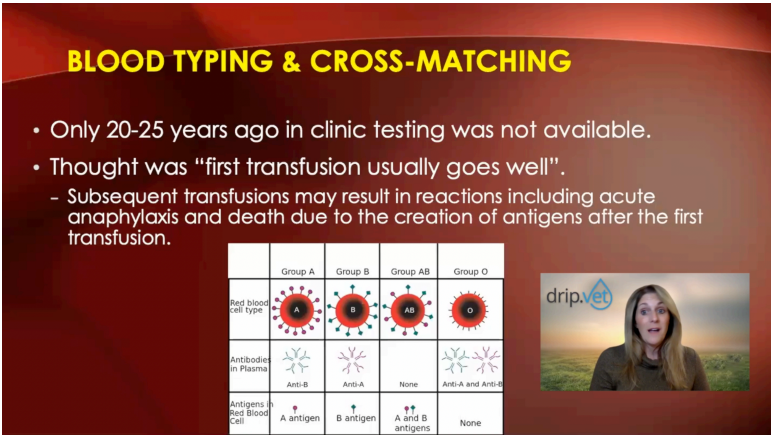
So some of the misconceptions I hear is, well, if total cells or total protein is low, we should get fresh frozen plasma to help increase that. And it's really not going to do that, again, mostly focused on coagulation factors.



Fresh frozen plasma and frozen plasma are not indicated, like I said, for hypoproteinemic patients. Little to no effect on the albumin or the actual volume of plasma.



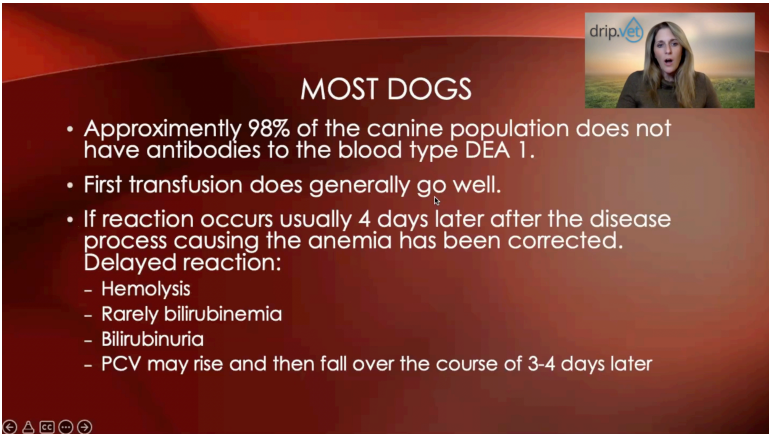
The dose, it's pretty much the same as packed red blood cells, so that 6 to 10 mls per kilogram over a couple of hours. Though, you may need to give multiple bags of this product because of the short half-life of clotting factors.



So let's talk about blood typing and cross-matching. So really, only 20 to 25 years ago in clinic testing was not available. So we just thought if the first transfusion goes well-- they haven't previously received an actual blood transfusion-- so it should just "go well."

Subsequent transfusions may result in reactions, including acute anaphylaxis and death due to the creation of antigens over the first transfusion. So again, that's the misconception. Or is it the truth?

So the way that blood transfusion medicine has evolved was there was a period of time where this truth was thought to be a myth. It's very confusing. But back in the '90s, like I said, whoever brought in their dog or their cat, we pretty much just took blood out. Put it into whatever pet patient we needed to treat, and we just went, oh, well, they didn't have a previous transfusion. They will be fine.



And so for most dogs, the first transfusion does generally go very well. It's interesting because if you were to ask me 10 years ago, I would have said there was one paper that came out that said you should not-- you should always cross-match, and you should always blood type in dogs. But now we're back to the theory that we probably don't have to worry about that.

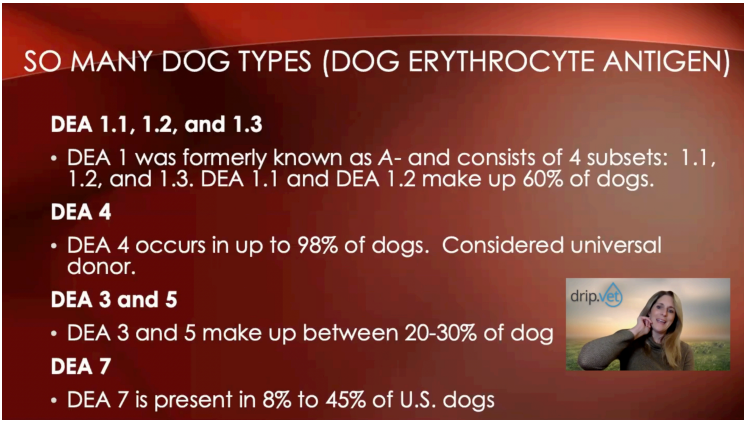
So here's the data and the research behind it. About 98% of canine population does not have antibodies to the blood type DEA 1. So therefore, as long as you transfused with DEA 1, 98% of the canine population will be fine.

And if they have a reaction, it's usually about four days later after the disease process causing the anemia has been corrected. And so we can see delayed reactions in terms of hemolysis. Rarely, but sometimes, we can see bilirubinemia, bilirubinuria.

And some of you who have seen this, you don't even know. But that is a reaction, and you've seen this. This is where the PCV-- let's just say, OK, 32% in a dog.

We go ahead, and we give it first transfusion. It jacks its PVC up to 44%. This dog's feeling great. And then approximately two or three days later, you're like, is that dog urinating blood? It's like this weird brown, rusty color.

And then the next thing you know its PCV is now 33%. That is because it hemolyzed its entire blood transfusion. And now, it's hopefully the underlying disease process is being corrected. It's just going to take a little bit for it to make enough for a blood cells to get back on track. So a lot of those patients we just monitor them, but there are post-delayed reactions in some of these dogs.



There's a lot of different types. So we have DEA 1.1, 1.2, and 1.3. DEA 1 was formerly known as A negative. So if you're really old school, you knew of-- you knew of it being DEA A negative blood in dogs. We don't call them anymore. It's now DEA 1.

And so it consists of these four subsets. DEA 1.1 and 1.2 make up 60% of our canine population. And this is pretty much worldwide. So it's not just in the States. Universally across the world, 60% of our dogs is DEA 1.1 and 1.2.

There's also DEA 4, and that occurs in about 98% of our dogs. It's considered a universal donor. And then we also have about DEA 3 and 5. That makes up about 20% to 35%-- 30% of the dogs.

And then DEA 7, it's present-- depending on the study that you look at, it's only 8% of the dogs or 45% of the US dogs. That's a weird one because studies really vary on that.