

# Case Discussion of Parvoviral Gastroenteritis

## Emphasis on Fluid Administration

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### Dr. Wood:

I had a 35# mixed breed puppy show up on my doorstep one busy Monday morning. He went to the Veterinary Emergency and Critical Care Hospital in OKC, OK Sunday for treatment for a moderately severe to severe case of parvoviral gastroenteritis. The owner literally dropped the pup off and had to run to work. I noticed he was in the “sitting dog” position and had very labored, wet breathing. Even though he was obviously exhausted, he would not lie down. He knew he would drown if he did. I didn’t have time to check him right away, so I had one of my assistants give him an ampule of Sports Blend. Within a few minutes, he was able to assume sternal recumbancy and get some much needed sleep. He had had an extremely nasty bout of bloody diarrhea in the owner’s car on the way to my clinic.

Later in the morning, when I had a chance to examine and treat him, I gave him antibiotics, dexamethasone, and Reglan injections. He was still so “wet”, I didn’t give him any more fluids that day. Subsequently, I only had to give about 200cc of LR Solution SQ daily for 2 more days. He had 2 more small bloody bowel movements that morning, and then the diarrhea stopped. He recovered uneventfully and went home 2 days after admission.

This case was a moderately severe to severe case of parvo. Some cases I see are not as bad and some are worse, but this case is very representative of the parvo cases I see. I did send the puppy home with more Sports Blend and a probiotic/enzyme preparation.

### Discussion:

I have related in earlier papers the dangers of overhydration with crystalloid IV fluids and the search for the perfect IV fluid. What I want to explore is a deeper understanding of what happened in the above case. Please understand I have talked to Dr. Kubat, owner of VEEC Animal Hospital, and thanked him for his care of the puppy. I know he rendered very high quality care and I was very grateful he was there to treat the puppy when he was very sick.

The reason the puppy’s lungs were so “wet” is obvious once one thinks about it. (I need to thank Dr. Crowe for this information.) Capillaries in the lungs are much more permeable than capillaries in muscle and fat. This means the interstitial fluid in the lungs

has a much higher concentration of albumin. Therefore, this will exert a very strong osmotic pull for any IV fluids.

This puppy also had the classic symptoms of severe bloody diarrhea. This is pretty easy to understand if we consider the extreme concentration of toxins present in the gut lumen as well as the amount and severity of destruction of the gut mucosa. This explains the very strong osmotic pull for the IV fluids that are given. (Saline enemas to evacuate toxic gut contents and mucosa are obviously a really good thing to do.)

Therefore, with traditional IV fluid therapy, we should not be surprised with the “wet” lungs and the severe diarrhea long attributed to the disease instead of the treatment.

Cerebral edema is not considered a significant problem associated with parvo. I think it should be considered, especially since most parvo treatments involve the IV infusion of large amounts of crystalloid fluids. In essence, this administration mimics what happens in cases of hyponatremia. All the IV fluids flood the interstitial fluid bin and this can cause solute depletion of brain cells, dangerous IS swelling, and dangerous electrical charges from this pressure on the collagen in the cells.

If the lungs are wet and the pet has diarrhea, this means the IV fluid bin is engorged with fluid. This means the heart is being overworked, making an already bad situation worse.

Traditionally, veterinarians focused on using the correct IV fluid to try and correct the dehydration associated with this disease. Hetastarch was used to try and keep the fluid in the IV bin. Unfortunately, it is crystalloid as well as a colloid, so it doesn't stay in the IV fluid bin as was hoped. Albumin has the same problem. The SAFE study proved there is no significant difference between saline and albumin, just the amount given with overhydration being the biggest problem.

What I want to point out is we need to understand what is happening with parvo cases that present to us. Fluids, whether endogenous or exogenous go to areas of high osmotic concentration. This is where I am proposing a paradigm shift in how we treat dehydration associated with the disease. Sports Blend, a mixture of 11 angstrom sized minerals with a negative charge, is absorbed by the body's cells within 15 seconds of oral administration. Thus, we increase the solute concentration within the cell and this osmotically draws fluids into the cell. This removes the high IV and IS fluid bin pressures, reduces electrical charges, dries out wet lungs, reduces diarrhea, and reduces any cerebral edema. Instead of trying to find the perfect IV fluid, as has been the case for years, I propose we use whatever fluid one is comfortable with, and use Sports Blend to direct that fluid where to go.

In summary, this reminds me of a client who asked me why I always put alcohol on a vein before I performed venipuncture. I told him it made the vein stand up, thus making the vein easier to hit. He asked me if I was sure, and I assured him I was. I've had to make venipunctures without alcohol, and it is much more difficult to do. He then asked me if I was sure the alcohol made the vein stand up, or was it possible it didn't affect the

vein at all and just shrunk the skin, thus making the vein stand up. I have to say I still don't know which way that works, but it is one of the many events in my practice life that has challenged me to look at problems from a different perspective. Hydration of parvo cases is very similar to this. We always gave lots of crystalloid fluids IV because it corrected the dehydration. We also thought any problems we saw could be corrected if we could just find the perfect IV fluid. In fact, what we were doing was looking at the proper hydration of parvo cases from the wrong perspective. We need to be more concerned about managing the fluid shifts within the 3 fluid bins more than arguing about what fluid should be used. Sports Blend, with the unique ability to place essential electrolytes within the cell, gives us the ability to direct where the fluids should go.

**Dr. Crowe:**

I had a 5-month male Lhasa Apso puppy with severe parvoviral gastroenteritis that presented in cardiac arrest i.e. white mucous membranes, no heart beat by auscultation and no pulses on palpation, unconscious but taking a few agonal gasps....we began with noninvasive ventilation (with a bag-valve-mask attached to an oxygen supply line and reservoir) and began giving some good breaths, then interrogated the pup for any vascular pulsatile flow and found some (the Doppler probe was placed on the pup's eye and the optic vessel flow was detected) thus I knew we had a chance... did a rapid cut-down on a cephalic vein that was not distending with occlusion pressure (sign of very poor venous return) using a curved mosquito hemostat placed under the vein and then pulling it caudally the 20 g IV catheter was able to be threaded into the vein. 2.5 ml per kg of hetastarch and 2.5 ml of hypertonic saline (6.5%) was administered and some mild chest compressions were performed to assist the feeble cardiac contractions. Within a minute or two the flows in the ocular Doppler were getting stronger and the dog began breathing on his own...and we gave a second round of each of these (hetastarch and hypertonic saline) was given. A blood sample was taken to determine glucose, PCV/TS, electrolytes, and serum chemistries. A nasal pharyngeal oxygen catheter was placed as well as nasogastric decompression and feeding tube was placed. Hetastarch was continued at 2-4 ml/kg / hr as level of consciousness, membrane color, pulse rate and quality, jugular vein distension quality and time and Doppler blood flow were assessed to determine resuscitation end-point. Then hetastarch was continued at 1 ml/kg/hr and the same parameters listed prior were used to assess vascular volume and avoid under or over treating with the intravenous fluids (Normosol and hetastarch). A saline enema was done using a warm bag of IV saline early on after the IV fluids were started. The saline was administered into the proximal descending colon using a feeding tube until the flow out of the rectum was clear. This took approximately 2/3 of a liter. The nasogastric tube was aspirated and approx 150 ml of green-pea soup stomach fluid was aspirated. The patients' glucose was found to be 35 so 20 ml of 25% glucose was given and the hetastarch bag was spiked with 50% glucose to make the fluid have a 5% glucose concentration. The enemas were repeated three time a day the first 2 days to remove all the fowl smelling liquid like stool containing bits of mucosa and blood with the enema continuing until the effluent was again clear. It was noted that although this did make the dogs uncomfortable I did give hydromorphone and a small amount of acepromazine (to increase GI blood flow and help with discomfort). I treated the dog with Photonic

Therapy to support his immune system, provide comfort, and decrease edema (uses 660 nm light to stimulate the acupuncture points). The dog received approximately 1200 to 1400 of hetastarch and Normosol R each of the first three days along with liquid enteral “trickle” feeding of 10% glucose and electrolyte solution (0.1 ml/kg/hour during the day with gradual increases being done as it appeared he was able to tolerate the feeding with much vomiting. Residual volumes from the stomach were removed every 4 hours (roughly) until there was not much. A unit of plasma was given over 12 hours to help correct the hypoalbuminemia. Cefazolin was used as a broad-spectrum antibiotic. For 4 days the dog received the enemas, the fluids, the liquid nutritional support, etc. and began eating on the fourth day of admission. He was discharged well and continued to gain strength. He made a complete recovery

### **Discussion:**

This case emphasizes the following (in my opinion)

- 1: Do not “give up” initially even when eyes are fixed and dilated as they were in this puppy if they are taking a gasp once in awhile;
2. Use ocular Doppler to assess cardiac function and flow in pulseless non-breathing, unconscious animals;
3. Use a cut-down rapidly whenever there is complete collapse of the vessels as vascular access is key and in my experience cannot be accomplished without it;
4. Use hetastarch and hypertonic saline as a rapid volume expander;
5. Monitor blood glucose in the pediatric –septic animal as soon as possible after admission to detect and treat the hypoglycemia that is so prevalent in the critical parvovirus puppy;
6. Use saline enemas to unload the distal GI tract of toxic fecal material early in the course of treatment to prevent its being able to be absorbed as reperfusion occurs;
7. Use early enteral nutrition and delivery of oral electrolytes and glucose and intermittent gastric decompression
8. Continue the use of hetastarch and plasma as needed to keep the plasma protein levels above 1.5 mg/dl;
9. Consider use of Photonic (light) and other forms of electromagnetic energy for support of the cardiovascular, immunological and gastrointestinal and hepatic tissues;
10. Use laboratory analysis of PCV/TS, glucose, electrolytes, common chemistries, CBC, and lactate or venous blood gases (pvO<sub>2</sub>) levels as well as level of consciousness, membrane color, pulse rate and quality, jugular vein distension quality and time and

Doppler blood flow to determine resuscitation end-points and continue to monitor frequently to avoid under or over treating with intravenous fluids and plasma. In some cases these cases will have to be treated by the owners at home in the evenings (or as an outpatient in cases of financial need) and I have seen this be successful with dedicated owners. Subcutaneous fluids and oral electrolytes and glucose have been used very successfully in many cases once the initial crisis is managed. The saline enemas, although is a simple idea, has worked very well for me and I highly recommended its use as well as the use of the electrolyte supplement that Dr. Wood discusses above.