

# ***Info shared by Pitbull SA.***

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## ***The fecal parvo Elisa test.***

The IDEXX snap test kit for Parvovirus, one of the most popular ELISA kits



The ELISA test has become the most common test for parvovirus in puppies.

ELISA stands for Enzyme Linked ImmunoSorbant Assay.

This sounds complicated and high tech but is actually the same type of technology that home pregnancy test kits use.

The Parvo ELISA test is also a kit and is performed in the vet's office in about 15 minutes or less.

There are many different brands and testing is very sensitive in its ability to detect the actual presence of the virus in stool.

The test has some limitations that are important to realize.

Recent vaccination with a live vaccine (the type of vaccine that is most effective) may interfere with the test results.

This means that the test may detect the live virus from the vaccine and show a positive reading when, in fact, the puppy does not have a parvo infection.

Classically, this interference occurs 5-12 days after vaccination so if a positive fecal ELISA test is obtained within this period after vaccination, additional tests may be recommended.

Further, the puppy could be infected but no longer shedding virus in its stool.

Or the virus particles may be so thoroughly coated with antibodies that they cannot react with the chemicals of the test.

In almost all cases, one can trust a negative ELISA reading but it is important to realize that no test is perfect.

### **The drop in white blood count.**

*Technologist prepares hematology slides for cell review.*



Recall that one of the first actions of the canine parvovirus is to inhibit white blood cell division in the bone marrow.

The virus essentially turns the immune system off before making its deadly way to the GI tract.

This is a feature of parvoviruses in all species which means that a characteristic drop in white blood cell count is seen on a blood panel. This characteristic finding is especially helpful in the diagnosis of a recently vaccinated puppy as the ELISA test maybe positive from the vaccine but if the white count is normal, the puppy is probably not infected.

The white blood cell count is commonly monitored in the treatment of a parvovirus case.

If the puppy is not presented to the veterinarian until later in its disease course, it is possible to miss the white cell drop and not correctly make the diagnosis.

Similarly, a puppy presented early in the course of infection may not yet have the white cell drop and sequential tests may be needed to confirm diagnosis.

### **Antobody titers.**



*Serum is prepared  
for lab testing*

There are two types of antibody titer that can be run: IgG and IgM. With the advent of ELISA testing, titers are not frequently used in making this diagnosis.

The IgG titer is a more long lasting antibody level.

A high IgG titer would probably indicate active infection in a puppy that is old enough to generate antibodies and who has not yet received any vaccinations.

Most of the time, the IgG titer simply reflects antibodies generated by vaccination.

The IgM titer reflects recent antibody production so if a vaccinated puppy had not been vaccinated recently, a high IgM titer might indicate active infection.

Because parvovirus infected puppies have frequently received vaccinations in their recent past and are frequently too young to generate their own antibodies (which is how vaccinated puppies get infected in the first place), these test results are difficult to interpret. It is easy to see why the ELISA test that directly detects presence of the virus has become so popular.

### **Biopsy.**

Parvovirus lesions in the GI tract are of a classical appearance.

There is no mistaking them under the microscope.

Unfortunately, tissue samples of the GI tract are not readily available and most infected puppies are not good surgical candidates.

Still, if a puppy has died and the cause is unclear, submitting samples of the GI tract can generally confirm or rule out a parvovirus diagnosis provided the tissue has not degenerated.

It is also important to realize that puppies with parvovirus infection may have concurrent intestinal parasites or even swallowed foreign bodies.

There will be complicating conditions that must be monitored.

This means that other tests will be required during the management of the parvo patient.

The above tests are simply those that can be used to confirm the parvovirus diagnosis.

### **Treatment.**

No magic pill, liquids or injection exists to treat parvovirus - no effective antiviral drugs and survival must rely on the patient's immune system for cure.

Once your puppy has been diagnosed with Parvovirus, the veterinarian will make the puppy as comfortable as possible. Be prepared for a 5 – 7 day treatment and intensive care to treat this infection.

**2. Intravenous fluid therapy** - Intravenous administration of is preferred.

This is crucial for the puppy to survive and to replace the vast fluid losses (from vomiting and diarrhoea) with intravenous fluids and is probably the single most important treatment.

The infection centres on supportive care and continuous administration of a balanced solution of electrolytes with added potassium and Dextrose (sugar) because the stress of the disease may lower blood sugar especially in a very small puppy.

**3. Antibiotics** - The second way parvovirus kills is through bacterial invasion of the circulatory system (“sepsis.”)

Antibiotic therapy is usually given to help control secondary bacterial infections.

In those dogs that have severe symptoms, antiserum against endotoxins may be given.

The intestine is normally full of bacteria and when the parvovirus ulcerates the intestine there is little to prevent the bacteria from marching easily into the bloodstream.

With the GI tract damaged, then antibiotics cannot be given orally.

Antibiotics are given either as injectable – Metronidazole, or are added into the IV fluid bag.

Or injectable Metronidazole.

There is a number of antibiotics which may be selected.

Some antibiotics you may see in use include – Cefazolin Gentamicin – Amikacin -Baytril / Tivrtrin –Ampicillin/pennilA -Trimethoprim-sulfa. Cefazolin as a basic choice.

For more information on this drug you may wish to read the Pharmacy Center section on its sister drug:

### **Cephalexin.**

Clinical problems that come up in the course of the infection are addressed individually with the goal of keeping the patient alive long enough for a generated immune response from the dog itself. Beyond these basics are some added plusses, which may or may not contribute to the chance for survival.

In order to achieve survival rate the basics principals must be addressed.

In less severe cases, subcutaneous or oral fluids may be used.

In severe cases, blood transfusions may also be necessary.

Corticosteroids may be given if the animal is in shock.

Severe vomiting cases - anti-nausea drugs to slow the vomiting may also be used.

### **Possible blood transfusions.**

**Control of nausea** - Patient comfort is a very important part of treatment for any disease but is especially important for Parvovirus treatment as these puppies feel extremely nauseated.

Again, the GI tract is too damaged for oral medication so medications are given as injections. There are several popular medications for nausea control:

**Metoclopramide/ Loperamide** : (best given as a continuous drip in the IV fluid set up.)

If used as separate injections, relief tends to be short lasting and does not provide "around the clock" control.

If a continuous drip is used, nausea control lasts as long as the drip is running.

**Chlorpromazine:**

a very strong nausea control medication which lasts 6-8 hours per injection and has the added benefit of a drowsiness side effect (so patients can sleep through most of this uncomfortable time).

**Ondansetron and dolasetron:**

These injectable medications are especially strong anti-nauseal medications.

In the past, expense has made these medications uncommon but recent generics have made them readily available.

Ondansetron is given 2-3 times daily while dolasetron is given only once daily.

**Maropitant** (brand name: Cerenia®): This powerful anti-nauseal has not been adequately tested in puppies under 16 weeks of age.

For older puppies, this should be an excellent choice to improve patient comfort.

It is given once daily.

**Gastroprotectants** - medication help heal ulcers and help minimize their formation.

The vomiting typical of Parvovirus infection is not only uncomfortable but can ulcerate the esophagus.

The disease itself ulcerates the stomach and small intestine.

These medications include the injectable antacids – Cimetidine - Ranitidine, or Famotidine as well as Sucralfate, which forms webbing over ulcers to facilitate healing.

**Momotoring** - The following tests are helpful in adjusting parvovirus treatment:

Internal parasites – Rule out worms/parasites by fecal flotation.

The last thing these patients need is a parasite burden contributing to their nausea and diarrhoea.

Since parvovirus victims are puppies and puppies are high risk for parasitism, it is important to test for worms and microbes that can contribute to the GI upset and eliminate them if present.

White blood cell counts -complete blood counts.

One of the first acts of the parvovirus is to shut down the bone marrow production of immunologic cells (the white blood cells). White blood cell counts are often monitored as the infection is followed.

The white blood cell count bottoms out at the height of the viral infection and recovers as the patient's immune system gains the upper hand.

Urine specific gravity/Azosticks.

In order to assess the effectiveness of the fluid therapy, some objective evaluation of dehydration is useful.

If adequate IV fluids have been provided then the urine produced will be dilute (as measured by "specific gravity") and azosticks measures of protein metabolites (which build up in the blood stream) should be at normal levels.

Abdominal Palpation - Abnormal motility of the intestines occurs with this infection.

Sometimes an area of intestine actually "telescopes" inside an adjacent area in a process called "intussusception."

This is a disastrous occurrence as intussusception can only be treated surgically and Parvovirus puppies are in no shape for surgery.

Euthanasia is usually elected in this event.

Plasma transfusions.

Plasma is the protein-rich fluid that remains when the red blood cells are removed from a sample of blood.



These proteins may include antibodies against the Parvovirus, albumin to help expand the patient's blood volume, as well as other healing proteins.

Plasma can be obtained from donor dogs in the hospital or can be purchased from animal blood banks.

Total blood protein monitoring - Protein depletion is common when there is heavy

diarrhoea.

If blood proteins drop, too low, special IV fluids or even plasma transfusions are needed to prevent massive life-threatening edema.

### **TAMIFLU® (OSELTAMIVIR).**

While this particular addition to the parvo treatment plan has not universally caught on everywhere, news of its efficacy has spread far and wide.

This oral medication is typically given for five days starting as soon as the diagnosis is made.

It interferes with the reproduction of the parvovirus so that the patient's immune system essentially has fewer enemy soldiers to combat.

This medication is helpful in the treatment of parvo patients plus can prevent development of the disease when given to exposed puppies. The key is to begin this treatment before the virus has had a chance to maximize its numbers;

If treatment is started later in the infection, there may be so many viral particles present that little benefit can be realized.

**Cefovecin** - a single injection of which lasts 2 weeks.

This product has not been adequately tested in puppies under age 16 weeks but may find a place in the treatment of older puppies.

The best antibiotic coverage controls both gram negative and gram

positive organisms, both aerobic and anaerobic organisms and does so with minimal side effects.

The use of Cefoxitin (brand name Mefoxitin<sup>®</sup>) does an excellent job of covering for the organisms of concern without the kidney side effects of gentamicin or amikacin and without the cartilage side effects of [Baytril](#)

### **SEPTI-SERUM**

This product represents anti-serum (antibodies extracted from horses) which binds the toxins of any invading GI tract bacteria.

The use of this product is controversial though the veterinary teaching hospital at Auburn University uses it commonly.

It is usually given only one time as the equine origin of the product has potential for serious immunological reactions,

### **ANTI-INFLAMMATORY DRUGS.**

There have been many studies indicating the benefits of single doses of these medications in the prevention of septic shock.

Repeated doses may cause further GI ulceration (which is obviously something a Parvovirus puppy has enough of).

The usual medication is Flunixin meglumine (banamine<sup>®</sup>).

### **NEUPOGEN**

“Neupogen” (although expensive) is the brand name of a genetically engineered hormone called “granulocyte colony stimulating factor.”

This hormone is responsible for stimulating the bone marrow to produce white blood cells and its administration easily overcomes the bone marrow suppression caused by the parvovirus.

In other words, Neupogen helps the white cell count recover.

A recent study did not find increased survival with the addition of this product to the Parvovirus regimen.

### **Prognosis.**

After the intestinal symptoms begin to subside, a broad-spectrum de-worming agent is often used.

Restricting the food during periods of vomiting is also necessary and parenteral nutrition (providing nutrients intravenously) may be necessary.

The prognosis remains guarded for puppies even with the best medical care.

Any puppy **that manages to survive** parvo will have immunity to the virus for at least 20 months.

Some puppies have a lifelong immunity.

Undertaking the treatment of affected dogs and puppies without professional veterinary care is very difficult.

Even with the best available care, the mortality of severely infected animals is high.

Without the correct amount of properly balanced intravenous fluids, the chance of recovery in a severely stricken animal is very small.

### **Home treatment for Parovirus.**

A puppy with a bloody diarrhoea could have a parasite problem, a virus other than parvovirus, a stress colitis, an intestinal foreign body, or may simply have eaten something that disagreed with him. It is important to confirm the diagnosis of parvovirus before embarking on what could be the wrong treatment. Home treatment for parvo infection is a bad idea when compared to hospitalization and intensive care.

Mortality rises substantially and the heavy diarrhoea and vomiting lead to heavy viral contamination in the home.

Still, if financial concerns preclude hospitalization, home care may be the puppy's only chance.

Fluids will have to be given under the skin at home as will injectable medicines.

**After care.**

Your puppy will be finishing up a course of antibiotics and may also be on some medication for nausea or diarrhoea.

It is important that you give your puppy the medication prescribed for the full amount of time it has prescribed.

**Diet** - Your puppy is recovering from some extensive damage to his/her intestinal tract.

It is typical for stool to be a little loose at first or for no stool to be produced for a few days as the tract recovers.

The stool should gradually firm up over the first 3-5 days at home and your puppy should be active and of normal attitude.

Your puppy may be ravenously hungry after going so long without food.

Do not allow the puppy to gorge as this can result in vomiting or diarrhoea.

Feed smaller meals separated by at least an hour or two.

Do not feed table scraps. Stick to the diet recommended by your veterinarian.

A prescription diet may have been sent home or a home cooked diet may have been recommended (such as boiled chicken and white rice, or fat free cottage cheese and pasta).

It is important for your puppy's food to be easily digestible so stick to the protocol your veterinarian has recommended.

**Exercise** - Your puppy should be considered contagious to other puppies for a good month so it is important to "play it safe" by restricting trips to the park, obedience school or other neighbourhood areas.

If your puppy is less than 16 weeks of age, he/she should not be allowed in public areas until the vaccination series is fully completed.

**Other Pets** -Humans are not susceptible to canine parvovirus infection though some strains can be contagious to cats. Adult dogs that have been vaccinated are not susceptible, either.

**Puppies, however, are at risk.**

If your sick puppy was indoors only, wait at least one month before any new puppies come to your home.

If your sick puppy was outdoors, remember that it can take 7 months before the virus is eliminated from soil.

(Freezing will preserve the virus so that any time during which the ground is frozen, that time does not count in this 7 month period.)

**Bathing -**

Your puppy may be bathed any time as long as you do not allow him/her to get cold or chilled after the bath.

Bathing will reduce the amount of virus left on the puppy's fur and will help reduce contagion.

**Resuming Vaccines -**

Follow your veterinarian's recommendations.

Your puppy cannot be re-infected with this virus for at least 3 years (and probably is protected for life simply by virtue of this infection) but there are other viruses that your puppy should be protected against.

Your veterinarian will give you a vaccination schedule to adhere to for the future.

There should be no permanent ramifications due to this infection. The recovered puppy should lead a normal life once the recovery period is completed (1-2 weeks).

**Conclusion.**

In summary, parvovirus is a very common problem that is a huge killer of puppies.

Due to its ability to be transmitted through hands, clothes, and most likely rodents, birds and insects, it is virtually impossible to have a kennel or private owned dwelling that will not eventually be exposed to the disease.

Modified live vaccines are safe and effective, but despite the best vaccination protocol, all puppies will have a window of susceptibility of at least several days where they will be at risk.

In addition, the newer CPV-2c strain presents new challenges since it is less detectable in laboratory tests and current vaccines may not be as effective in providing protection against it.

Prompt treatment by a veterinarian will increase survivability in infected puppies and working with your veterinarian on a vaccination program that is best for your puppy is important.

With a better understanding of the disease and how it spreads, dog owners will be able to make good health decisions for their dogs that will help prevent and reduce the spread of this disease.

**Maintaining a clean and hygienic environment, limiting the puppy's contact with other dogs and maintaining a vaccine schedule can all help prevent a puppy from contracting the parvovirus?**

The use of high-“titer” canine parvovirus vaccines also appears to help offer the puppy some protection, even during the open window when the “titers” begin to drop in the puppy's bloodstream.

A combination of all preventative measures will help protect the puppy from the often-fatal virus.