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2. Treatment.

1. 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/ Loperamidee : (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.

Monitoring - 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.
Extra treatment which is helpful and may be considered.

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®) 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.

t 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 Parvovorus puppy has enough of).
The usual medication is Flunixin meglumine (banamine®).

NEUPOGEN.

“Neupogen” (although expense) 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.