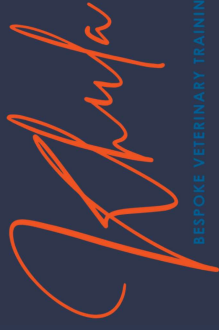


Parvovirus

Animal health technician:

CPD accreditation: AC/0542/21 (1 point)



BESPOKE VETERINARY TRAINING

R. Shufu Epidemiology

Aetiology:

- Canine Parvovirus type 2
- Part of Parvoviridae family
- Very small, non-enveloped viruses
- Highly resistant to heat and common disinfectants
- Worldwide distribution
- Virus related to feline panleukopaemia virus

Route of infection:

- Oronasal route
- Contact with infected surfaces usually by fecal matter

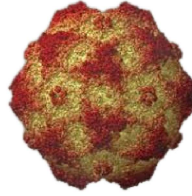
Morbidity and mortality:

determined by:

- dose of virus/viral load
- age of puppies
- stress factors
- breed (black and tan)
- concurrent infections

Affected tissue:

Rapidly dividing cells eg enterocytes in the gastrointestinal tract
Target cells: crypt cells of the small intestine



<https://microbewiki.kenyon.edu/>

Parvovirus: Overview

Also known as **Cat flu** or **katgriep** although it has nothing to do with cats!

Caused by a **virus** that affects young animals. The virus is very hardy and can survive in the environment for up to a year

5 in 1 vaccination includes vaccine against Parvo virus. Needs to be given in 3 doses 3 - 4 weeks apart to build adequate immunity.

Causes severe, usually bloody **diarrhoea** and **vomiting**. Animals lose their appetite completely, become very dehydrated and the nausea and diarrhoea is often difficult to control.

Unfortunately there is no cure and treatment includes **supportive and symptomatic treatment** until the animals own immune system fights off the virus.

Can be fatal. Treatment can take anything from 3 - 10 days and can be very **expensive**.

Prevention is better than cure. Most important thing we as veterinary staff can do in the fight against Parvo, is to encourage owners to vaccinate!



<https://www.pashudrugpractices.com/>

R. Shufu Epidemiology

Faecal shedding - begins 4-5 days after exposure (i.e before clinical symptoms)

Clinical symptoms start 6-10 days after exposure

Shedding occurs for a total of 7-10 days, usually ending by 14 days after exposure.

Animal discharged after successful treatment is a low risk of contagion to other dogs through the faeces it passes.

Cote's Clinical Veterinary Advisor, 2nd edition

How does the immune system works



<https://www.immunoprecise.com/immunology-10-1innate-and-adaptive-immunity/>

R. Shukla

How does the immune system works



<https://www.immunoprecise.com/immunology-10-1innate-and-adaptive-immunity/>

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How does the immune system works

Cell	Image	% in adults	Nucleus	Functions	Lifetime	Main targets
Macrophage*		Varies	Varies	<ul style="list-style-type: none"> Phagocytosis Antigen presentation to T cells 	Months - years	<ul style="list-style-type: none"> Various
Neutrophil		40-75%	Multi-lobed	<ul style="list-style-type: none"> Phagocytosis (discharge of contents of a cell) Release of various enzymes, factors, cytokines 	6 hours - few days	<ul style="list-style-type: none"> Bacteria Fungi
Eosinophil		1-6%	Bi-lobed	<ul style="list-style-type: none"> Degranulation 	8-12 days (circulate for 4-5 hours)	<ul style="list-style-type: none"> Parasites Various allergic tissues
Basophil		< 1%	Bi- or tri-lobed	<ul style="list-style-type: none"> Degranulation Release of histamine, enzymes, cytokines 	Lifetime highly variable - a few hours - few days	<ul style="list-style-type: none"> Various allergic tissues
Lymphocytes (T cells)		20-40%	Densely staining, eccentric	<ul style="list-style-type: none"> T helper (TH) cells (CD4+) immune response mediators Cytotoxic T cells Regulatory T cells Antibody cell destruction 	Weeks to years	<ul style="list-style-type: none"> Th cells: intracellular bacteria Regulatory T cells: virus-infected and tumour cells Cytotoxic T cells: virus-infected and tumour cells
Monocyte		2-6%	Kidney shaped	Differentiate into macrophages and dendritic cells to elicit an immune response	Hours - days	<ul style="list-style-type: none"> Various

<https://www.immunoprecise.com/immunology-10-1innate-and-adaptive-immunity/>

R. Shukla

Pathophysiology



Virus enters body through mouth and nose and begins replication in the lymphoid cells of the naso- and oropharynx

Virus spreads through blood to other lymphoid tissues (eg T and B lymphocytes) where it replicates more

Virus eventually ends up in the intestinal epithelial cells and more specifically the crypt cells of the SI

Results in:

- gut lining necrosis
- villous atrophy
- impaired nutrient absorption

Eventually leads to a disrupted gut barrier which allows bacteria to pass from gut into blood stream

Crypt cells are rapidly dividing cells (especially in younger puppies). This allows for very rapid viral replication

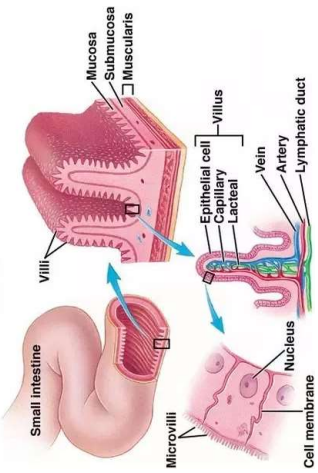
Also affects other rapidly dividing cells such as bone marrow and Lymphocytes which causes lymphocytopaenia and impairs immune system

R. Shukla

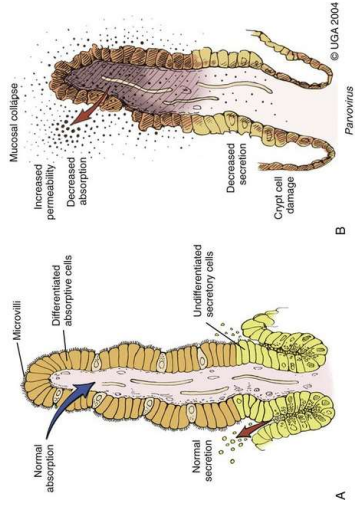
Parv

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Small Intestine



<https://www.quora.com/What-are-the-functions-of-intestinal-villi>



<https://www.quora.com/What-are-the-functions-of-intestinal-villi>

Symptoms

Initially lethargy and anorexia, which progresses to vomiting and haemorrhagic diarrhoea. About 25% of cases can have diarrhoea that is not bloody.

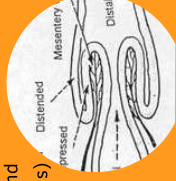


Symptoms usually starts 5 - 7 days after infection



Animals can be extremely sick when they present, if left too long and show signs of dehydration, decreased CRT, increased heart rate, hypoglycemia and hypothermia.

If the abdomen is very painful on palpation or abnormalities are felt then further investigations should be done to rule out intussusception

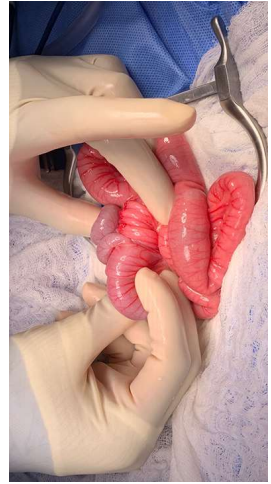


In severe cases can progress to neurological signs, ascites and subcut fluid build up and eventually death

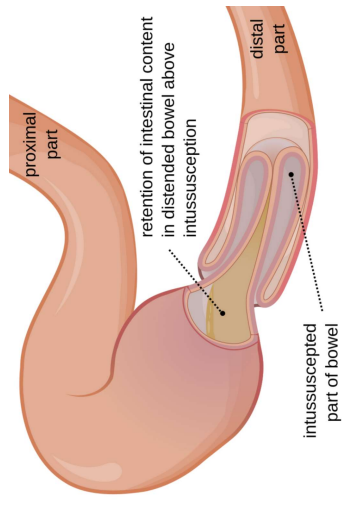
<https://www.msdvetmanual.com/intestinal-disease/parvovirus-infection-in-dogs>
<https://en.wikivet.net/>

Parv

Complication: intussusception



<https://www.fdiclinicalref.com/articles/intussusception-in-dogs>



<https://petfindu.com/diagnosing/intussusception-in-dogs-and-cats/>



Snap tests:
 Results within 10 minutes!
 Not all snap tests were created equally. Some can give false positive results if an animal has been vaccinated within 2 weeks of testing

History of being unvaccinated, incomplete vaccination or vaccinations from a questionable source

PCR:
 Serum sent to lab
 Longer turn around time - don't usually have the luxury of time when dealing with parvo cases
 More accurate than snap tests.



Due to the contagious and serious nature of the disease a snap test should always be performed if an unvaccinated puppy presents with vomiting and diarrhoea

Blood smear:
 Neutropaenia often present but not always

Diagnosis

Usually affects puppies less than a year old but can also affect unvaccinated adults

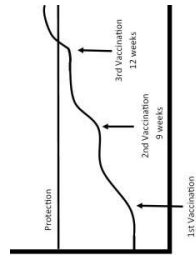
<https://www.msdvetmanual.com/intestinal-disease/parvovirus-infection-in-dogs>
<https://www.idpsx.co.za/>

Parvaxi!!!

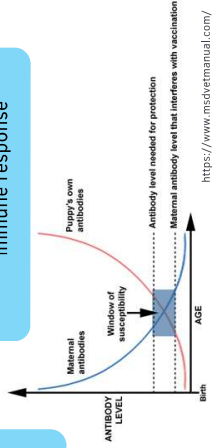
It is our duty to **EDUCATE** owners on the importance of vaccinations!

Owners should be made aware of how important the intervals between vaccinations are so that they follow the strict schedule

NB that owners know that a puppy is not protected until at least 2 weeks after their last puppy vaccination and they should not be socialised with older dogs or in public areas before that!



Why 3 vaccinations?
 • interference of maternal antibodies
 • boosters ensure adequate immune response



Biosecurity

Extremely important when it comes to parvo treatment!!!
 Need to protect all of our other patients from becoming sick

- Separate isolation ward set up:
- should be cleaned thoroughly between patients
- should contain all basic equipment necessary for treatment to prevent contaminating other wards
- A limited number of personnel should be assigned to parvo ward eg one vet and one nurse/kennel hand
- Wash hands and use foot baths when entering and exiting ward
- Ideally should wear gown, booties and gloves

- Extremely hardly so need to make sure using appropriate disinfectants at correct strengths:
- F10 : 10ml diluted in 1litre of water. F10SC: disinfectant, safe to use directly on and around animals
- F10SCXD: soap in as well to break up biological material but not safe for ingestions etc
- Soak bedding in F10SC for 15 minutes before washing
- Water and food bowls: wash with F10SCXD then spray with F10SC and allow to dry
- Wipe all surfaces with F10SCXD



https://www.msivetmanual.com/ photos://photos.vetnet.com



Parvovirus

Treatment

Treatment revolves around supportive care



Anti-nausea

Fluids



Nursing care



Probiotics and gastric protectants

Feeding



Antibiotics



Parvovirus

Treatment: Planning

Not all cases of Parvax are the same and a plan should be developed for each individual patient.

Medications can be added in or left out depending on the patients symptoms. The whole team should be on board with this plan and everything should be recorded on a hospital sheet to ensure nothing is missed

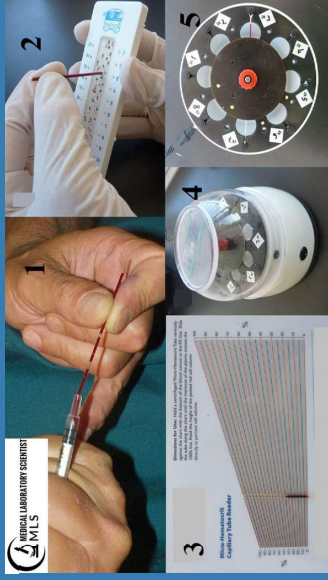
Patient Information Sheet		DATE	TIME	TYPE	DOSE	ROUTE	BY	REMARKS
NO. 1001	NAME							
NO. 1002	NAME							
NO. 1003	NAME							
NO. 1004	NAME							
NO. 1005	NAME							
NO. 1006	NAME							
NO. 1007	NAME							
NO. 1008	NAME							
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NO. 1019	NAME							
NO. 1020	NAME							

Clinical exam

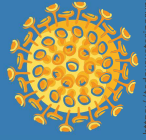
- Animals should be examined at least twice a day
- This should include a full TPR
- Abdominal palpation is NB to screen for complications such as intussusceptions
- Plan should be adjusted based on this clinical exam
- Ideally electrolytes, PCV and TP should be done daily if finances allow

Parvovirus

Treatment: monitoring



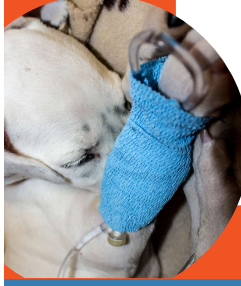
<https://medicallabsciences.com/pcv-hct-measurement/>



<https://today.veterinarynurses.com/>

Parvovirus

Treatment: Fluids



Vomiting and diarrhoea can not only quickly dehydrate a patient but can also cause serious electrolyte imbalances.

Need to rehydrate as well as replace ongoing losses

- Usually **Ringers lactate**
- Fluid rates usually relatively high: **>2x maintenance**.
 - Puppies have higher fluid needs than adults
 - continuous ongoing losses through vomiting and diarrhoea
 - decreased oral fluid and food intake due to anorexia
- **Fluid volumes** should be calculated and monitored to make sure that animals are receiving adequate amounts and drips are not getting blocked.
 - An easy way to see how much is left in a drip bag is to weigh the bag. 1000ml RL = 1000mg
- Spiked with **potassium chloride** and **dextrose**
 - ideally should run electrolytes, PCV/TP and glucose daily but not always financially feasible for owner
- **Jelcos** need to be checked daily for signs of infection and replaced at least every 3 days, alternating legs.
- If severe hypoalbuminaemia then can consider Voluven or plasma

Probably the most NB treatment!!!

<https://today.veterinarynurses.com/>

Parvovirus

Treatment: medications



Anti-nausea

- Often most challenging part of treatment is controlling the vomiting and nausea
- Often combination of anti-nausea medications needed
- **Cerenia**
 - lasts 24hours
 - aids in pain control
- **Clonpamon**
 - given as CRI in drip
 - also a prokinetic so helps gut contract
- **Stemetil**
- **Ondansetron** (if refractory nausea)

Antibiotics

- Antibiotics don't treat viruses, so we are not giving antibiotics to kill the parvo.
- Are given to treat secondary bacterial infections
- Compromised gut wall so bacteria can leak into blood and cause sepsis
- Best to give IV as oral meds can be vomited up
 - **Co-amoxycylav**
 - **Metronidazole**
 - **Amikacin** (ensure kidney function is adequate)
 - **Baytril**

Probiotics and gastric protectants

- Constant vomiting can leave stomach inflamed
- **Ulsamic** and **Omeprazole** help protect stomach lining and can have some anti-nausea properties
 - These should be given 1hour prior to feeding
 - Ulsamic can be administered down feeding tube
- Probiotics and stool binders can help replenish gut flora and firm stool, eg **Diomec**
- Deworming is also advised



Parvovirus

Treatment: Nutrition

Feeding

- Although Parvo patients tend to vomit up anything we feed them, the gut needs nutrients to help it heal
- Nasogastric or esophagostomy tubes often placed to help with feeding.
- **Royal Canin liquid recovery**
- **Liquidised Hills a/d mixed with water**

- Amount of food should be calculated
- Start by feeding 25% of requirements and work your way up to full amount over 4 days.
- kCal requirement/day = (BWx30) + 70

Example: 5kg dog being fed Hills a/d (130ml tin with 200kCal per tin) which you want to feed over 6 meals per day, Hills a/d needs to be diluted 1:1 with water to be able to syringe feed down feeding tube.

- (BWx30) + 70 = (5x30) + 70 = 220kCal/day required
- requ kCal/kCal per tin X volume of tin = 220/200 X 130ml = 143ml food required which will need to be diluted with 143ml water (286ml of mix per day)

- Day 1: 25%: 72ml over 6 meals: 12ml per meal
- Day 2: 50%: 143ml over 6 meals: 24ml per meal
- Day 3: 75%: 216ml over 6 meals: 36ml per meal
- Day 4: 100%: 286ml over 6 meals: 48ml per meal



Nursing care

- Very important to keep these puppies **washed and clean**
- Bedding needs to be replaced regularly
- Linen savers very useful
- Often hospitalised during important socialisation age so want to also give them love and attention
- Although it is difficult for many owners to see their animals like this, visiting can lift their spirits

<https://today.veterinarynurses.com/>



Parvovirus

Treatment:

Home treatment

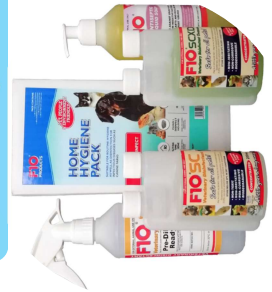
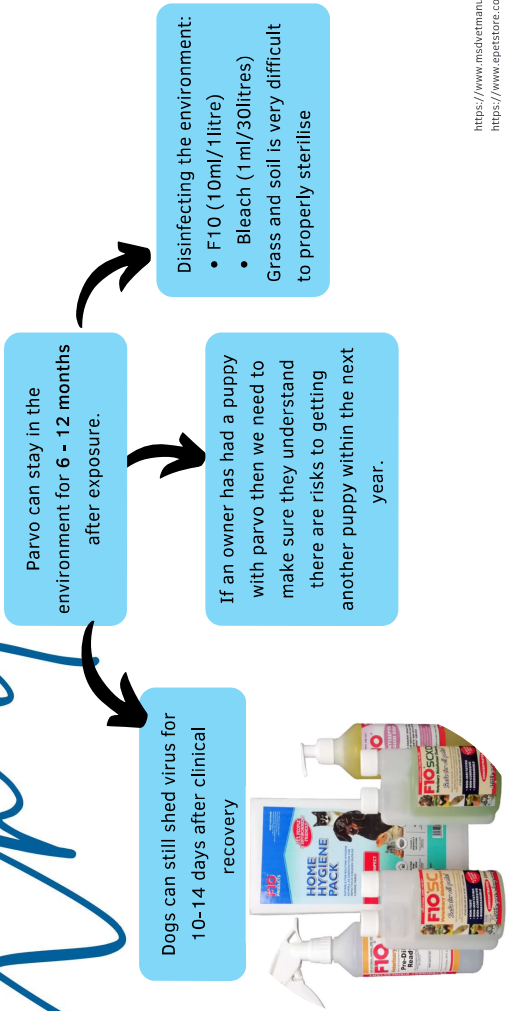


- In hospital Parvo treatment is very intensive and therefore often quite expensive. Many owners can't afford this, in which case home treatment can be considered. Owners however need to understand that the **survival rate decreases** with home care vs hospital treatment. They also need to understand that this is a commitment and someone will need to be responsible for nursing, administering medication, cleaning and feeding the puppy throughout the day.
- Unfortunately with full home treatment only **oral medications** and fluids can really be considered, which is not ideal as many of these puppies will vomit these up.
 - This would include oral antibiotics, oral anti-emetics, hourly oral electrolyte administration
- **Daily visits** to the practice can be considered where a daily injectable medications can be administered and SC or IP fluids administered. It is NB to follow biosecurity protocols in these cases. eg: owners wait in their car until called, ideally during quiet time of the day, treatments occur in parvo ward.
 - This would include subcut AB and anti-emetics that last for 24 hours

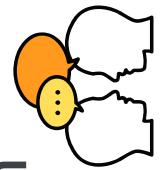
<https://todaysveterinarynurse.com/>

<https://www.msdivetmanual.com/>
<https://www.epetstore.co.za/>

Parvo Prevention



Client communication

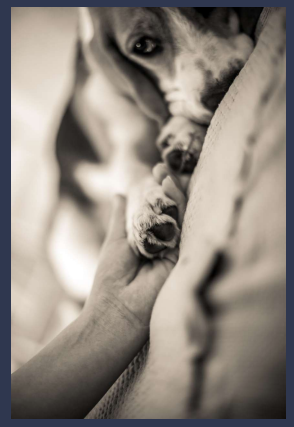


Avoid judging clients.
We know how easy it is to prevent Parvo with vaccinations so it can be extremely frustrating when clients don't follow our advice and their pets suffer the consequences.
We however need to remember that not everyone has our knowledge base and we need to educate to avoid this happening again in future.

Manage expectations.
Owner need to be aware from the get go that this is a very serious disease. Their puppy could die from it. For the best chance of survival the puppy will need intensive hospital care.
Clients should be updated daily on the condition of their puppy and their expectations should be adjusted accordingly.

Discuss finances openly.
From the get go an owner needs to be made aware of the possible worst case scenario financial implications. Owners should be updated daily on where their account is at.
We need to also work within an owners budget. If an owner makes it clear to us what their maximum limit is then we should work within that or communicate to the owner that this is unrealistic or care will be compromised.

An excellent website to learn more about Parvovirus
<https://veteriankey.com/canine-viral-enteritis/>



<https://www.msdivetmanual.com/>

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