

Parvovirus

Animal health technician:

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



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

5in1 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.pashudhanpraharee.com/>

Khula 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 panleukopaenia virus

Route of infection:

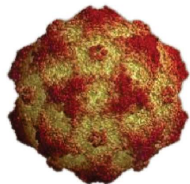
- Oronasal route
- Contact with infected surfaces usually by fecal matter

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/>

Khula 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

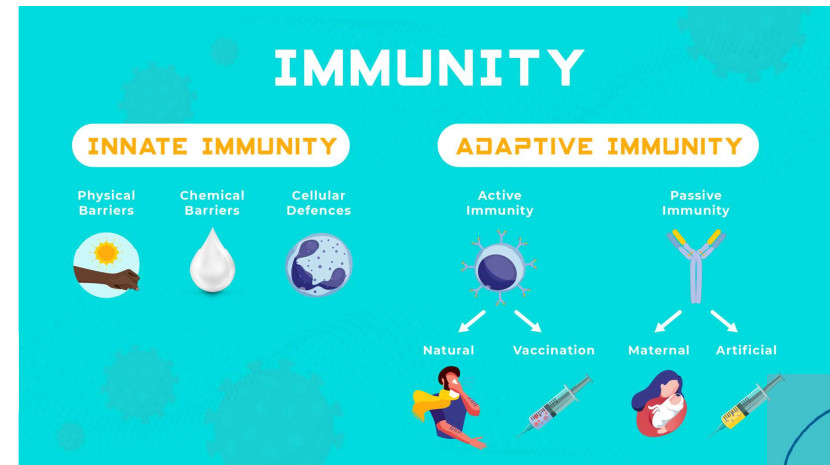
How does the immune system works

INNATE IMMUNE SYSTEM		ADAPTIVE IMMUNE SYSTEM	
RAPID RESPONSE (HOURS)	DELAYED RESPONSE (DAYS)		
NON-SPECIFIC RESPONSE TO FOREIGN MOLECULES	HIGHLY SPECIFIC RESPONSE TO ANTIGEN		
RESPONSE FIXED (NON ADAPTIVE)	RESPONSE ADAPTIVE (CHANGES OVER TIME)		
NO IMMUNOLOGICAL MEMORY	IMMUNOLOGICAL MEMORY		

<https://www.immunoprecise.com/immunology-101-innate-and-adaptive-immunity/>

Khufu

How does the immune system works



<https://www.immunoprecise.com/immunology-101-innate-and-adaptive-immunity/>

Khufu

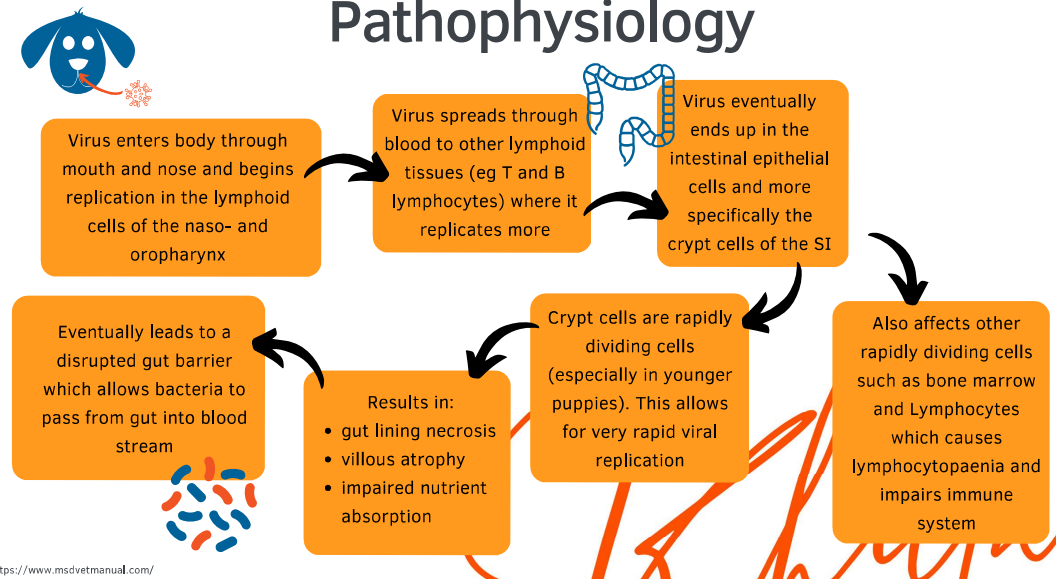
How does the immune system works

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 Degranulation (discharge of contents of a cell) 	6 hours – few days	<ul style="list-style-type: none"> Bacteria Fungi
Eosinophil		1-6%	Bi-lobed	<ul style="list-style-type: none"> Degranulation Release of enzymes, growth factors, cytokines 	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 uncertain, likely a few hours – few days	<ul style="list-style-type: none"> Various allergic tissues
Lymphocytes (T cells)		20-40%	Deeply staining, eccentric	<ul style="list-style-type: none"> T helper (Th) cells (CD4+): immune response mediators Cytotoxic T cells (CD8+): cell destruction 	Weeks to years	<ul style="list-style-type: none"> Th cells: intracellular bacteria Cytotoxic T cells: virus infected and tumour cells Natural killer 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.msdvetmanual.com/diagnostic-procedures/immunology/101-innate-and-adaptive-immunity-101-innate-and-adaptive-immunity>

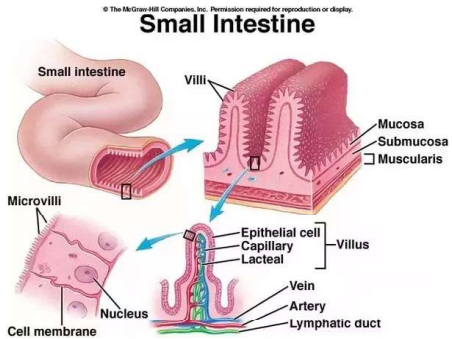
Khufu

Pathophysiology

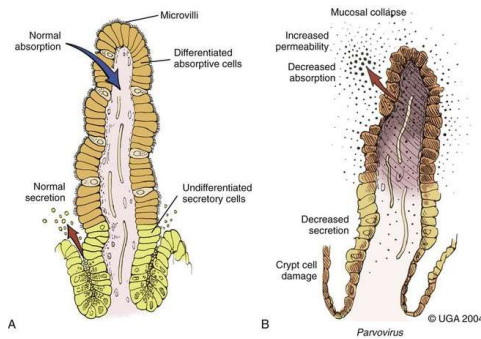


<https://www.msdvetmanual.com/>

Khufa

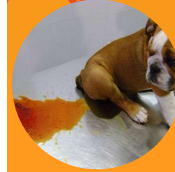


<https://www.quora.com/What-are-the-functions-of-intestinal-villi>



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

Symptoms



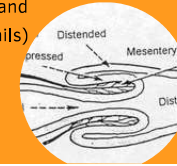
Symptoms usually starts 5 - 7 days after infection

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



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.

A clinical examination and initial diagnostics often reveal bloody diarrhoea on rectal and neutropaenia (low neutrophils) on blood smear.



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

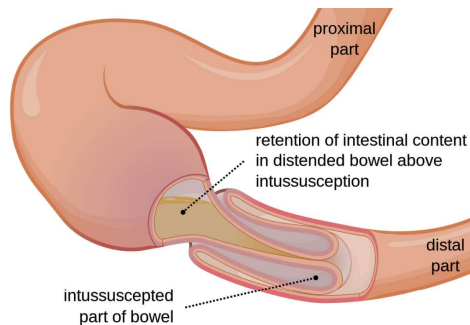
<https://www.msdtvetmanual.com/>
<https://mowbrayvet.com.au/>
<https://en.wikivet.net/>

Khufa

Complication: intussusception



<https://www.cliniciansbrief.com/article/intussusception-reduction>



<https://pethelpful.com/dogs/intussusception-a-guide-for-pet-owners>

Diagnosis



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

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

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

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

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.



<https://www.msdtvetmanual.com/>
<https://www.idexx.co.za/>

Blood smear:
Neutropaenia often present but not always

Khanika: VACCINATION!!!!

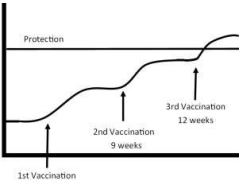
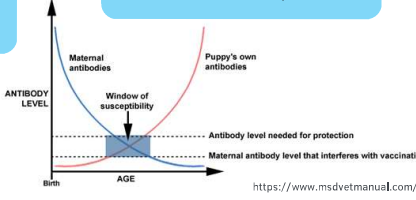
It is our duty to **EDUCATE** owners on the importance of vaccinations!

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

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

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

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 hardy 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.vetmanual.com/>
<https://www.dsm380.com/>

Parvovirus Treatment


Treatment revolves around supportive care




Anti-nausea




Feeding



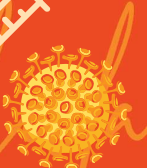
Fluids



Nursing care



Antibiotics




Probiotics and gastric protectants

<https://todaysveterinarynurse.com/>

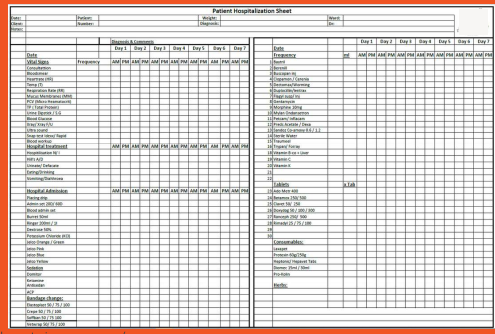
Parvovirus Treatment: Planning

Not all cases of Parvo 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



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

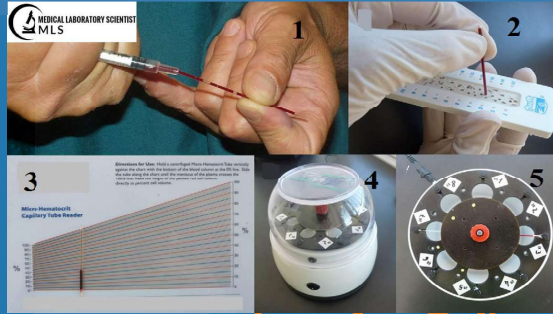


<https://todaysveterinarynurse.com/>

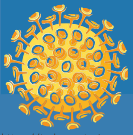


Parvovirus

Treatment: monitoring



<https://medicallabs.vetnet.org/pcv4-hci-measurement/>



<https://todaysveterinarynurse.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



<https://todaysveterinarynurse.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
- **Clopanon**
 - 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
- **Ulsanic and Omeprazole** help protect stomach lining and can have some anti-nausea properties
 - These should be given 1hour prior to feeding
 - Ulsanic 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.
- $kCal \text{ requirement/day} = (BW \times 30) + 70$
- **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.**
- $(BW \times 30) + 70 = (5 \times 30) + 70 = 220kCal/day$ required
- $\text{requ } kCal/kCal \text{ per tin} \times \text{volume of tin} = 220/200 \times 130ml = 143ml$ 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://todaysveterinarynurse.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/>



Prevention

Parvo can stay in the environment for 6 - 12 months after exposure.

Dogs can still shed virus for 10-14 days after clinical recovery

If an owner has had a puppy with parvo then we need to make sure they understand there are risks to getting another puppy within the next year.

Disinfecting the environment:

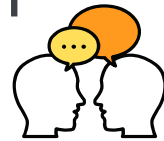
- F10 (10ml/1litre)
- Bleach (1ml/30litres)

Grass and soil is very difficult to properly sterilise



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

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.

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



An excellent website to learn more about Parvovirus

<https://veteriankey.com/canine-viral-enteritis/>



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