

Hemoparasitic Infections of Companion Animals

Hemoparasitic Disease Dynamics

Dear Vets,

Hemoparasitic infections remain a major clinical challenge in companion animal practice, particularly in tropical regions where vector exposure is high. Key pathogens including Ehrlichia, Anaplasma and Babesia target blood cells - monocytes, platelets and erythrocytes, resulting in a spectrum of disease characterised by anaemia, thrombocytopenia and systemic involvement. Transmission occurs predominantly through tick vectors, with additional routes such as blood transfusion, transplacental spread and bite wounds contributing to disease epidemiology.

These infections often present with non-specific and overlapping clinical signs, ranging from sub-clinical carrier states to severe, life threatening illness. Disease pathogenesis involves direct cellular damage, immune mediated destruction and bone marrow suppression, frequently complicated by co-infections.

Doxycycline remains the cornerstone of therapy for rickettsial infections and also serves as an important adjunct in protozoal diseases such as babesiosis. Species-specific therapy, along with appropriate supportive care, including fluid therapy, blood transfusion and management of complications is essential for optimal clinical outcomes.

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Introduction

Hemoparasitic infections are among the most important vector-borne infections affecting companion animals, particularly in tropical and subtropical regions such as India, where prevalence/exposure to ectoparasites is high. These diseases are caused by a diverse group of pathogens, including protozoa (*Babesia* spp.), obligate intracellular bacteria (*Ehrlichia* and *Anaplasma* spp.), hemotropic mycoplasmas and other blood-associated parasites, which primarily infect erythrocytes, leukocytes or platelets. Transmission occurs predominantly through arthropod vectors such as ticks and fleas, although alternative routes including blood transfusion, transplacental transmission and bite wounds may also contribute to disease spread.

These infections are characterised by a wide spectrum of clinical manifestations ranging from subclinical illness to severe systemic disease, commonly involving anemia, thrombocytopenia and multisystem dysfunction. Among them, ehrlichiosis, anaplasmosis and babesiosis are of major clinical importance due to their high prevalence, overlapping clinical features and potential for chronic carrier states, often complicated by co-infections. Diagnosis is challenging due to non-specific signs and requires integration of hematological, serological and molecular techniques. Effective management relies on early diagnosis, appropriate antimicrobial or antiprotozoal therapy and supportive care, while prevention primarily depends on integrated vector control strategies.

Major Haemoparasites of Companion Animals

Category	Etiological Agent	Disease	Host	Transmission	Target Cells
Rickettsial	<i>Ehrlichia canis</i>	Ehrlichiosis	Dog	Tick	Monocytes
	<i>Anaplasma platys</i>	Anaplasmosis	Dog	Tick	Platelets
	<i>Anaplasma phagocytophilum</i>	Anaplasmosis	Dog/Cat	Tick	Neutrophils
Protozoa	<i>Babesia gibsoni</i>	Babesiosis	Dog	Tick, dog bite	RBCs
	<i>Babesia vogeli</i>	Babesiosis	Dog	Tick	RBCs
	<i>Hepatozoon canis</i>	Hepatozoonosis	Dog	Tick ingestion	Leukocytes
	<i>Hepatozoon felis</i>	Hepatozoonosis	Cat	Tick ingestion	Leukocytes
	<i>Babesia canis</i>	Babesiosis	Dog	Tick	RBCs
Hemotropic bacteria	<i>Mycoplasma haemocanis</i>	Hemoplasmosis	Dog	Fleas/ Blood	RBCs
	<i>Mycoplasma haemofelis</i>	Hemoplasmosis	Cat	Fleas/ Bites	RBCs
	<i>Candidatus M. haemominutum</i>	Hemoplasmosis	Cat	Fleas	RBCs

Ehrlichiosis

Ehrlichiosis is a tick-borne disease of dogs caused primarily by *Ehrlichia canis*, resulting in canine monocytic ehrlichiosis (CME). It is highly prevalent in tropical and subtropical regions, including India, due to the widespread distribution of brown dog tick, *Rhipicephalus sanguineus* (Fig. 1). Although the disease primarily affects dogs, occasional cases have been reported in cats. In dogs, *E. canis* is most important, while *E. ewingii* and *E. chaffeensis* are less common; cats are rarely affected. Dogs serve as the primary reservoir host for *Ehrlichia canis*, maintaining the infection cycle in nature.

Infected dogs act as a source of infection for ticks, which subsequently transmit organism to other susceptible hosts. This host–vector relationship plays a crucial role in persistence and spread of ehrlichiosis, particularly in endemic areas.

Transmission and Life Cycle

Ehrlichia is primarily transmitted through the bite of infected ticks during blood feeding, most commonly *Rhipicephalus sanguineus*. Organism is maintained through transstadial transmission and intrastadial transmission by adult ticks may also occur. Non-vector transmission, such as through blood transfusion is possible but relatively uncommon.

After ingestion of infected blood, pathogen multiplies in tick gut and subsequently migrates to salivary glands, from where it is transmitted to a new host during feeding. This host–vector cycle facilitates the persistence and circulation of infection.

Pathogenesis

Pathogenesis of ehrlichiosis involves both direct infection of host cells and immune mediated mechanisms. *Ehrlichia canis* infects monocytes and macrophages. Organism multiplies within membrane bound vacuoles forming characteristic morulae, which facilitate intracellular survival and dissemination.

Infected monocytes circulate and localize in organs of the reticuloendothelial system such as spleen, liver and lymph nodes leading to systemic spread of infection.

The major pathological changes include:

- Infection and proliferation within monocytes
- Vasculitis due to endothelial damage
- Altered platelet function contributing to bleeding tendencies
- Bone marrow suppression leading to cytopenias
- Immune mediated platelet destruction and immune complex deposition

These mechanisms collectively result in thrombocytopenia, anaemia and multisystem involvement, particularly in chronic stages.

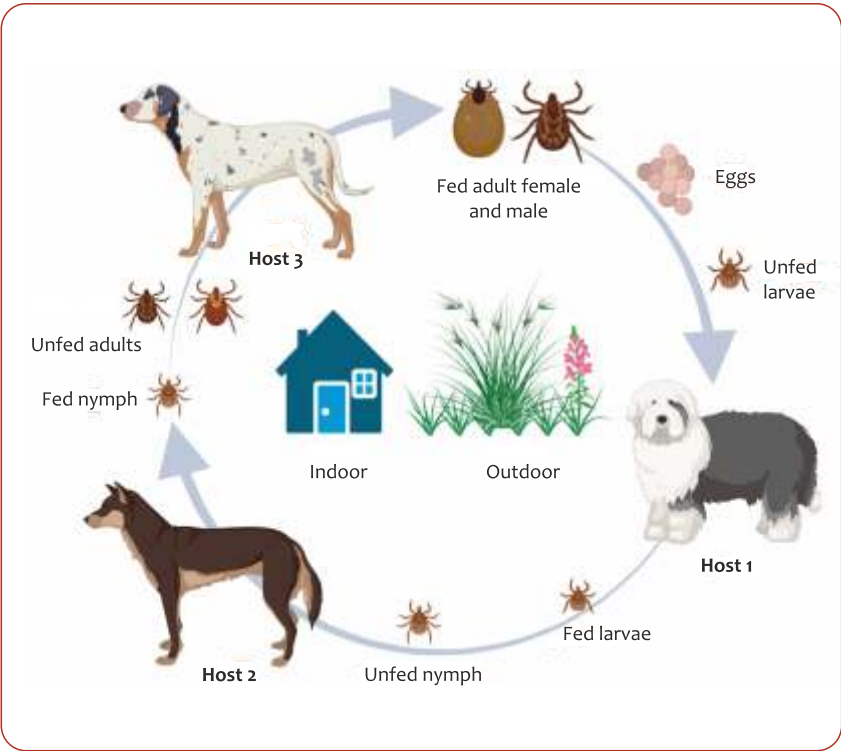


Fig. 1: *Rhipicephalus sanguineus* three-host tick life cycle and its transmission (Ferrolho, et al., 2025)

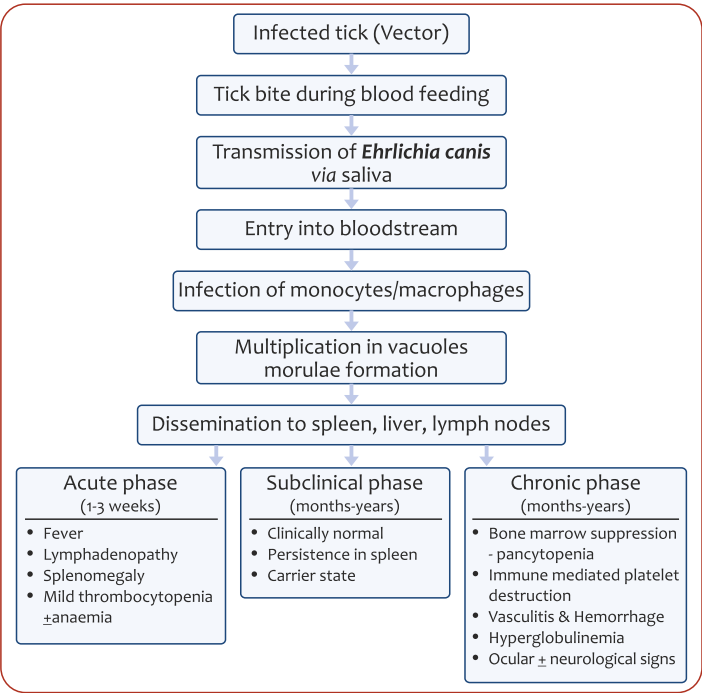


Fig. 2: Pathogenesis of Ehrlichiosis

Clinical Findings

Clinical manifestations vary depending on stage of disease and species affected. In dogs, the disease typically progresses through acute, subclinical and chronic stages. In **acute stage**, animals commonly present with fever, lethargy, anorexia and enlargement of lymph nodes and spleen, along with mild bleeding tendencies due to thrombocytopenia. During the **sub-clinical stage**, infected dogs may not exhibit any obvious clinical signs despite persistence of the organism within the body. In **chronic stage**, clinical signs become more severe and include marked weight loss, pale mucous membranes due to anemia and hemorrhagic manifestations such as petechiae, ecchymosis and epistaxis. In some cases icterus may also be observed, evidenced by yellow discolouration of mucous membranes and skin (Fig. 3). Ocular abnormalities such as uveitis and neurological signs may also be observed in advanced cases, and severe cases are often associated with life-threatening pancytopenia. Dogs may remain subclinical carriers for extended periods, showing minimal or no clinical signs despite persistent infection

In cats, ehrlichiosis is less common and is often underdiagnosed, as the disease generally presents in a milder or subclinical form. When clinical signs are evident, they are usually non-specific and include fever, lethargy and anorexia, along with mild anaemia or thrombocytopenia.



Fig. 3a: *E.canis* affected dog - conjunctiva



Fig. 3b: bleached gingival mucosa - *E. canis* dog



Fig. 3c: Icteric gingival mucosa- *E.canis* dog



Fig. 3d: Icteric abdomen - *E.canis* dog



Fig. 3e: Canine ehrlichiosis - bilateral nasal bleeding



Fig. 3f: Canine ehrlichiosis - bilateral petechial hemorrhages on abdomen

Fig. 3(a-f): Clinical Manifestations of Canine Ehrlichiosis in Dog (Karlapudi et al., 2015)

Diagnosis

Diagnosis of ehrlichiosis is based on combination of clinical evaluation and laboratory investigations. Haematological examination typically reveals **thrombocytopenia (most consistent finding)** along with varying degrees of anaemia and leukopenia, particularly in chronic cases. Microscopic examination of blood smears may occasionally demonstrate morulae within monocytes (Fig. 4).

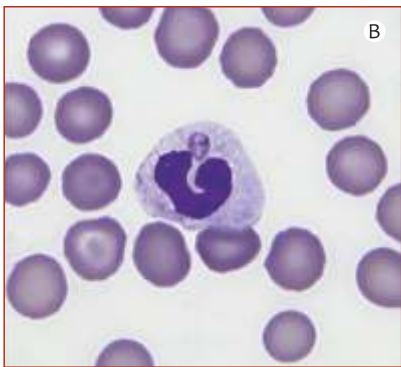
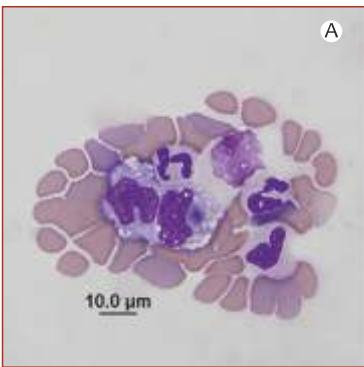


Fig. 4: Morulae of Ehrlichia spp. (A) *Ehrlichia canis* in monocyte (B) *Ehrlichia ewingii* in neutrophil (Little 2010)



Serological and molecular tests play a key role in confirmation:

- **Serology (ELISA, IFA):** Useful for detecting antibodies, though false-negative results may occur in early infection before seroconversion.
- **PCR:** Most sensitive and specific method, confirming active infection by detecting pathogen DNA. PCR testing should ideally be performed before initiation of antibiotic therapy, as treatment may reduce circulating organisms and lead to false-negative results.

In addition, biochemical abnormalities such as hyperglobulinemia, hypoalbuminemia and proteinuria may be observed, indicating systemic involvement and possible organ dysfunction.

Treatment

Treatment of ehrlichiosis is primarily based on antimicrobial therapy, with Doxycycline (**Inj. Doxprim**) being the drug of choice due to its excellent intracellular penetration and efficacy against rickettsial organisms. It is typically administered @ 5 mg/kg b. wt. BID or 10 mg/kg b. wt. SID (IV) for a minimum duration of 28 days.

Clinical improvement, particularly reduction in fever and improvement in appetite, is usually observed within 24–48 hours of initiation of therapy. However, complete haematological recovery may take several weeks, especially in chronic cases.

Supportive Therapy

Following supportive measures are broadly applicable to management of most hemoparasitic infections.

- **Fluid therapy:** Administer intravenous fluids such as normal saline, Ringer's lactate and plasma substitutes (**Plasmup Pet** @ 20 ml/kg b. wt/day) to correct dehydration and maintain tissue perfusion. Plasmup Pet contains hydroxyethyl starch and sodium chloride, which act as a plasma volume expander to improve circulatory stability.
- **Blood transfusion:** Blood transfusion should be administered in cases of severe anaemia or life-threatening conditions using whole blood or packed red blood cells to restore oxygen-carrying capacity.
- **Platelet support in bleeding cases:** In animals with severe thrombocytopenia and active hemorrhage, platelet support should be provided using platelet-rich plasma or fresh whole blood transfusion to control bleeding and restore adequate hemostatic function.
- **Management of immune mediated complications:** Corticosteroids such as prednisolone or dexamethasone may be administered for short term use in cases with severe immune mediated complications, particularly thrombocytopenia.
- **Hematinics and nutritional support:** Appropriate hematinic therapy along with nutritional supplementation including iron preparations **Feritas Pet** @ 5 ml/20 kg b. wt, orally, twice daily can be administered along with B-complex vitamins.
- **Antipyretics:** Antipyretics should be administered to control fever, such as meloxicam (**Melonex**) at a dose of 0.1–0.2 mg/kg b. wt.

Co-infections

Dogs infected with *Ehrlichia canis* may also harbour other tick-borne pathogens such as *Babesia* and *Anaplasma*. Coinfections can result in more severe clinical disease, complicate diagnosis and reduce response to treatment. Therefore, concurrent infections should be considered, especially in endemic areas. Co-Infections often result in more severe anemia, thrombocytopenia and delayed therapeutic response

Anaplasmosis

Anaplasmosis is a tick-borne infectious disease of companion animals, particularly dogs, caused by obligate intracellular bacteria of genus *Anaplasma* belonging to the family Anaplasmataceae.

Dogs: *Anaplasma phagocytophilum* (infects neutrophils) and *Anaplasma platys* (infects platelets)

Cats: *Anaplasma phagocytophilum*

Anaplasmosis is widely distributed in regions where tick vectors are prevalent. *A. phagocytophilum* is transmitted by *Ixodes* ticks and *A. platys* is commonly linked to *Rhipicephalus sanguineus*. Clinical presentation ranges from sub-clinical infection to severe systemic illness and frequently overlaps with other tick-borne diseases. Although primarily affecting dogs, occasional infections have been reported in cats; affected animals exhibit clinical and laboratory findings like those observed in dogs.

Transmission and Pathogenesis

Anaplasma is transmitted primarily through bite of infected ticks during blood feeding and is maintained within the vector through transstadial transmission. Additional routes such as blood transfusion or exposure to infected blood may occur rarely. Following transmission, the organism infects circulating blood cells, *A. phagocytophilum* targets neutrophils, while *A. platys* infect platelets where it multiplies within membrane-bound vacuoles forming morulae and disseminates *via* bloodstream. This leads to altered cell function, inflammatory responses and hematological abnormalities.

- Impaired neutrophil function → reduced host defence (*A. phagocytophilum*)
- Cyclic parasitism of platelets → recurrent thrombocytopenia (*A. platys*)
- Immune mediated platelet destruction contributes to bleeding tendencies
- Bone marrow shows compensatory response (↑ megakaryocytes)
- Inflammatory cytokines → fever, lethargy

Disease severity increases in presence of co-Infections and varies with host immunity.

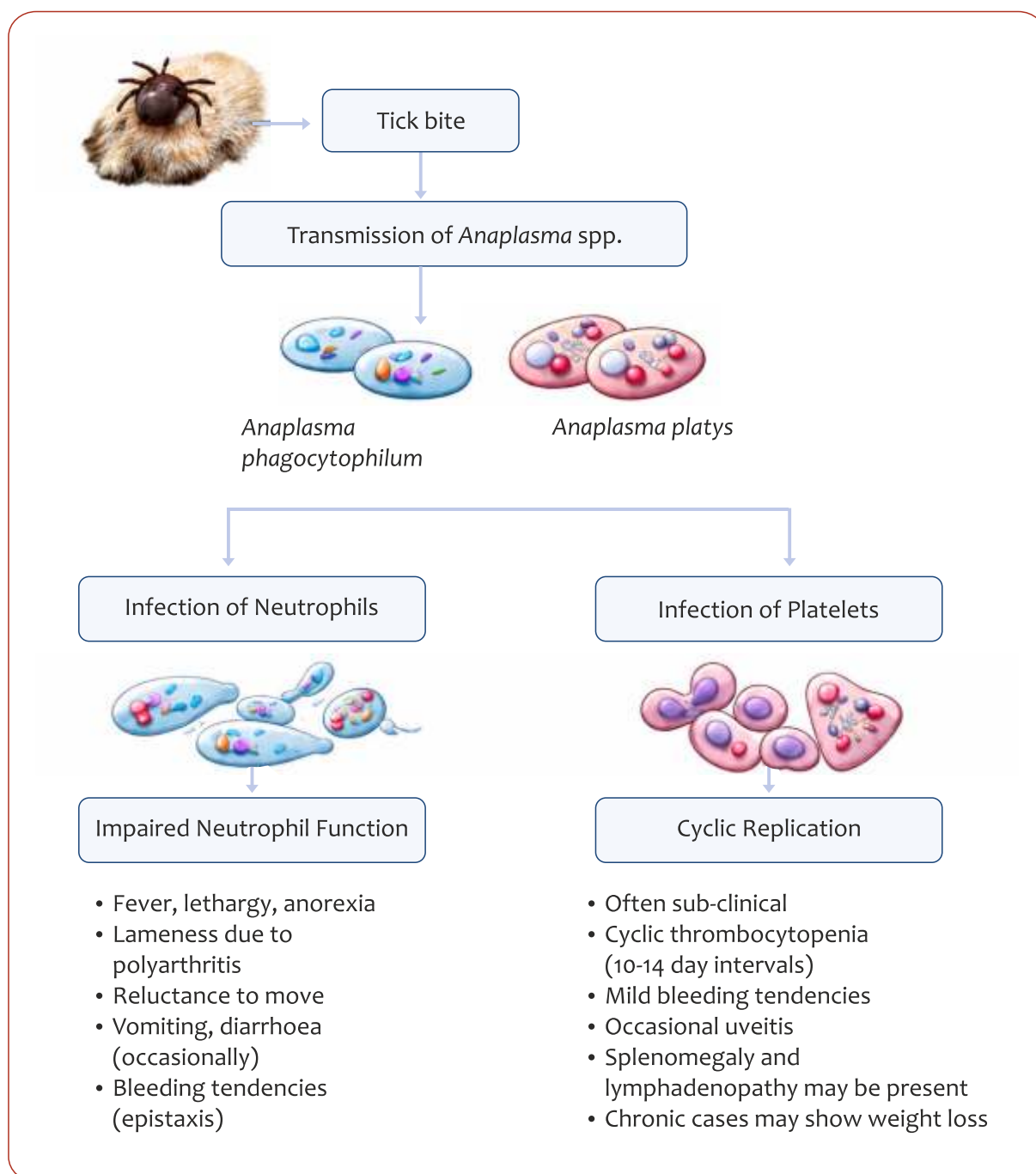


Fig. 5: Pathogenesis of Anaplasmosis

Clinical Findings

Clinical manifestations vary with species involved and disease stage, ranging from subclinical infection to mild or moderate systemic illness. Many infected dogs remain asymptomatic despite persistent infection.

A. phagocytophilum:

- Fever, lethargy, anorexia
- Lameness due to polyarthritis and reluctance to move
- Vomiting, diarrhoea (occasionally)
- Bleeding tendencies (epistaxis)

A. platys:

- Often sub-clinical
- Cyclic thrombocytopenia (10–14 day intervals)
- Mild bleeding tendencies
- Occasional uveitis
- Splenomegaly and lymphadenopathy may be present
- Chronic cases may show weight loss

Diagnosis

Diagnosis is based on clinical suspicion supported by haematological and confirmatory laboratory tests. Thrombocytopenia is the most consistent finding, especially in *A. platys* infection.

Microscopy:

Morulae in:

- Neutrophils (*A. phagocytophilum*)
- Platelets (*A. platys*) (Fig. 6)

Confirmatory tests:

- Serology (ELISA, IFA): detects antibodies, cross-reactivity possible
- PCR: most sensitive and specific; detects active infection

Treatment

Treatment is primarily based on Doxycycline, which is highly effective against *Anaplasma* spp.

Doxycycline (**Inj. Doxprim**) @ 5 mg/kg b. wt. BID or 10 mg/kg b. wt. SID (IV)

Duration: 14–28 days (often extended similar to ehrlichiosis)

Clinical improvement is usually rapid (within 24–48 hours), although persistent infection may occur in some cases.

Supportive therapy

Supportive therapy is similar to that described for canine ehrlichiosis. In most cases, the disease is less severe and primarily requires fluid therapy, hematinic support and antipyretics, while blood transfusion is rarely indicated unless significant anaemia develops.

Babesiosis

Babesiosis is an tick-borne intraerythrocytic protozoan disease affecting companion animals, particularly dogs and less commonly, cats. It is caused by intraerythrocytic protozoa of the genus *Babesia*, which invade and multiply within red blood cells, leading to haemolysis and systemic illness. The disease is widely distributed in tropical and subtropical regions, including India, where environmental conditions favour tick vectors.

Babesiosis in dogs ranges from sub-clinical infection to severe, life-threatening disease. In contrast, the condition is relatively rare and less well characterised in cats; however, when present, clinical and laboratory findings are broadly similar to those observed in dogs.

Etiology and Transmission

Babesiosis is caused by protozoan parasites belonging to the phylum Apicomplexa.

Dogs: *Babesia gibsoni*, *Babesia vogeli* and *Babesia canis*

Cats: *Babesia felis*

Vector: *Rhipicephalus sanguineus* (brown dog tick) – major vector for *B. vogeli* and *Haemaphysalis* spp. - associated with *B. gibsoni*

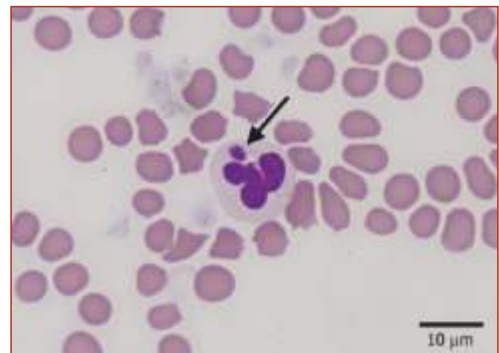


Fig. 6: Peripheral blood smear of a cat infected with *Anaplasma phagocytophilum* (Savidge et al., 2016)

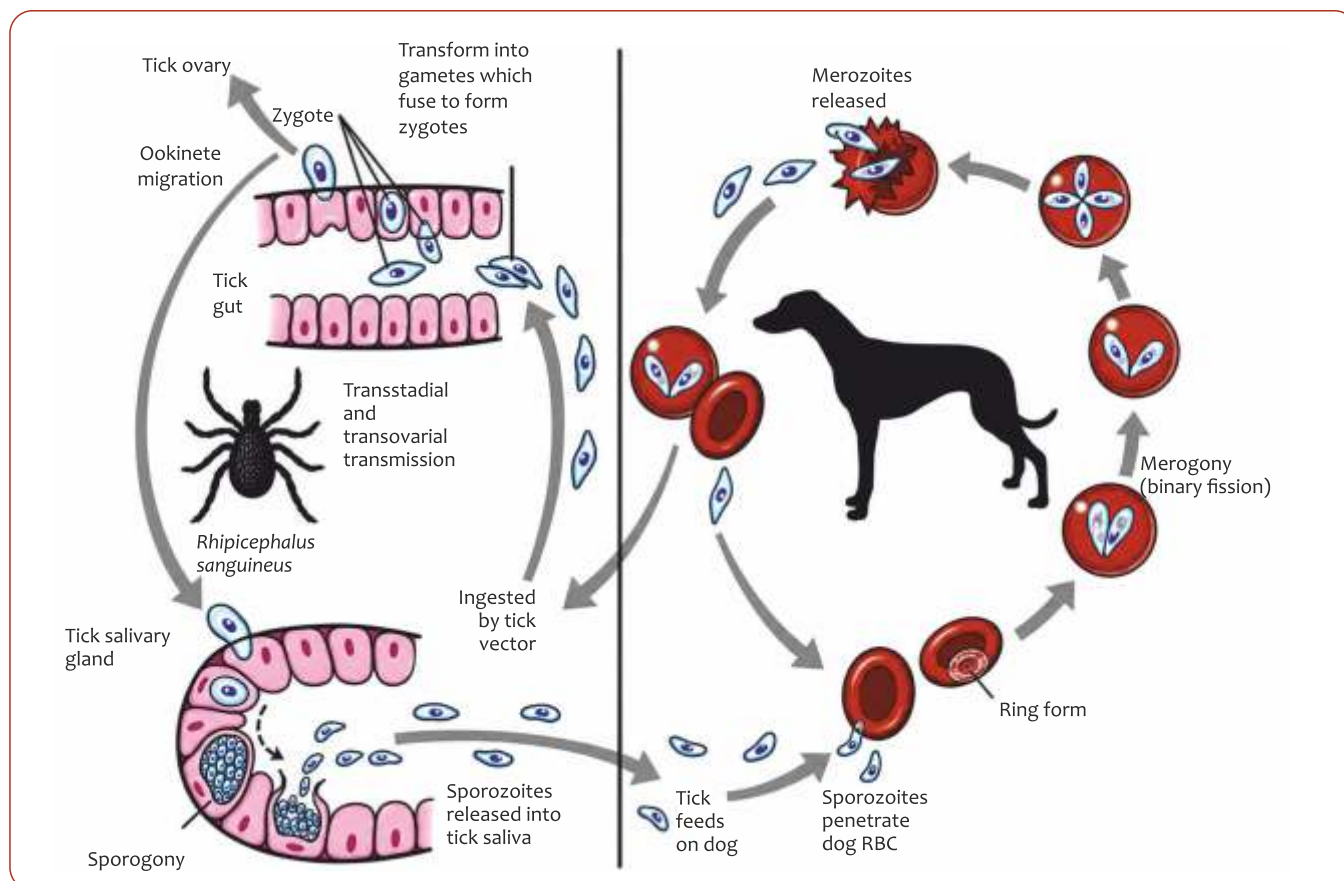


Fig.7: Life cycle of *Babesia canis* (Birkenheuer, 2021)

Life Cycle

Life cycle of *Babesia* involves both vertebrate host and tick vector. Infection begins when an infected tick transmits sporozoites during feeding. Within the host, sporozoites invade erythrocytes and undergo asexual replication (merogony), producing merozoites that rupture red blood cells and infect new erythrocytes. Within tick, ingested parasites undergo sexual reproduction in gut, forming zygotes that develop into motile stages (ookinetes), which migrate to salivary glands. These develop into infective sporozoites and are transmitted during subsequent feeding. Within tick, sexual reproduction occurs and infective stages develop in salivary glands for transmission to new hosts (Fig. 7)

Transmission

Transmission of canine babesiosis primarily occurs through bite of infected ticks during blood feeding, when sporozoites are inoculated into host from salivary glands. The parasite is maintained within tick populations through transstadial transmission, ensuring persistence of infection in endemic regions.

In addition to vector borne transmission, other routes play an important role, particularly in dogs. These include blood transfusion, transplacental transmission and direct transmission through dog bites or fighting, especially in infections with *Babesia gibsoni*. Dogs serve as principal reservoir hosts, with chronically infected animals acting as carriers of infection.

Pathogenesis

Babesiosis is primarily a hemolytic disease resulting from direct destruction of erythrocytes and immune mediated mechanisms. Following invasion of red blood cells, parasite multiplies and causes cell rupture, leading to anaemia and associated systemic effects (Fig. 8).

- Intravascular and extravascular haemolysis → anaemia
- Release of haemoglobin → hemoglobinemia and haemoglobinuria
- Immune mediated destruction of infected and non-infected RBCs
- Inflammatory response → fever and systemic illness
- Microvascular changes may contribute to organ dysfunction

Severe cases, particularly with *B. gibsoni*, may lead to complications such as acute kidney injury, hepatic dysfunction and systemic inflammatory response syndrome.

Clinical Findings

Clinical signs vary depending on species, parasite load and host immunity, ranging from mild illness to severe disease.

In dogs

- Variable fever, lethargy, anorexia
- Pale mucous membranes (anaemia)
- Icterus (jaundice) in severe cases
- Hemoglobinuria
- Splenomegaly and lymphadenopathy
- Tachycardia and weakness

Severe cases

- Acute collapse
- Multi-organ dysfunction
- Shock

In cats

- Often mild or sub-clinical
- Fever and lethargy
- Anaemia (variable)
- Icterus (occasionally)

Chronic infections may result in intermittent clinical signs and carrier states, especially in dogs.

Diagnosis

Diagnosis is based on clinical signs, hematology and confirmatory laboratory tests.

Haematological findings:

- Anaemia (regenerative)
- Thrombocytopenia
- Hyperbilirubinemia
- Elevated liver enzymes (in severe cases)

Microscopy

Giemsa stained blood smear:

- *B. gibsoni* → ring forms
- *B. vogeli* and *B. canis* → paired pear-shaped forms

Useful in acute cases but low sensitivity in chronic infection

Confirmatory tests:

PCR:

- Most sensitive and specific
- Differentiates species

Serology (IFA, ELISA):

- Detects exposure
- Limited in distinguishing active infection
- Combination of microscopy and PCR is recommended for accurate diagnosis.

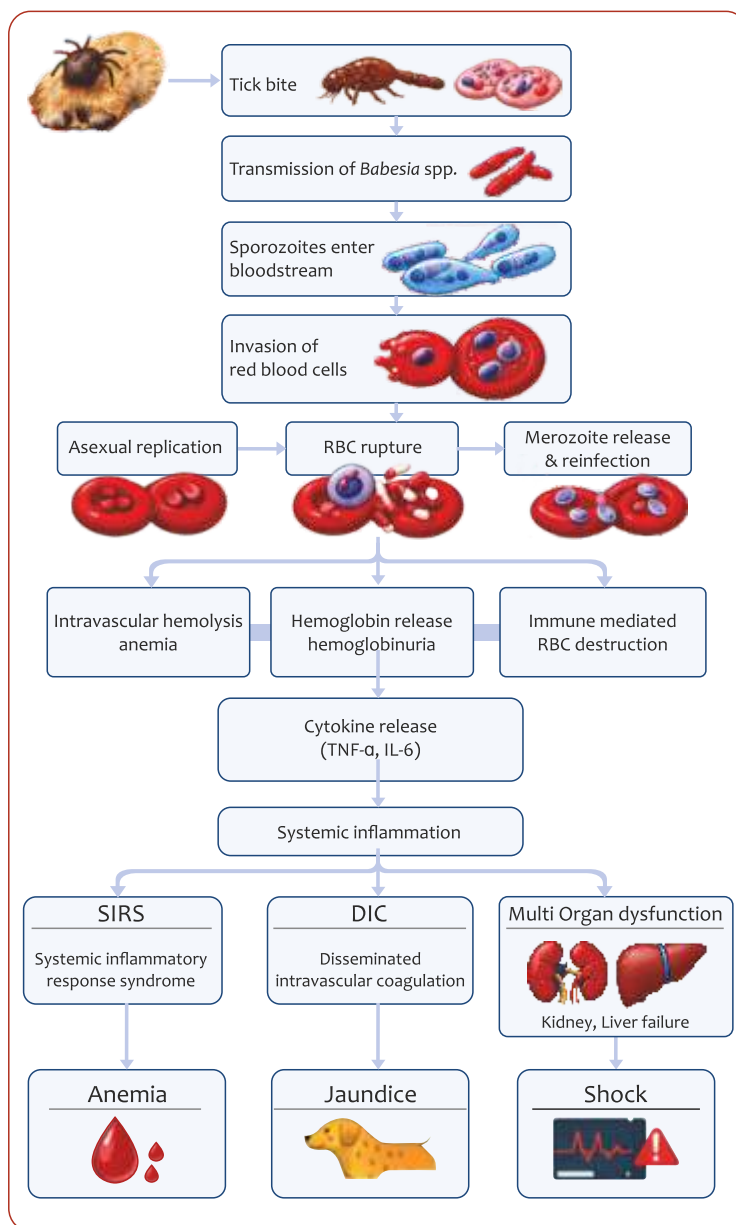


Fig. 8: Pathogenesis of Babesiosis



Fig. 9: Two pear-shaped *Babesia canis* organisms in erythrocyte (Duh et al., 2004)



Treatment

Treatment depends on the species involved and severity of disease.

- ***Babesia vogeli***

Administration of **Imidocarb dipropionate** (5–6 mg/kg, IM/SC, two doses at 14-day interval)

Premedication with Atropine may be considered to reduce cholinergic side effects

- ***Babesia gibsoni*** requires **combination therapy** due to poor response to single drugs.

- o **Atovaquone + Azithromycin:**

- Atovaquone @13.3 mg/kg PO, TID
- Azithromycin @10 mg/kg PO, SID
- Duration: 10 days

- o **Doxycycline (adjunct):**

- 5 mg/kg b. wt. BID or 10 mg/kg b. wt. SID (IV)
- Duration: 2–4 weeks

In critical or mixed infection cases initial parenteral therapy with Doxycycline (**Inj. Doxprim**), used as an adjunct particularly in mixed infections or for supportive antimicrobial coverage, helps achieve rapid clinical response in critical cases. This is followed by oral therapy for continued effective treatment and improved compliance.

Clinical improvement is usually observed within a few days, though complete parasite clearance may not always be achieved, particularly with *B. gibsoni*.

Supportive therapy

Supportive therapy is more intensive compared to ehrlichiosis due to marked haemolysis. It primarily includes blood transfusion in cases of severe anaemia, aggressive fluid therapy and management of complications such as haemoglobinuria and shock. Additional supportive care includes antipyretics and hepatoprotective agents, with close monitoring of renal function.

Hemotropic Mycoplasmosis (Feline Infectious Anaemia)

In cats, haemotropic mycoplasmosis is a relatively common haemoparasitic disease caused by *Mycoplasma* spp. that attach to red blood cells and result in haemolytic anaemia. The main organisms include *Mycoplasma haemofelis* (most pathogenic), *Candidatus Mycoplasma haemominutum* (usually mild or sub-clinical) and *Candidatus Mycoplasma turicensis*.

Transmission occurs mainly through fleas, bite wounds and blood exposure, with carrier animals playing an important role. The disease is characterised by immune mediated destruction of erythrocytes, leading to anaemia.

Clinically, affected cats may show pale mucous membranes, lethargy, anorexia and fever, while severe cases can develop marked anaemia and occasional icterus. Sub-clinical infections are common, especially in less pathogenic species.

Diagnosis is based on haematology and blood smear examination, with PCR as the confirmatory test.

Treatment

Doxycycline (drug of choice):

- 5 mg/kg b. wt. BID or 10 mg/kg b. wt. SID (IV)
- Duration: 21–28 days

In clinically compromised or anorectic cats, doxycycline (**Inj. Doxprim**) can be initiated to ensure reliable drug delivery and rapid therapeutic levels, followed by oral therapy once the animal stabilizes.

Supportive therapy

Supportive therapy mainly focuses on correction of anemia and includes blood transfusion in severe cases, fluid therapy and hematinic supplement (**Feritas Pet**). Stress reduction and nutritional support are important, while corticosteroids may be used in cases with immune mediated haemolysis.



Prevention and Control Strategies of haemoparasitic infections

Prevention of haemoparasitic infections primarily relies on effective vector control, reduction of exposure and early detection of infected animals.

- **Tick control:** Use regular anti-tick products (**Nayflee Spot-on / Spray, Softas range of Shampoos**) to kill and prevent ticks.
- **Environmental control:** Keep surroundings clean and spray insecticides in kennels to reduce tick load.
- **Blood safety:** Use screened donors and sterile needles to prevent transmission.
- **Direct contact control:** Avoid dog fights and isolate infected animals.

Integrated tick control combined with early diagnosis and prompt treatment remains the most effective strategy for reducing the burden of haemoparasitic diseases in companion animals.

Efficacy studies of Doxycycline

Study 1 Efficacy of Injectable Doxycycline in Canine Monocytic Ehrlichiosis: A Clinical Study (Ranjithkumar et al., 2023).

Objectives

To evaluate the efficacy of injectable Doxycycline in natural cases of non-myelosuppressive canine monocytic ehrlichiosis (CME) and to compare it with conventional oral Doxycycline therapy, with a shorter treatment duration.

Materials and Methods

A randomized double-blinded clinical study was conducted on dogs presented with clinical signs such as fever, anorexia, depression, lymphadenopathy, splenomegaly, anaemia and hemorrhagic manifestations including epistaxis and petechiae suggestive of ehrlichiosis. A total of 120 suspected cases were screened using blood smear examination, lateral flow assays and PCR (16S rRNA nested PCR) using blood and splenic aspirates. Out of these, 48 cases were confirmed positive and 22 non-myelosuppressive cases were selected based on bone marrow aspiration findings. These selected cases were randomly divided into two groups.

Group I was treated with injectable Doxycycline @ 10 mg/kg b. wt. IV once daily for 15 days, while Group II received oral Doxycycline @ 10 mg/kg b. wt. once daily for 28 days. Clinical signs, hematological and biochemical parameters were recorded before and after therapy. Diagnostic confirmation and treatment response were assessed through PCR analysis of blood and splenic aspirates along with bone marrow cytology.

Results

Animals treated with injectable Doxycycline showed marked clinical improvement with no observable side effects, whereas vomiting and anorexia were reported in dogs treated with oral Doxycycline. After 15 days of therapy, dogs in the injectable Doxycycline group tested negative for *Ehrlichia canis*. Significant improvement was observed in hematological parameters, including increased erythrocyte and platelet counts, along with reduction in monocyte count. In contrast, the oral Doxycycline group showed comparatively slower and less significant improvement, with significant changes mainly in platelet count.

Conclusion

The study demonstrates that Injectable Doxycycline is more effective than oral therapy, offering faster recovery, fewer side effects, shorter treatment duration (15 days) and quicker elimination of *Ehrlichia canis*.

Study 2 Comparative therapeutic efficacy of Doxycycline and Enrofloxacin in Canine Ehrlichiosis (Basvanta et al., 2023).

Objectives

To evaluate and compare the therapeutic efficacy of Doxycycline and Enrofloxacin along with supportive therapy in the treatment of canine ehrlichiosis and to assess associated hematological and biochemical changes.

Materials and Methods

Out of 100 dogs showing clinical signs suggestive of ehrlichiosis, 16 were confirmed positive through blood smear and rapid antibody testing. Twelve cases were selected and divided into two groups (n=6 each). Group T1 received Inj. Doxycycline (10 mg/kg b. wt. IV once daily), while Group T2 received Inj. Enrofloxacin (5 mg/kg b. wt. IM twice daily) for 5 consecutive days. All animals received supportive therapy including fluids, hematinics, vitamin B-complex, antacids, antiemetics and liver tonics. Clinical parameters such as rectal temperature, respiration rate, heart rate and mucous membrane colour were recorded before treatment and daily for 5 days. Hematological and biochemical parameters were evaluated on day 0 and day 25 post-treatment.



Results

Common clinical signs included fever, lymphadenopathy, depression, tick infestation, splenomegaly, anorexia and hemorrhagic manifestations. Both groups showed significant improvement in clinical parameters within 5 days of treatment. However, the Doxycycline group exhibited faster recovery, with 83.33% recovery by day 7 and complete recovery by day 15, whereas the Enrofloxacin group showed slower initial recovery (49.98% by day 7) but reached complete recovery by day 15. Hematological and biochemical abnormalities, including anaemia and thrombocytopenia, improved in both groups over time.

Conclusion

The study demonstrates that both Doxycycline and Enrofloxacin are effective in the treatment of canine ehrlichiosis; however, Doxycycline administered intravenously at 10 mg/kg body weight provides faster clinical recovery and is considered more effective and preferable as a first-line therapy.

Study 3 Therapeutic Management of Canine Babesiosis using Doxycycline based Combination Therapy- A Case Report (Ravi Shankar *et al.*, 2026).

Objectives

To evaluate the efficacy of combination therapy using Doxycycline as adjunctant, Clindamycin, and Metronidazole along with supportive treatment in the successful management and recovery of canine babesiosis.

Materials and Methods

A 1.5-year-old male Belgian Shepherd dog presented with inappetence, weakness, and lethargy was examined. Clinical findings included pale mucous membranes and enlarged lymph nodes. Laboratory investigations revealed anaemia, thrombocytopenia, and elevated bilirubin levels, while blood smear confirmed Babesia infection. Dog was treated with Doxycycline @ 10 mg/kg IV, Clindamycin @ 25 mg/kg IV, Metronidazole @ 15 mg/kg IV and Pantoprazole @ 1 mg/kg IV for 3 days. Subsequently, treatment was continued orally with Doxycycline @ 10 mg/kg once daily, Clindamycin @ 25 mg/kg twice daily, Metronidazole @ 15 mg/kg twice daily and Pantoprazole @ 1 mg/kg once daily for 10 days. Supportive therapy included administration of hematinics and liver supplements for 15 days.

Results

Clinical improvement, including restoration of appetite and normalization of vital parameters was observed within 3 days of treatment initiation. By 15 days, significant improvement in hematological parameters (hemoglobin, PCV, TEC, platelets) and normalization of biochemical values were noticed. Blood smear examination turned negative for Babesia, indicating complete recovery.

Conclusion

The study demonstrates that Doxycycline-based triple combination therapy with Clindamycin and Metronidazole, along with supportive treatment, is highly effective in achieving complete clinical and hematological recovery in canine babesiosis.

Conclusion

Hemoparasitic infections in companion animals are important vector-borne diseases, especially in tropical regions, causing conditions ranging from mild to life-threatening. They primarily affect blood cells, leading to anaemia, thrombocytopenia and systemic complications, often with overlapping signs and co-infections that complicate diagnosis. Accurate detection requires a combined approach using clinical evaluation along with hematological, serological and molecular diagnostics.

Doxycycline remains the drug of choice for rickettsial infections like ehrlichiosis and anaplasmosis and serves as an important adjunct in managing protozoal infections such as babesiosis. Clinical evidence shows that injectable Doxycycline providing faster clinical recovery, improved hematological parameters, shorter treatment duration. In diseases like babesiosis, combination therapy is often necessary for complete clearance of infection. Supportive therapy is essential in improving patient outcomes and includes fluid administration, blood transfusion, hematinic support and management of immune mediated complications.

Overall, successful management depends on early diagnosis, appropriate drug therapy, effective supportive care and proper vector control, which together help reduce disease burden and improve recovery in companion animals.

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