Babesiosis in bovines

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Babesiosis

- Caused by apicomplexan parasites of the genus *Babesia*

- They are obligate parasites of the erythrocytes of vertebrate hosts, transmitted by ixodid ticks

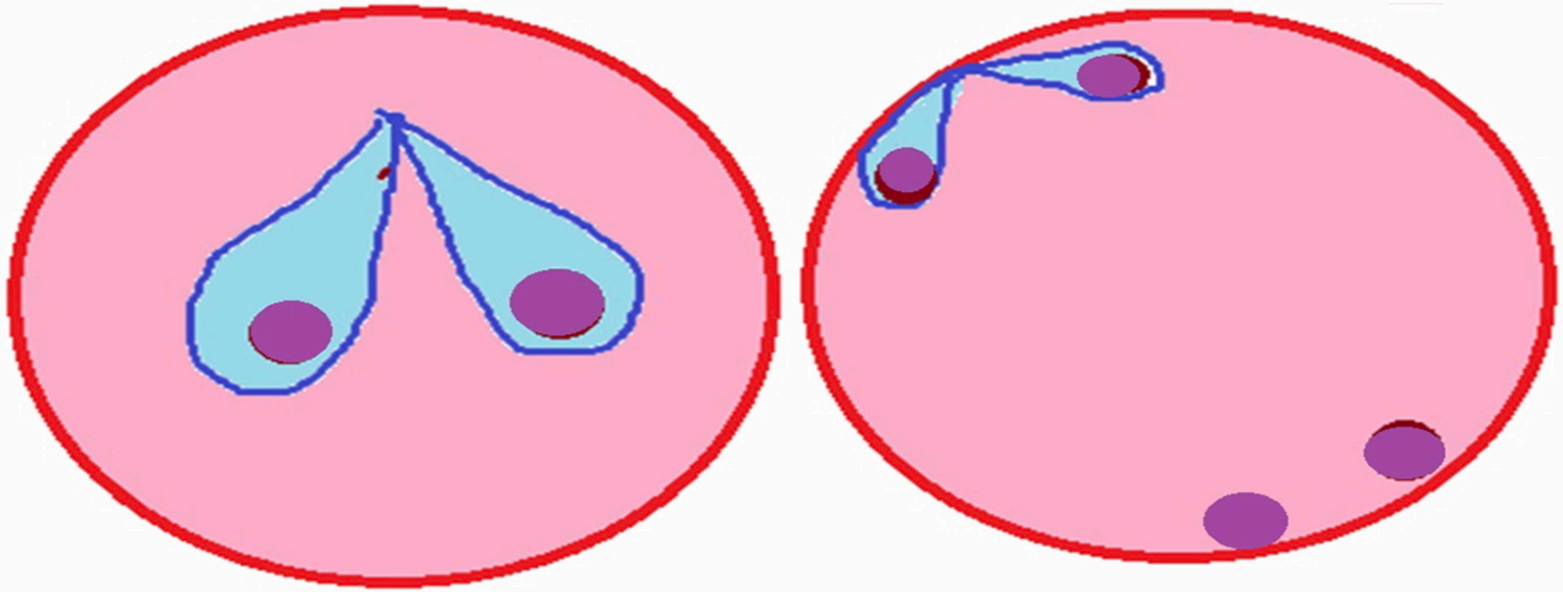
Animal	*Babesia* spp.
Cattle	*B. bovis, B. bigemina, B. divergens*
Sheep and goats	*B. motasi, B. ovis*
Horses	*B. caballi*
Pigs	*B. trautmanni, B. peroncitoi*

Babesiosis

- The most important stage for diagnosis is the merozoite stage which is intraerythrocytic and referred to as the piroplasm. Generally multiplication occurs within the RBC and hence multiples of 2 namely 4, 8 or 16 merozoites may be detected within an infected RBC.

- Based on the size, *Babesia* are divided into two forms: the small form (1-1.5 µm) and the large form (2.5-5 µm). At times, atypical forms such as the amoeboid, ring or round forms may also be seen. Free stages may be seen in the plasma but it is generally rare.

Babesiosis



Babesiosis

Animal species	Large form	Small form
Bovine	*B. bigemina*	*B. bovis, B. divergens*
Equine	*B. caballi*	-
Ovine	*B. motasi*	*B. ovis*
Caprine	*B. foliata*	*B. taylori*
Porcine	*B. trautmanni*	*B. perroncitoi*

Babesiosis

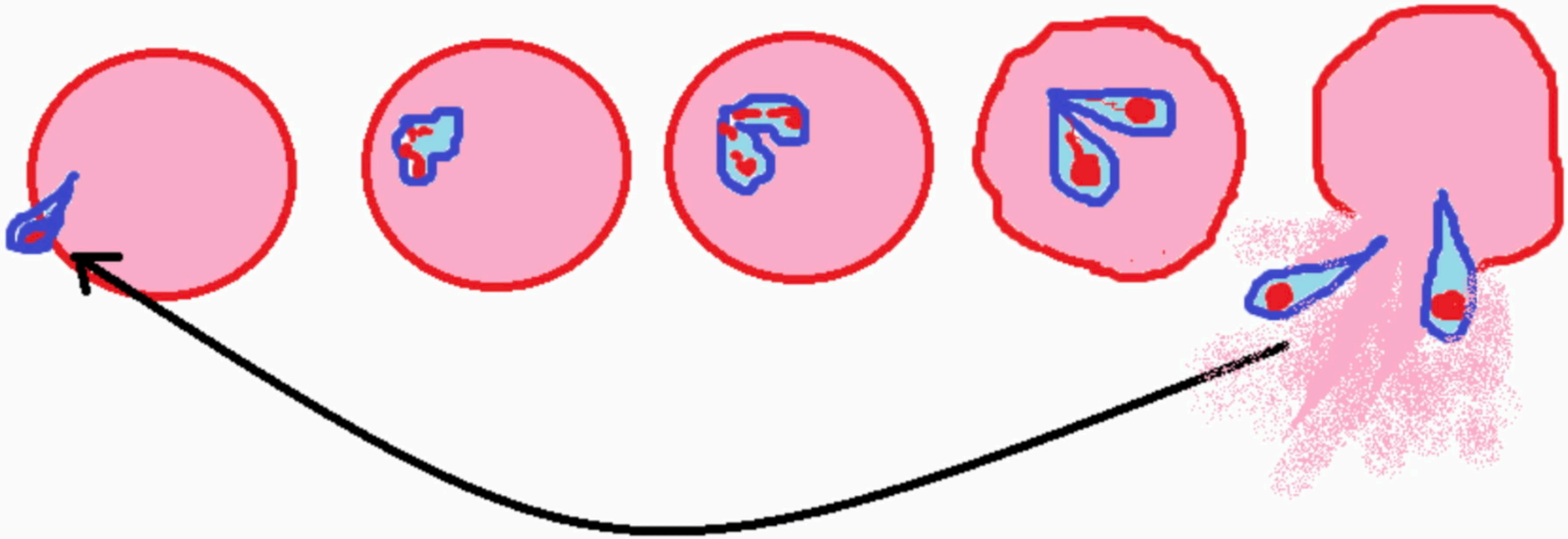
Transmission

- Main mode of transmission is through ticks *[Rhipicephalus (Boophilus) microplus]*, *Dermacentor, Hyalomma and Rhipicephalus* spp. of ticks.
  - transovarian transmission
  - trans-stadial transmission
- Transplacental transmission
- Iatrogenic transmission

Babesiosis

Pathogenesis

- Mainly through erythrocyte destruction-Intravascular haemolysis- RBC ruptures when piroplasms emerge from the RBC. There is also an immune mediated loss of erythrocytes at a later stage



Babesiosis

Pathogenesis

- Mainly through erythrocyte destruction-Intravascular haemolysis- RBC ruptures when piroplasms emerge from the RBC. There is also an immune mediated loss of erythrocytes at a later stage
- Anaemic anoxia- damaged endothelium with its loss of integrity allows fluid to escape which results in hypoproteinaemia and oedema
- Glomerulonephritis - Result of haemolysis. Haemoglobin is filtered through the glomerulus into the renal tubules and collecting ducts. Majority remains unabsorbed and passes out into urine resulting in haemoglobinuria. Colour of urine is reddish-brown depending on proportion of the haemoglobin converted to methaemoglobin.

Babesiosis

- **Pathogenesis**

Cerebral babesiosis:

Usually seen in infections with small *Babesia* even with low parasitaemia. The parasitized RBCs become 'sticky' and stagnate in the microcirculation of various organs especially the brain, thus literally clogging the circulation of blood. It often leads to signs of cerebral damage

Babesiosis

Clinical signs

- Cattle: High temperature of 41-42 deg C, anaemia, haemoglobinuria, icterus and high mortality. With cerebral manifestation, signs like hyperexcitability, later coma, trembling, weakness, grinding of teeth and even death.
- Pigs: Fever, anaemia, haemoglobinuria, jaundice, oedema and incoordination. Abortion may occur. In *B. trautmani* infection mortality may be up to 50%

Babesiosis

Clinical signs

- Sheep and goats: Pyrexia (41-42 deg C), prostration, haemoglobinuria, anaemia and high mortality.
- Equines: Fever, anorexia and laboured breathing, anaemia, thrombocytopenia, icterus and petechiae in the conjunctiva. In chronic infection, there is weight loss, lethargy, partial anorexia and the spleen might be enlarged on rectal palpation.
- NECROPSY LESIONS: Icteric appearance of carcass, coffee-coloured urine in bladder, hepatomegaly and splenomegaly.

Thank you