



The KMF is a promoter of evidence-based research and clinical practice for tick-borne diseases and an advocate for better testing, treatment and education in Australia.

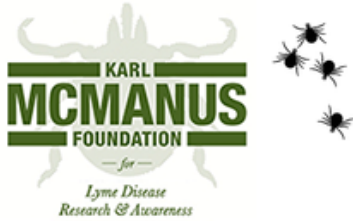
*Recognising, Understanding, Caring*

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**Table 1: Common Symptoms of Tick-borne Co-infections**

Intensity and diversity depends on the number of co-infections and the immuno-competence of the host.

Babesia	Bartonella (e.g: trench fever, cat scratch disease,	Rickettsia (QLD tick typhus, scrub typhus etc,	Ehrlichia/ Anaplasma
fever parasitemia-parasite in blood diaphoresis- perspiring profusely anaemia shortness of breath weakness fatigue jaundice dark urine haemoglobinuria- blood in urine general organ failure	Headache Seizures Mood swings Behavioural disturbance Aphasia- cognitive dysfunction Hemiparesis- weakness on one side of the body Paraperesis- pelvic floor muscle weakness Focal neurological deficits Lymphadenopathy- swollen lymph nodes Angiomatosis- little knots of capillaries in various organs Peliosis hepatis-multiple blood filled cavities in liver Splenitis- enlargement of spleen Osteomyelitis-infection of bone Bacteraemia	Fever Headache Malaise Myalgia-muscle pain Nausea Vomiting Abdominal pain Maculopapular to petechial rash typical 2-5 after fever Complications can include skin necrosis, acute renal failure, pneumonia, Neurological symptoms, thrombocytopenia, hypoalbuminemia,- low albumin, hypotension, hyponatremia- low sodium	Fever Headache Myalgia Nausea Arthralgia-joint pain Malaise Cough Pharyngitis Lymphadenopathy- swollen lymphnodes Diarrhoea Vomiting Abdominal pain Mental health Conjunctivitis Dysuria-painful urination Peripheral oedema
Hilderbrandt et al 2013 Ref: <a href="http://www.ncbi.nlm.nih.gov/pubmed/24104943">http://www.ncbi.nlm.nih.gov/pubmed/24104943</a>	Harms & Dehio, 2012 Ref: <a href="http://www.ncbi.nlm.nih.gov/pubmed/22232371">http://www.ncbi.nlm.nih.gov/pubmed/22232371</a>	Parola et al., 2013 Ref: <a href="http://www.ncbi.nlm.nih.gov/pubmed/24092850">http://www.ncbi.nlm.nih.gov/pubmed/24092850</a>	Ganguly & Mukhopadhyay, 2008 Ref: <a href="http://www.ncbi.nlm.nih.gov/pubmed/19248653">http://www.ncbi.nlm.nih.gov/pubmed/19248653</a>



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**Table 2: Common Diagnostic Tests**

Babesia	Bartonella	Rickettsia	Ehrlichia/Anaplasma
Blood film microscopy Serology IFA	Serology PCR culture	Serology PCR	Serology PCR

**Table 3: Treatment of Tick-borne co-infections**

Use of multiple antibiotics can reduce the development of tolerance. The biofilm and polymorphism needs to be addressed for each pathogen

Babesia	Bartonella	Rickettsia	Ehrlichia/ Anaplasma
Artemisin atovaquone (no CQ10) Malarone- atovaquone+proguanil Azithromycin Clindamycin + quinine Riamet- artemether +lumefantrine	Macrolides - azithromycin is considered drug of choice co-trimoxazole or quinolones or rifampicin with one another not co-trimoxazole	Tetracyclines- doxycycline quinolones	Doxycycline plus rifampicin

Other global co-infections include brucellosis, leptospirosis, Q- fever, Tick Borne encephalitis virus, tularemia