

Tickborne diseases

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Tickborne diseases are a worldwide public health problem. While Australia is free from many of the serious tickborne diseases endemic in North America and Europe, ticks are still a hazard to human health in Australia and measures to prevent tick bites should be undertaken.

Tick ecology

There are over 800 species of tick worldwide; Australia is home to approximately 75 of these. Of Australian species, approximately 15 attack humans, the most important of these being *Ixodes holocyclus*, otherwise known as the ‘paralysis tick’. This species is active year-round in Australia. The paralysis tick is particularly vulnerable to desiccation, thus it tends to be most active during periods of high humidity, such as after rainfall.

Ticks as a vector for disease

Various tick species are competent vectors of human disease-causing pathogens including a variety of bacteria, viruses, rickettsia and protozoa. Ticks are capable of vertically transmitting several pathogens to their larval stage offspring which can then be passed to the nymph and thence to the adult. Thus an infective state can be maintained across multiple generations without contact with a vertebrate reservoir.¹ The vectorial capacity of ticks varies among species and specific pathogens are often transmitted only by a limited range of ticks.

Australian tickborne diseases

There are three tickborne diseases in Australia: two spotted fever group rickettsiae (Queensland tick typhus and Flinders Island spotted fever) and Q fever. Although Q fever has been isolated from ticks, transmission to humans has not been definitively proven. A number of other microorganisms (including the flavivirus Saumarez Reef virus) have been isolated from ticks in Australia but to date are not known to have caused any cases of human disease.

Queensland tick typhus, caused by *Rickettsia australis*, is found along Australia’s eastern seaboard as far south as

Victoria. The vector is the paralysis tick. Flinders Island spotted fever, caused by *R. honei*, is found in south-eastern Australia, including Tasmania, and is transmitted by the reptilian tick, *Bothriocroton hydrosauri*. Both infections cause mostly mild illness which is characterised predominantly by fever, rash, myalgia, headache and lymphadenopathy. Despite this, several cases of severe infection with Queensland tick typhus requiring admission to intensive care have been reported and death may occur if left untreated.² Both infections respond well to antibiotic therapy.

In addition to infectious diseases, tick bites can cause a range of adverse reactions, from localised pain and swelling to systemic allergic reactions including anaphylaxis or tick paralysis. Tick paralysis, caused by a toxin found in the saliva of *I. holocyclus*, is a frequent cause of paralysis and death in animals and although rare today, had been fatal in humans before the development of an antivenene.

Prevention and control

Personal precautions can include avoiding tick infested areas, using repellents, wearing light coloured clothing and regularly checking for ticks. Environmental strategies such as fencing to exclude wildlife from areas inhabited by humans, modification of the habitat to decrease humidity through clearing of vegetation and mowing lawns and chemical control of ticks in the environment may also be used.³

Conclusion

The global burden of tickborne disease is significant. In Australia however, tickborne diseases do not contribute greatly to the overall communicable disease burden, due to both low overall incidence and the relative mildness of locally endemic tickborne diseases. However, exposure to ticks does carry a risk and changes in the distribution of ticks and the epidemiology of tickborne diseases have been witnessed internationally. Changes in climate and human lifestyle will influence the presentation of tickborne disease.

References

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