

Ticks: Rocky Mountain Spotted Fever

Jose Lapenta*, Jose Miguel Lapenta

University of Carabobo, J Medic Surgeon, Specialty Dermatology, CEO Dermagic express, Venezuela

***Corresponding author:** Jose Lapenta, University of Carabobo, J Medic Surgeon, Specialty Dermatology, 24 years of exercise. Highly trained in the field of Leprology, CEO Dermagic express, Venezuela, Email: dermagicexpress@gmail.com

Abstract:

In this publication we present you another disease caused by the bite of several TICKS: ROCKY MOUNTAIN SPOTTED FEVER, which is caused by a bacterium named *Rickettsia Rickettsii*, and by another recently discovered bacterium, *Rickettsia Parkeri*. This disease, described since the 1900s, is disseminated from North America to South America. The purpose of this publication is to provide information about the main vectors of the disease, how it is transmitted, its symptoms, treatments and to alert the world once again that these parasites, ticks, are the new plague of the 21st century.

Keywords: Rocky Mountain spotted fever; Spotted fever; Typhus by ticks; Black measles, *Dermacentor andersoni*; *Dermacentor variabilis*; *Rhipicephalus sanguineus*; *Rickettsia rickettsii*; *Rickettsia parkeri*

Introduction

Hello friends of Ommega, we bring you another interesting topic about the TICKS and the diseases they transmit, in this case it is the ROCKY MOUNTAIN SPOTTED FEVER (RMSF), which is transmitted by the a tick bite and disseminated not only in the United States, but has also been described in the AMERICAS under the name of “Sao Paulo fever” or “Maculosa Fever” in BRAZIL; “Spotted fever” or “tick Typhus” In MEXICO; or “Tobia Fever” in COLOMBIA. Cases have also been described in Costa Rica and Panama^[1-5].

This disease is caused by the bacterium called *Rickettsia Rickettsii*, a gram-negative intracellular cocobacillus considered to be the most pathogenic strain in the Western Hemisphere and in a small part of the Eastern Hemisphere. It belongs to the *Rickettsiaceae* Family, Order: *Rickettsiales*, Class: *Alphaproteobacteria*, Domain: Bacteria, Genus: *Rickettsia* and species: *Rickettsia Rickettsii*. The disease extends from Canada to South America, and is the most frequent rickettsial disease in the United States^[6-11].

The main tick transmitter of this bacterium are the ticks of the *Dermacentor* genus, Family *Ixodidae*, known as “hard ticks” which, in addition to transmit the *Rickettsia Rickettsii*, are transmitters of other diseases such as: Tick Paralysis (neurotoxin); the Powassan virus (*Powassan encephalitis*); the Fever Q (*Coxiella burnetii*); Anaplasmosis in cattle and humans (*Anaplasma Marginale* and *Anaplasma spp.*); Tularemia (*Francisella tularensis*) and Babesiosis in equine (*piroplasmosis*) and humans (*Babesia Caballi* and *Babesia spp.*)^[12-18].

The *Dermacentor* genus of ticks belongs to the *Ixodidae* Family and has more than 34 described species and the most commonly involved in the Rocky Mountain Spotted Fever are

Dermacentor Andersoni (Rocky mountain tick) and *Dermacentor Variabilis* (American dog tick or Wood Tick), which is the second main vector causing this disease.



Figure 1: *Dermacentor Andersoni*.

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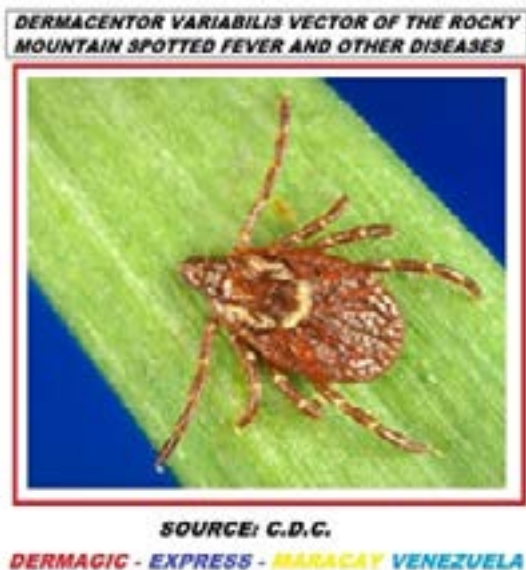


Figure 2: Dermacentor variabilis.

The “hard tick”, *Dermacentor Variabilis*, in addition to transmitting the Rocky Mountain spotted fever, also transmits Tularemia (*Francisella tularensis*). They can also be the carriers for *Anaplasma phagocytophilum*, which causes the Human Granulocytic Anaplasmosis, and for *Ehrlichia chaffeensis*, the causal agent of Human Monocytic Ehrlichiosis; they can also cause Tick Paralysis by injecting a “neurotoxin” into the human blood stream during feeding.

In addition to the *Dermacentor Variabilis* and *Dermacentor Andersoni*, which are vectors of the Rocky Mountain Spotted Fever (RMSF), other species have been described: *Rhipicephalus Sanguineus* (Brown tick of the dog), *Amblyomma Cajennense* (Cayena tick), disseminated in the South and Central Americas, *Amblyomma Americanum* (Lone Star Tick) and *Amblyomma Maculatum* (Tick of the Gulf Coast), all of which are involved in the transmission of this disease^[1-22].

On the other hand, it was discovered in the year 2002 and confirmed in 2003 that another species of *Rickettsia*, the *Rickettsia Parkeri*, found in the tick *Amblyomma Maculatum* and recently found in the tick *Amblyomma Americanum*, can also causes Rocky Mountain Spotted Fever (RMSF).

In addition, even though the ticks *Dermacentor Variabilis* and *Reticulatus* are not considered vectors of *Borrelia Burgdorferi*, the causal agent of Lyme disease, also known as Erythema Migrans, antibodies against *Borrelia Burgdorferi* have been shown to be present in these two ticks.

History

The disease Rocky Mountain spotted fever is also known as “Typhus by ticks” and “Blue Disease”. It was described in the years 1800 and 1900 in the Valleys of Montana United States (US), known at that time as “Black measles” for its clinical characteristics. Later it was discovered that the ticks were the vectors of the same disease and it was in the year 1906, scientist Howard T. Ricketts discovered the causal agent and described it as an agent “smaller than a bacterium and longer than a virus”; the agent was named *Rickettsia Rickettsii* in honor of Howard T. Ricketts^[22-30].

It was Willy Burgdorfer who linked Rocky Mountain spotted fever to the *Rickettsias*. In fact, between 1967 and 1978, when he was investigating the *Rickettsial Zoonoses* in Egypt he was relocated by the WHO (1976-1986 - World Health Organization) to Montana, United States, and in the course of his investigations he discovered the feared *Spirochete Borrelia* in 1981 which carries his surname *Burgdorferi* in his honor.

These ticks are the natural hosts and they serve as reservoirs and vectors; they transmit the *Rickettsia* through their bites of vertebrates mammals and man, and unlike other diseases they only need two hours to be attached to the skin to cause transmission of the disease; so the disease is a zoonosis, transmitted from animals to man. It can also be transmitted through fluids, tick feces and contaminated tissues.

Symptoms: Symptoms of the disease appear after an incubation period of 1 to 2 weeks, (can affect children and adults) and include three stages:

Initial phase: fever, headache, nausea, vomiting, loss of appetite, mumps.

Secondary phase: characterized by maculous and petechial rash, abdominal pain, conjunctivitis and joint pain.

Posterior or late stage: the *Rickettsia* may invade the brain, heart, eyes, lungs, kidneys, gastrointestinal tract, and other organs causing definitive sequel such as: deafness, ataxia, blindness, and loss of bladder and bowel control and in extreme cases amputation of limbs by gangrene. Mortality in severe cases: 30-80%.

The “Classical Triad” of this disease in terms of symptoms is: Fever, Maculous, Petechial Eruption and the Precedent of Tick Bite. It should be noted that only 35 to 60 % of patients manifest the complete triad; 40 % do not present the typical rash of the disease. It is presented in a centripetal form, spreading from the extremities to the trunk^[1-32].

Treatment

The treatment of choice for the Rocky Mountain Spotted Fever (RMSF) is Doxycycline (tetracycline antibiotic), the same medication used to treat Lyme disease and Ehrlichiosis, which is administered for a period of 10 to 14 days, and in some cases may be longer. The other antibiotic that is shown to be effective against *Rickettsias* is chloramphenicol, but this medication should be used with cautions because it has many side effects.

Following is a list of nine (9) diseases caused by seven (7) ticks: (Including the ticks of the Family *ixodidae*: *Ixodes Scapularis* or the black legged tick)

Rocky Mountain spotted fever (*Rickettsia Rickettsii*).

Powassan Encephalitis (*Powassan virus, flavivirus*).

Tick Paralysis (*neurotoxin*).

Ehrlichiosis (*Ehrlichia chaffeensis, Ehrlichia ewingii*).

Human Granulocytic Anaplasmosis (*Anaplasma spp*)

Babesiosis in Animals and Humans (*Babesia spp*).

Fever Q (*Coxiella burnetti*).

Tularemia (*Francisella tularensis*).

Lyme Disease (*Ixodes Scapularis*)^[1-32]

“... perhaps other diseases Today not well documented or simply man has not discovered yet.”

Conclusion

On the web you can find thousands of articles about the Rocky Mountain Spotted Fever (RMSF), history and symptoms, but for us the main objective of this publication is to make you understand the following:

- These ticks are distributed practically all over the planet.
- Transmitted parasitic diseases with risk of mortality pose a real and present public health danger if the diagnosis and treatment are not made in time.
- Some of the transmitted diseases are resistant to treatments such as Lyme disease, causing permanent disabilities, confining patients to wheelchairs for life.
- In addition to fighting against tick-borne diseases such as Lyme disease, the efforts should be devoted to control and eliminate ticks and their hosts.
- The Codes Icd-11 (International Classification of Diseases, year 2018) for the Rocky Mountain spotted fever have been recognized by the World Health Organization (WHO) a long time ago, but for entities like Lyme disease, the scientific community and the affected population await their inclusions.
- The new plague of the 21st century are not caused by mosquitoes (Dengue, Zika and Chikungunya), but by ticks^[33-38].

“... Humanity is not going to be extinguished by atomic bombs thrown into the air, atomic bombs walk in the earth attached to animals, mice, rats, birds, coyotes, deer, dogs, cats, cattle, goats, camel sheep, rabbits, etc, or the humans, feeding on his blood, contaminating and spreading vertiginously, slowly creating a incapacitated society ... “

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