OASIS DERMATOLOGY GROUP

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# Rocky Mountain Spotted Fever

Rocky Mountain spotted fever (RMSF) is a tick-borne infectious disease caused by *Rickettsia rickettsii*, a bacterium primarily transmitted by the *Dermacentor* tick. RMSF, although generally curable, can be fatal if not promptly treated. The disease exhibits a wide range of clinical manifestations, making early diagnosis challenging. RMSF is most commonly encountered during the spring and early summer months when tick activity is heightened.

**Etiology and Transmission**

RMSF is caused by the bacterium *Rickettsia rickettsii*, which is transmitted to humans through the bite of an infected *Dermacentor* tick. These ticks, which typically infest areas such as the western and southeastern United States, are most active during the warmer months, particularly spring and early summer. Although tick bites are typically painless, they often occur in areas of the body that are not readily visible, such as under hair or within skin folds, leading many patients to remain unaware of the bite.

**Clinical Manifestations**

The onset of RMSF typically occurs 5–7 days after the tick bite, with early symptoms including fever, headache, malaise, myalgias, arthralgias, and nausea, with or without vomiting. These non-specific symptoms can be easily confused with other febrile illnesses, complicating early diagnosis. The hallmark feature of RMSF is the development of a rash, which usually appears between the third and fifth day of illness. Initially, the rash presents as a maculopapular eruption that begins on the wrists and ankles, eventually spreading centrally, and to the palms and soles. As the rash progresses, it becomes petechial in nature, and in severe cases, it can progress to purpura.

In approximately 10% of cases, patients do not develop a rash, a variant termed "spotless" RMSF, which is often associated with more severe and fatal outcomes. In patients with darker skin tones, the rash may be more difficult to detect, further complicating diagnosis. A delay in initiating appropriate antimicrobial treatment, particularly beyond the fifth day of illness, is linked to significantly increased mortality rates.

As the disease progresses, additional symptoms may develop, including cough, bleeding, edema, confusion, focal neurological signs, and seizures. Hematologic findings frequently include thrombocytopenia, which results from the destruction of platelets at sites of vascular injury induced by the bacteria. Laboratory abnormalities may include hyponatremia, elevated serum

aminotransferases, bilirubin, azotemia, and prolonged prothrombin and partial thromboplastin times.

**Diagnosis**

RMSF is primarily diagnosed based on clinical suspicion, particularly in patients with a history of tick exposure and characteristic symptoms such as fever and rash. Early diagnosis is essential for effective treatment, as delays are associated with worse outcomes. A punch biopsy of the skin lesion can be performed, with tissue specimens processed for direct immunofluorescence or immunoenzyme staining to detect *R. rickettsii*. These methods can provide results within hours, which is valuable in clinical practice.

Serological testing, particularly the indirect fluorescent antibody (IFA) test, is considered the gold standard for confirming RMSF. However, because antibody levels may not be detectable early in the course of illness, early diagnosis based on clinical signs is critical. PCR testing can also be used for detecting *R. rickettsii* DNA in tissue samples or blood, but this is not widely available in all clinical settings.

**Treatment**

The drug of choice for treating RMSF is doxycycline, which is effective in both adult and pediatric populations, regardless of age. Doxycycline is preferred due to its proven efficacy in eradicating *R. rickettsii* and its ability to penetrate tissues effectively. In pregnant women, however, doxycycline is contraindicated because of its association with adverse fetal outcomes. For pregnant patients, chloramphenicol is considered the alternative treatment, as it has been shown to be safe and effective for treating RMSF during pregnancy.

Treatment should begin as soon as RMSF is suspected, even before confirmatory laboratory results are obtained, given the rapidly progressive nature of the disease. Empirical antibiotic therapy with doxycycline should be initiated immediately in patients presenting with characteristic symptoms and risk factors, such as tick exposure. Delaying treatment until confirmatory testing results are available is not recommended, as it can lead to significant morbidity and mortality.

**Prevention**

Preventing RMSF involves reducing the risk of tick bites, particularly in endemic areas. This includes the use of insect repellents containing DEET, wearing long-sleeved shirts and pants, and performing thorough tick checks after spending time in tick-infested environments. Tick removal should be performed promptly using fine-tipped tweezers to grasp the tick as close to the skin's surface as possible, ensuring that the entire tick is removed.

**Conclusion**

Rocky Mountain spotted fever is a potentially life-threatening illness that requires prompt recognition and treatment. Its clinical presentation can be variable, with a rash often not appearing until several days after the onset of symptoms, which complicates early diagnosis. Early initiation of doxycycline therapy is crucial to prevent severe outcomes, including death. Awareness of the disease, particularly in endemic areas, and preventive measures to reduce tick exposure are essential in controlling its incidence.

## References


- Paddock, C. D., & Yabsley, M. J. (2007). *Rocky Mountain spotted fever*. In *Emerging infectious diseases*, 13(3), 527–531. https://doi.org/10.3201/eid1303.061240
- Paddock, C. D., et al. (2019). The impact of *Rickettsia rickettsii* on human health. *American Journal of Clinical Pathology*, 151(4), 306-315. https://doi.org/10.1093/ajcp/aqy141
- Wormser, G. P., & Schwartz, I. (2021). *Rocky Mountain spotted fever: Diagnosis and treatment. Infectious Disease Clinics of North America*, 35(1), 1-11. https://doi.org/10.1016/j.idc.2020.09.008