

Rickettsia with Atypical Presentation in Rural Population

Vaishnavi Gurumurthy^{1*} and Gauri Jain²

Abstract

Rickettsia species are small, Gram-negative bacilli that are obligate intracellular parasites of eukaryotic cells. Incidence of Rickettsia have been found in various states of India. Over the last decade, there has been rising incidence of Rickettsia infection in the rural population of Indian subcontinent. The pathogenesis of Rickettsia is varied because of which there are high chances of atypical presentation to the hospital. One such atypical symptom is edema. Due to inflammation of endothelial cells of the blood vessel, extravasation of fluid occurs causing edema and acute kidney injury.

Keywords: Bipedal Edema; Doxycycline; Rickettsia; Rash

Introduction

Ticks, lice, fleas, mites, chiggers, and mammals are hosts to a variety of Gram-negative, obligately intracellular bacteria called rickettsiae [1]. Scrub typhus and Indian tick typhus are the most frequent rickettsial infections to have been reported from India thus far. Cases have been reported in increasing numbers over the past ten years. In fact, it has been proven that rickettsial infections are zoonotic bacterial infection that is reemerging in the Indian subcontinent. However, due to a number of factors, including difficulty in diagnosing infections due to inadequate diagnostic tests, low index of clinical suspicion due to nonspecific signs and symptoms, and lack of awareness among healthcare professionals, all cases reported so far from India are an underestimate [2]. These zoonotic pathogens cause infections that disseminate in the blood to many organs. *Rickettsia* and *Orientia* species are transmitted by the bite of infected ticks or mites or by the feces of infected lice or fleas. Through the bloodstream, rickettsiae spread from the skin's portal of entry to infect the endothelium and occasionally the vascular smooth muscle cells and reticuloendothelial cells [1,3]. Herein we discuss a case where a woman presenting with fever, splenomegaly and bipedal edema and developing rash during her hospital stay and how Rickettsia came to be diagnosed.

Case History

A 72 year old woman presented to the Emergency Department with complaints of fever with chills, increased urination, generalised fatigue, bipedal edema and myalgia accompanied with a history of remote insect bite. Admission was decided on the fact that she had unremitting fever for the last 5 days along with bite history. On admission routine blood tests such as CBC, RFT, CRP and USG abdomen was ordered. On admission the values were Hb- 9.3 mg/dl, TLC- 13,300 cells/mm³, platelet- 2,25,000/mm³, CRP- 54 mg/dL. Renal function test revealed serum creatinine level of 1.42, BUN of 40mg/dL and proteinuria of 1+. USG abdomen revealed hepatomegaly

Affiliation:

¹Department of PID, Indian Council of Medical Research-NIIH, Mumbai, India

²Emergency Department, Ashoka Medico Hospital, Nashik, India

*Corresponding Author

Dr. Vaishnavi Gurumurthy, Indian Council of Medical Research- NIIH, 13th floor, New Multistoreyed building, KEM Hospital Campus, Parel, Mumbai-400012, India.

Citation: Vaishnavi Gurumurthy, Gauri Jain. Rickettsia with Atypical Presentation in Rural Population. Archives of Clinical and Medical Case Reports 7 (2023): 18-19.

Received: December 11, 2022

Accepted: December 30, 2022

Published: January 20, 2023

with splenomegaly. The patient was admitted to the wards and empiric treatment was started. On day 2 of admission, she developed rashes in her upper extremity, torso and lower extremity. Blood tests were drawn for PCR tests wherein checking for infectious causes such as malaria, dengue, typhoid and rickettsia were done. She was immediately started on Inj. Doxycycline 100 mg in 100cc BD with fluid restriction of 1.5L/day and fever reducer. On day 3 of admission, PCR came positive for Rickettsia. Retesting of CRP showed a level of 157 mg/dL. She was continued with Inj. Doxycycline for the next 7 days and her fever, rash and edema improved over time.

Discussion

Numerous rickettsial species have shown signs of being dangerous to humans. On the other hand, many other species, some of which may be weakly pathogenic, have not shown any evidence of being pathogenic to humans. Although a number of potential factors have been put forth as contributing to rickettsiae's pathogenicity, the precise molecular basis for this pathogenicity has not yet been determined [4]. The pathogenic sequence of events that occur in rickettsial infection begins with the entry of organisms inoculated by the feeding tick or mite or scratched into the skin from infected louse or flea feces deposited on the skin. The rickettsiae then spread via lymphatic vessels to the regional lymph nodes as has been observed vividly in the lymphangitis associated with *R. sibirica mongolitimoniae* infection [5]. Rickettsiae then spread hematogenously throughout the body and infect mainly endothelial cells, but also to a lesser extent, macrophages, in the skin, lungs, brain, liver, gastrointestinal tract, kidneys, heart, and other organs. The fundamental lesion of rickettsial diseases is vasculitis, which comprises the events that follow rickettsial infection and activation of endothelium and subsequent spread to involve focal continuous networks of endothelial cells mainly of the microcirculation [1,5]. These lesions form the basis for the rash, which progresses from macules to maculopapules with the accumulation of interstitial edema, and subsequently to petechial lesions with extravasation of blood around the most intensely infected networks of microcirculation in the center of the maculopapules. The pathophysiologic events can be attributed principally to rickettsia infection-associated increased vascular permeability leading to edema, hypovolemia, hypotension, reduced perfusion of organs, acute respiratory distress syndrome, and CNS abnormalities [5]. The patient encountered above had a similar course of events when she developed bipedal edema on presentation without rash. Because of the extravasation of fluid, this patient can be witnessed as having acute kidney injury evidenced

by the increased serum creatinine and urea levels. Although she was normotensive, it was evident that she had reduced perfusion of organs. This presentation can diverge the course of treatment as mistreatment or misdiagnose. Keeping in mind the resurgence of Rickettsia in the Indian subcontinent mainly in the rural population, one must look out for various symptoms not only pointing towards it but also the atypical symptoms and do timely testing for prompt treatment.

Conclusion

The pathogenesis of Rickettsia is varied because of which patients can present with variety of symptoms outside of textbook knowledge. Physicians must be aware and keep in mind this fact and get PCR testing done as early as possible to tackle the rising numbers of Rickettsia in rural population of India. Due to inflammation and vasculitis there are high chances of presenting with edema before the development of rash; which is pathognomic of Rickettsia. Such symptoms must not be missed and training to the healthcare providers must be done to create awareness; especially those working at the periphery to consider rickettsial infections as one of the important causes of PUO. In view of low index of suspicion, nonspecific signs and symptoms, and absence of widely available sensitive and specific diagnostic test, these infections are notoriously difficult to diagnose. Failure of timely diagnosis leads to significant morbidity and mortality.

Funding

No funding received from any organization.

Conflict of Interest

None to declare.

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