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Severe Mediterranean Spotted Fever Presenting with Septic Shock and Multiple Organ Dysfunction Syndrome: A Case Report

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ABSTRACT

Background: Mediterranean spotted fever , caused by Rickettsia conorii, is an endemic tick-borne zoonosis in the Mediterranean region. Although the disease is usually self-limiting, severe forms complicated by septic shock and multiple organ dysfunction syndrome are uncommon and potentially life-threatening. Early recognition and prompt initiation of doxycycline are crucial to improve outcomes.
Case Presentation: We report the case of a 61-year-old man with poorly controlled type 2 diabetes mellitus (HbA1c 10%) who presented with a 15-day history of fever, generalized maculopapular rash, and progressive confusion. On admission, he was febrile (39°C) and in septic shock with hypotension, tachycardia, oliguria, and a Glasgow Coma Scale score of 13/15. Physical examination revealed a characteristic inoculation eschar in the right gluteal region. Laboratory investigations showed marked systemic inflammation, thrombocytopenia, acute kidney injury, hepatocellular injury with cholestasis, hyperlactatemia, and coagulation abnormalities. Serological testing by indirect immunofluorescence assay detected anti-Rickettsia conorii IgG antibodies. The diagnosis of severe Mediterranean spotted fever complicated by septic shock and multiple organ dysfunction syndrome (SOFA score: 10) was established. The patient received intravenous crystalloids, norepinephrine, doxycycline, ciprofloxacin, methylprednisolone, insulin therapy, gastric protection, and venous thromboembolism prophylaxis. His clinical course was favorable, with progressive resolution of organ dysfunction, successful discontinuation of vasopressor support, and transfer to the Infectious Diseases Department.
Conclusion: This case highlights that Mediterranean spotted fever should be considered in the differential diagnosis of septic shock associated with fever, rash, and an inoculation eschar in endemic areas. Early diagnosis, prompt doxycycline therapy, and timely intensive care management are essential for improving patient outcomes.

KEYWORDS :

Mediterranean spotted fever; Rickettsia conorii; Septic shock.

MAIN ARTICLE

INTRODUCTION

Mediterranean spotted fever (MSF) is a tick-borne zoonosis caused by *Rickettsia conorii* subsp. *conorii* and transmitted by the brown dog tick, *Rhipicephalus sanguineus*. It is endemic throughout the Mediterranean basin, including North Africa, where it represents the most common spotted fever group rickettsiosis [1,2]. The disease typically presents with the classical triad of fever, maculopapular rash, and an inoculation eschar, although atypical manifestations are not uncommon [1]. While MSF is generally considered a self-limiting illness, severe forms complicated by septic shock and multiple organ dysfunction syndrome have increasingly been recognized, particularly in elderly patients and those with underlying comorbidities such as diabetes mellitus [1,3]. Early diagnosis remains challenging because microbiological confirmation is frequently delayed; therefore, prompt recognition and early initiation of doxycycline are crucial to improve outcomes [1,4]. We report a rare case of severe Mediterranean spotted fever presenting with septic shock and multiple organ dysfunction successfully managed in the intensive care unit.

CASE PRESENTATION

A 61-year-old man with poorly controlled type 2 diabetes mellitus, treated with metformin (HbA1c: 10%), was admitted to the intensive care unit with a 15-day history of persistent fever, generalized skin rash, and progressive alteration of mental status. On admission, he was febrile (39°C), confused with a Glasgow Coma Scale (GCS) score of 13/15 (E4V4M5), attributable to impaired verbal response, and exhibited no focal neurological deficits. His pupils were equal, and reactive to light. Hemodynamic assessment revealed hypotension (80/70 mmHg), tachycardia (120 beats/min), and oliguria with dark-colored urine, consistent with circulatory failure. Respiratory examination demonstrated tachypnea (35 breaths/min) with an oxygen saturation of 95% on room air. Dermatological examination (Figures 1-2) disclosed a diffuse maculopapular rash involving the trunk and extremities, together with a characteristic inoculation eschar located in the right gluteal region (Figure 3), highly suggestive of

Mediterranean spotted fever. Initial laboratory investigations (Table 1) revealed marked systemic inflammation, leukocytosis with neutrophilia, severe thrombocytopenia, acute kidney injury, hyperlactatemia, hepatocellular injury associated with cholestasis, and mild coagulation impairment. Serological testing by indirect immunofluorescence assay (IFA) detected anti-*Rickettsia conorii* IgG antibodies. Cerebrospinal fluid analysis was unremarkable, showing no cytobiochemical or microbiological abnormalities. Brain computed tomography, thoracoabdominal computed tomography, and transthoracic echocardiography revealed no significant abnormalities. Based on the epidemiological context, characteristic clinical findings, and supportive serological results, a diagnosis of septic shock secondary to Mediterranean spotted fever complicated by multiple organ dysfunction syndrome involving the neurological, renal, hepatic, and hematological systems was established. The patient's Sequential Organ Failure Assessment (SOFA) score on admission was 10, reflecting severe organ dysfunction. The patient underwent hemodynamic resuscitation with intravenous crystalloids and norepinephrine infusion for septic shock. Empirical antimicrobial therapy consisting of doxycycline (200 mg/day) and intravenous ciprofloxacin (200 mg every 12 hours) was initiated promptly, together with adjunctive methylprednisolone (40 mg every 12 hours). Supportive care also included gastric protection with a proton pump inhibitor , venous thromboembolism prophylaxis, and glycemic control with insulin therapy..The patient's clinical condition progressively improved, allowing discontinuation of norepinephrine after hemodynamic stabilization. Neurological status returned to baseline, while serial laboratory assessments demonstrated recovery of renal and hepatic function, normalization of inflammatory markers, and resolution of thrombocytopenia. He was subsequently transferred to the Department of Infectious Diseases to complete antimicrobial therapy and continue specialized management.

Table 1. Laboratory findings on admission

Parameter	Admission value	Reference range
Hemoglobin (g/dL)	13.2	13–17
White blood cell count (×10⁹/L)	15	4–10
Neutrophils (×10⁹/L)	14	2–7.5
Platelet count (×10⁹/L)	34	150–400

C-reactive protein (CRP) (mg/L)	334	<5
Procalcitonin (ng/mL)	16	<0.5
Troponin (ng/L)	33	2–34
Blood urea (g/L)	1.73	0.15–0.38
Serum creatinine (mg/L)	17	7–12
Aspartate aminotransferase (AST) (U/L)	107	<40
Alanine aminotransferase (ALT) (U/L)	126	<45
Alkaline phosphatase (ALP) (U/L)	160	40–130
Gamma-glutamyl transferase (GGT) (U/L)	243	<60
Total bilirubin (mg/L)	46	3–10
Prothrombin time (%)	66	70–100
Blood lactate (mmol/L)	4	<2
Sodium (mmol/L)	135	135–145
Potassium (mmol/L)	4.37	3.5–5.0
Serum bicarbonate (mmol/L)	21	21-28
Glycated hemoglobin (HbA1c, %)	10.0	<7.0

Figure 1

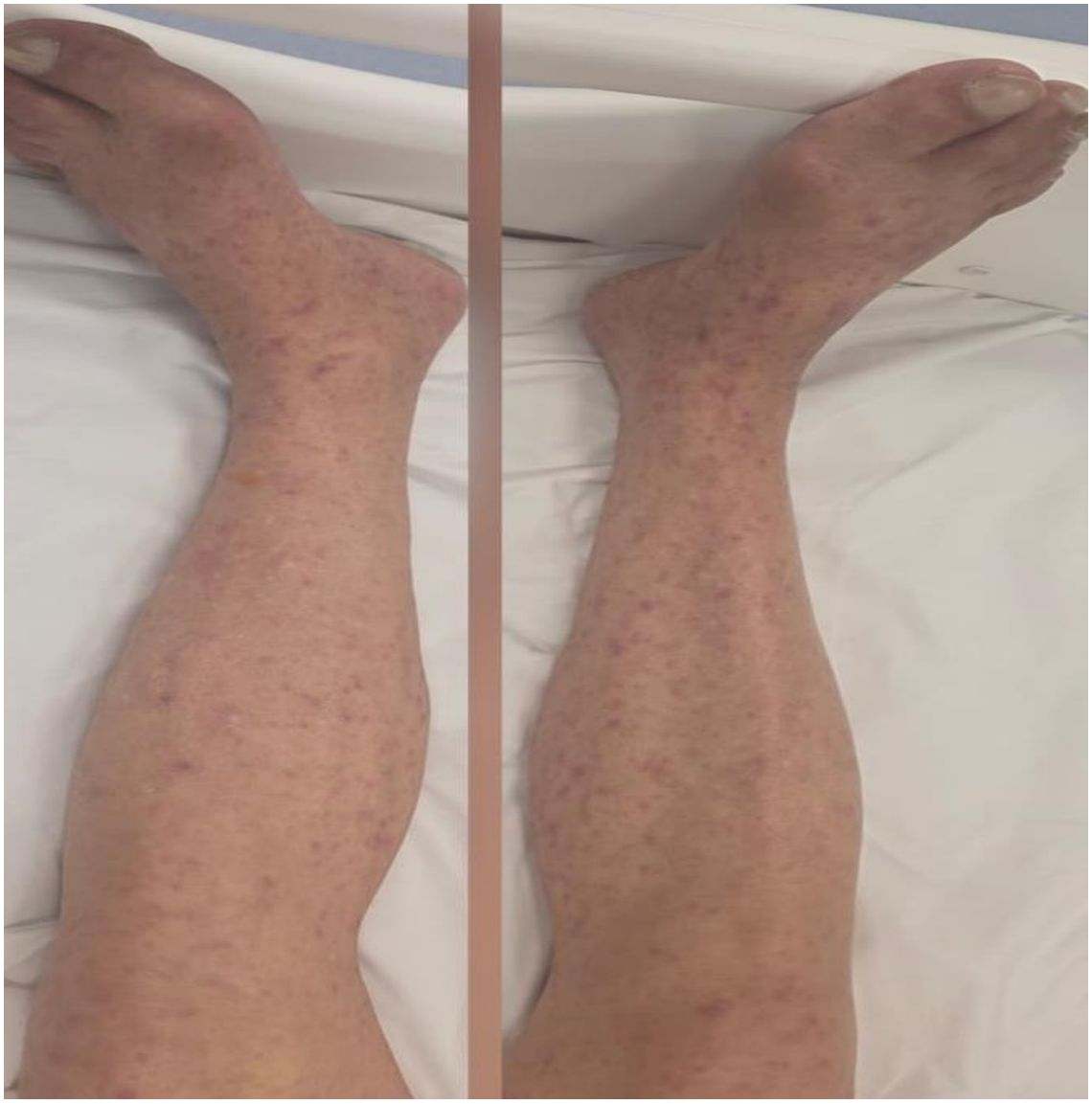

Figure 2

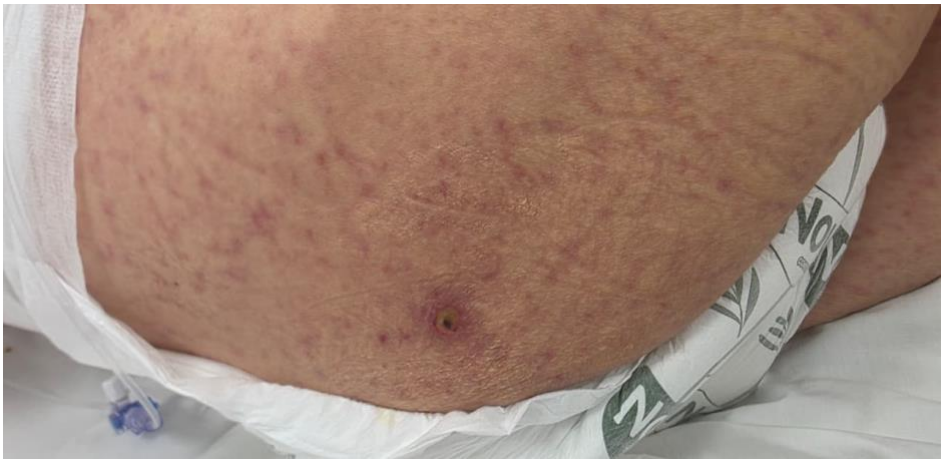

Figure 3

DISCUSSION

MSF has traditionally been regarded as a benign infectious disease, severe and potentially fatal presentations have been increasingly reported over the past decades [1,3]. Septic shock remains an uncommon manifestation but should be recognized as part of the clinical spectrum of severe rickettsiosis [3]. Our patient developed septic shock associated with neurological, renal, hepatic, and hematological dysfunction, illustrating the capacity of *Rickettsia conorii* to induce multiple organ dysfunction syndrome.

The severity of MSF is mainly explained by the pathogen's marked tropism for vascular endothelial cells. After inoculation through the tick bite, *R. conorii* invades endothelial cells, causing diffuse vasculitis, endothelial injury, increased capillary permeability, activation of inflammatory pathways, and microvascular dysfunction. These mechanisms account for the development of distributive shock, tissue hypoperfusion, and subsequent organ failure, including acute kidney injury, hepatic dysfunction, thrombocytopenia, and neurological manifestations, all of which were observed in our patient [1,5].

Several risk factors have been associated with severe MSF, including advanced age, diabetes mellitus, chronic cardiac or respiratory disease, immunosuppression, delayed diagnosis, and delayed initiation of appropriate antimicrobial therapy [3]. Our patient presented several of these unfavorable prognostic factors, namely age greater than 60 years, poorly controlled diabetes mellitus (HbA1c 10%), and multiple organ dysfunction at admission. His SOFA score of 10 reflected the severity of organ involvement and justified immediate intensive care management.

The diagnosis of MSF remains primarily clinical, especially during the early phase of the disease, when serological tests may still be negative [1]. The combination of persistent fever, diffuse maculopapular rash, and a characteristic inoculation eschar in a patient living in an endemic region strongly suggests the diagnosis and should prompt immediate empirical treatment [1,4]. In our patient, the diagnosis was supported by positive indirect immunofluorescence assay (IFA) for anti-*Rickettsia conorii* IgG antibodies together with the characteristic clinical presentation.

The laboratory abnormalities observed in our patient, including thrombocytopenia, acute kidney injury, elevated inflammatory biomarkers, hyperlactatemia, hepatocellular injury, and

cholestasis, have been consistently reported in severe MSF and reflect the systemic endothelial injury induced by rickettsial infection [1]. Although cerebrospinal fluid analysis and imaging studies were unremarkable, transient neurological dysfunction has frequently been described in severe disease and is thought to result from cerebral vasculitis rather than direct bacterial invasion [1,6].

Doxycycline remains the cornerstone of treatment for all rickettsial infections regardless of disease severity [4]. Because microbiological confirmation is often delayed, treatment should be initiated immediately whenever MSF is clinically suspected. Early administration of doxycycline has been consistently associated with reduced mortality and improved clinical outcomes [1,4]. In addition to targeted antimicrobial therapy, patients presenting with septic shock require prompt hemodynamic resuscitation, vasopressor support, and comprehensive organ support. In the present case, early initiation of doxycycline combined with aggressive supportive care resulted in rapid hemodynamic stabilization and complete recovery.

This case emphasizes that MSF should be included in the differential diagnosis of septic shock associated with fever, rash, thrombocytopenia, and hepatic or renal dysfunction in patients living in or returning from endemic regions. Careful skin examination for an inoculation eschar remains a simple but invaluable diagnostic clue that may facilitate early recognition and timely treatment, thereby substantially improving patient prognosis [1,3].

CONCLUSION

This case highlights that Mediterranean spotted fever, although usually benign, may present as septic shock with multiple organ dysfunction. In endemic areas, early clinical suspicion, recognition of the characteristic rash and inoculation eschar, prompt initiation of doxycycline, and appropriate intensive care management are essential to improve patient outcomes.

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The authors declare no conflict of interest

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