Reminder of important clinical lesson

Association between sepsis and Rocky Mountain spotted fever

Marcelo Rodrigues Bacci, José Jorge Namura

Department of General Practice, Faculdade De Medicina Do ABC, Santo André, Sao Paulo, Brazil

Correspondence to Professor Marcelo Rodrigues Bacci, mrbacci@yahoo.com

Summary

Rocky Mountain spotted fever (RMSF) is a disease caused by the Gram-negative coccobacillus *Rickettsia rickettsii* which has been on the rise since the last decade in the USA. The symptoms are common to the many viral diseases, and the classic triad of fever, rash and headache is not always present when RMSF is diagnosed. It may progress to severe cases such as renal failure, disseminated intravascular coagulation and septicaemia. This report aims to present a fulminant case of RMSF associated with sepsis. It describes a female patient's case that quickly progressed to sepsis and death. The patient showed non-specific symptoms for 5 days before being admitted to a hospital. The fact that she lived in an area highly infested with *Amblyomma aureolatum* ticks was unknown to the medical staff until the moment she died.

BACKGROUND

As it is of great importance to endemic areas, we present the following report of severe complications caused by undetected Rocky Mountain spotted fever (RMSF). We were also moved to report this serious case of sepsis and RMSF because there is no significant number of references in the databases that state this association. We do believe that this will help many general practitioners and emergency doctors consider RMSF in endemic regions as a differential diagnosis in the septic syndrome.

CASE PRESENTATION

A 52-year-old woman, who lived in São Bernardo do Campo, a southeastern municipality in Brazil, presented to her general practitioner with diarrhoea and general muscular pain, especially in the lower limbs, for 5 days. While the symptoms lasted, paracetamol, sodium diclofenac and butilescopolamin were administered for relief. She was transferred to the emergency department (ED) of the Faculdade de Medicina do ABC Medical School hospital, in São Bernardo do Campo, sweating, dyspneic and with a blood pressure of 110/60 mm Hg and a heart rate of 140 beats/min. She presented paleness and extremity cyanosis. The ECG tracing revealed only sinus tachycardia. There were no alterations in either the abdominal physical or neurological exams. The patient remained awake and conscious with no meningeal irritation signs. Laboratory test results, displayed in table 1, indicate a decrease in the haemoglobin levels and in the leucocyte and platelet counts. There was renal deterioration.

INVESTIGATIONS

The first clinical investigation encompassed a complete biochemical analysis, the collection of blood and urine cultures, which revealed no bacterial growth, as well as serological tests for hepatitis A, B and C. The patient lived in a big city situated in the southeastern part of Brazil, and

Table 1 Laboratorial data

Variable	Reference range adults	On presentation
Blood culture	Negative	Negative
Haemoglobin (g/dl)	12–16 (women)	9.7
Haematocrit (%)	36–47 (women)	29.2
White cell count (per mm ³)	5000–10000	6200
Differential count (%)		
Monocytes	4–12	5
Neutrophils	55–69	79
Lymphocytes	15–30	13
Basophils	0–2	2
Platelet count (per mm ³)	150000–450000	9000
Urea (mg/dl)	17–50	149
Creatinin (mg/dl)	0.6–1.1	6.20
Potassium (mEq/l)	3.5–5.1	3.6
Sodium (mg/dl)	135–145	143
Creatine phosphokinase (U/l)	26–155	567
<i>Rickettsia</i> IgM antibody	<64	>256
<i>Rickettsia</i> IgG antibody	<64	<64
<i>Rickettsia</i> PCR	Negative	Positive

once it is a known endemic area for RMSF, serological tests for the disease were performed despite the lack of confirmation that the patient was exposed to the tick. As the case was first reported as meningococcaemia, she was empirically started on ceftriaxone, 2 g twice a day and underwent a platelet transfusion (7 units) due to the thrombocytopenia and the need of lumbar puncture.

DIFFERENTIAL DIAGNOSIS

This case was a real challenge to the ED physicians because of the multiple possibilities of diagnostics. The patient developed a septic shock syndrome and initially had diarrhoea and could have developed a bacterial abdominal translocation as main reason for the sepsis.

Other possibilities according to the sequential signs as rash and thrombocytopenia could be meningococcaemia

and meningitis due to the fast and terrible evolution; dengue and viral fulminant hepatitis also were kept in mind by the staff of ED.

Other Rickettsiosis could also be the reason for the sepsis, however, only the PCR would make the diagnosis.

As pulmonary infectious diseases such as bacterial pneumococcal infection, are very common and could present with septic shock and intravascular disseminated coagulopathy, we also thought in this issue as a cause even, with no history of respiratory signs because of the high prevalence of pneumonia at this age.

OUTCOME AND FOLLOW-UP

Around 30 min after admission she developed livedo reticularis over the lower limbs, hypotension and respiratory failure. She was drowsy and presented no sign of neck stiffness.

Orotracheal intubation was performed along with volemic expansion with crystalloids and vasopressors.

The patient went into cardiorespiratory arrest and died 4 h after her admission to the hospital. There was not enough time for a safe lumbar puncture. However, the research for *Rickettsia* spp, analysed by PCR method, later proved to be positive.

DISCUSSION

The present case does not reflect the most common evolution of RMSF¹. The worst scenario (renal failure, coagulopathy and sepsis) is directly related to the delay on the diagnosis and on the medication administration.² The patient had already been examined by the general practitioner before being admitted to the ED. However, the symptoms the patient presented resembled the early manifestations of viral infections, a fact that makes the initial diagnosis more difficult.³

After her death, her husband reported that she had been feeling general discomfort and muscular pain for 7 days and that they lived in a country house, close to a water reservoir, in an infested area with ticks. No signs of skin spots or tick bites were reported.

RMSF has an average incubation period of 7 days.³ The classic triad, fever, headache and rash, is not always present, and the diagnosis based only on the early symptoms is a challenge to any general practitioner. Most of the times these symptoms are first seen as viral syndromes, and the epidemiological factor should always serve as a screening process to better direct the diagnosis.

Sepsis, as an infectious syndrome, is a highly common disease in any ED. Once it is an RMSF complication, it may easily be confused with more common diseases, such as meningococcaemia or other bacterial infections.^{3 4} Sepsis differential diagnosis in an endemic area, like the place where the patient in question lived, mandatorily includes RMSF serology and an investigation on the

exposure to the *Amblyomma aureolatum*, better known as yellow dog tick in the southeastern part of Brazil where it is the main vector for RMSF.

Serological analysis by immunofluorescence reaction is very sensitive, but little specific for the *Rickettsia rickettsii* once it does not differentiate it from other rickettsioses. The PCR method⁵ is another useful tool in the difficult task of quickly identifying other *Rickettsia* species. Such an exam was not performed on the patient because it has not been standardised in the hospital where she was admitted.

In conclusion, the systematic investigation for RMSF in patients who live in endemic areas should be part of the first clinical investigation in the event of sepsis. Constant publications in peer-reviewed journals are a useful tool for the continuing medical education and the scientific community.

Learning points

- The classic triad of fever, rash and headache is not always present in Rocky Mountain spotted fever cases. An investigation on a possible tick exposure in endemic areas must be systematically conducted.
- Sepsis is a syndrome caused by several different infectious agents, and when it is not taken care of in time, it has a bad evolution. The valid and recommended measure is the quick identification of possible causal agents and empirical treatment of broad spectrum.
- The collection of PCR for *Rickettsia* is a useful means to detect rickettsial pathogens once the immunofluorescence reaction does not discriminate them.

Competing interests None.

Patient consent Obtained.

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