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Short communication

Fatal *Rickettsia rickettsii* infection in a child, Northwestern Colombia, 2017

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ABSTRACT

This report describes a new lethal case of *Rickettsia rickettsii* infection in a child from Northwestern Colombia, after ten years of the last outbreaks in the same region. Colombian public-health authorities should consider to include this severe rickettsiosis in the compulsory-reporting diseases, with the aim of knowing its burden in the country.

1. Introduction

Rickettsia rickettsii infection, also known as Rocky Mountain spotted fever (RMSF), is a severe tick-borne disease geographically restricted to the American continent, being endemic in the United States, Mexico, Panamá, Costa Rica, Colombia, Brazil and Argentina (Hidalgo et al., 2013). In countries where the disease is nationally notifiable (USA, Mexico and Brazil), high case fatality rates have been reported between 10–51% (Biggs et al., 2016; Álvarez-Hernández et al., 2017; de Oliveira SV et al., 2016). In Colombia, after its first description in 1937, four sporadic outbreaks of RMSF took place between 2003 and 2008 in central (Department of Cundinamarca) and northwestern (Departments of Antioquia and Cordoba) regions with a case fatality rate of ≈ 30% (Faccini-Martínez et al., 2016). In the last decade no new human confirmed cases have been described, nevertheless, the real burden of this rickettsiosis is unknown since it is not subject of compulsory-reporting diseases system by the Colombian health authorities. We report another fatal case of *R. rickettsii* infection in a child from Colombia.

2. Case presentation

On July 11, 2017 a 3-year-old boy was taken to outpatient clinic of the municipal hospital in Chigorodó (Urabá region, Department of Antioquia), Colombia (7°40′11″N 76°40′53″W), after two days of fever, chills, vomiting, diarrhea, headache, and abdominal pain. A presumptive diagnosis of dengue was made, and he was released to the care of his parents. Four days later he became stuporous and developed generalized diffuse petechial rash and was admitted to the hospital. At physical examination, the patient appeared acutely ill with fever (39 °C), tachycardia and tachypnea. Skin examination showed a petechial rash involving the trunk and extremities, and edema in lower limbs. The patient was referred to a higher level complexity hospital in the municipality of Apartadó, Department of Antioquia. Initial blood analysis showed normal leukocytes count (9090 cells/mm^3), neutrophilia (83%), thrombocytopenia (30,000 platelets/μL), hyponatremia (115 mEq/L) and elevated C-reactive protein (20.47 mg/L). On July 16, six days after onset of symptoms, ceftriaxone was started for suspected meningococcemia, but the patient's condition continued to deteriorate. Serological tests for dengue and *Leptospira* were negative. An increasing neutrophilia (86%), elevated transaminases (AST [324

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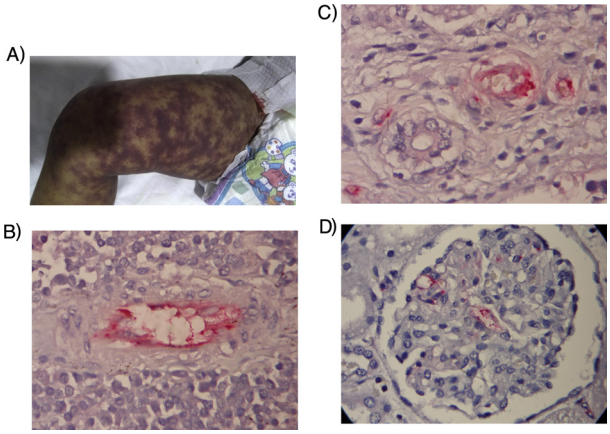

Fig. 1. *Rickettsia rickettsii* rickettsiosis in a Colombian child, 2017. A) Purpuric rash involving the right thigh of the patient. Immunohistochemical staining of spotted fever group rickettsial antigens (red) in central arteriole in the spleen (B), arteriole in the liver (C), and glomerular capillaries in the kidney (D). Immunoalkaline phosphatase stain with fast red-naphthol phosphate and hematoxylin counterstain (polyclonal anti-*Rickettsia rickettsii* antibody at 1/400, CDC); original magnifications, x40. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article).

U/L], ALT [113 U/L]), blood urea (59.3 mg/dL) and anemia was observed, with persistence of thrombocytopenia (26,000 cells/μL). The patient became comatose with persistence of fever and developed a generalized purpuric rash (Figure, Panel A); he was transferred to the intensive care unit with supplemental oxygen and inotropic support. He died the following day of multiple organ failure, seven days after onset of symptoms. An autopsy showed generalized ecchymosis, congestive hepatomegaly, splenomegaly, vascular congestion, interstitial edema, and microhemorrhages. Post-mortem organ samples were sent to Instituto Nacional de Salud (INS) de Colombia where histopathological study showed multiple foci of perivascular lymphocytic and monocytic infiltration in brain, lungs and spleen. Additionally, kidney and serum samples were sent to Laboratorio de Ciencias Veterinarias CENTAURO of Universidad de Antioquia for molecular diagnosis suspecting a RMSF case. Through quantitative and conventional PCR protocols (Hidalgo et al., 2007; Quintero et al., 2017), partial fragments of *gltA* and *ompA* rickettsial genes were amplified and sequenced from both kidney and serum samples. After BLAST comparisons, *gltA* and *ompA* genes shared 100% identity with *R. rickettsii* sequences. Complementarily, at INS, the formalin-fixed, paraffin-embedded sections of spleen, liver, and kidney demonstrated abundant spotted fever group rickettsial antigens by immunohistochemistry (Biggs et al., 2016) (Fig. 1, Panel B, C and D). In a retrospective interview, after confirming the diagnosis, relatives of the child recalled a familial leisure activity in a riparian rural area of Chigorodó municipality few days before illness, and also reported having three dogs at home; which suggest potential risk of tick exposure.

3. Discussion

This report describes a new lethal case of *R. rickettsii* infection in a child from northwestern Colombia, ten years after the last outbreaks in the same region (Faccini-Martínez et al., 2016). This presents the question about a possible reemergence of this disease, or alternatively, an endemic condition with underdiagnosed cases. The latter is plausible taking into account recent studies performed in rural areas of Urabá region (where the child came from), that shows high seroprevalence (25–41%) to spotted fever group rickettsiae (SFGR) and a cumulative incidence of 6.23% to rickettsial infections in humans. Nevertheless, this high seroprevalence is likely related to a less pathogenic *Rickettsia* such as *Rickettsia amblyommatis* or *Rickettsia parkeri* (Quintero et al., 2017; Londoño et al., 2017; Quintero et al., 2018). Moreover, a descriptive longitudinal study in the same region during 2007–2008, pointed SFGR as a probable etiology in ≈ 3% of acute febrile non-malarial syndromes (Arroyave et al., 2013)

Our findings demonstrate the ongoing presence of *R. rickettsii*, the most pathogenic SFGR, in Colombia, and try to make health professionals aware of considering it as a differential diagnosis within the etiologies of cases of acute febrile illness coming from rural areas, especially in the central and northwestern regions of the country, for the clinical diagnosis and appropriate treatment of RMSF. As well as, persuading the Colombian public-health authorities to include it in the compulsory-reporting diseases, with the aim of better understanding the epidemiology and burden of this rickettsiosis in the country. Finally, failure to recognize this rapidly progressive and life-threatening disease, particularly in areas where it appears sporadically, is a challenge faced throughout the Americas, not just Colombia (Álvarez-Hernández et al., 2017; CDC, 2000).

Conflict of interest

The authors declare no financial or personal conflicts of interest in the study.

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