

## Rickettsial Infection Diagnosed in a Clinical Context in Oman

### تشخيص العدوى بالركيتسيات في سياق سريري في عمان

Dear Sir,

An 11-year-old boy presented to the Sultan Qaboos University Hospital (SQUH), Muscat, Oman, in 2016 with a one-week history of scattered nodular-like erythematous lesions over the arms, petechial rashes over the *dorsa* of both feet and itchy maculopapular urticarial rashes over both thighs [Figure 1]. He had a high-grade fever which reached 39.5 °C as well as a headache, generalised body pain and swelling around the joints. The patient lived in Muscat and had no known history of tick bites, travel or contact with animals. A systemic examination revealed hepatomegaly and splenomegaly (both organs enlarged to 3 cm below the costal margin) as well as generalised body tenderness, *myalgia* and meningism. The bilateral knee and ankle joints were swollen with some restriction in movement, mainly flexion with partial extension. All vital signs were stable and normal, except for the persistent high-grade fever, which responded only partially to antipyretic medications.

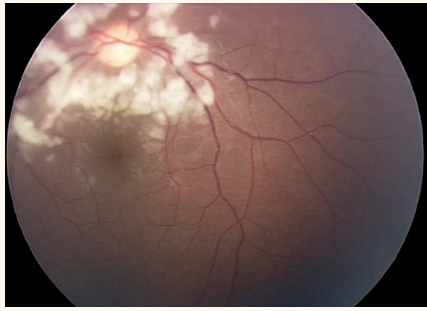
Initial investigations showed mild proteinuria (700 mg/dL over a 24-hour period) and microscopic haematuria (1+). A complete blood count revealed normal amounts of haemoglobin cells and platelets; however, the patient had leukocytosis (white blood cell count: 24,000/m<sup>3</sup>) and neutrophilia (absolute neutrophil count: 21,400/m<sup>3</sup>). His coagulation profile was normal. Further investigations indicated high C-reactive protein levels (125 mg/L), a high erythrocyte sedimentation rate (58 mm/hour), persistent unexplained low sodium levels (128 mmol/L), low chloride levels (89 mmol/L), very high creatine kinase levels (781 U/L), low serum albumin levels (29 g/L), normal renal function, normal complement levels, elevated alanine aminotransferase levels (190 IU/L) and elevated aspartate aminotransferase levels (250 U/L). An initial chest X-ray, ultrasound of the abdomen and gallium scan were normal.

Autoimmune causes, including vasculitis, immune deficiency, malignancy and *pyrexia* of unknown origin, were ruled out with various investigations, including antinuclear antibody, anti-double-stranded DNA, antineutrophil cytoplasmic autoantibody, antimyeloperoxidase antibody and antiproteinase 3 antibody tests, skin and bone marrow aspirate biopsies, cultures and lumbar punctures. However, the patient had persistently high inflammatory markers. Serology screening for *Brucella*, *Leishmania*, *Mycoplasma*, malaria and *Leptospira* infections was negative. A bronchoalveolar *lavage* for tuberculosis resulted in a negative acid-fast *bacilli* smear with normal cytology and negative cultures. Virology screening was negative for cytomegalovirus, Epstein-Barr virus and acute hepatitis infections. Virology screening of nasopharyngeal aspirate was negative for influenza A and B viruses and subtype A H1N1 as well as enteroviruses, Coxsackieviruses, human immunodeficiency virus and *Coxiella burnetii* bacteria.

The patient was treated with several combinations of antibiotics, including ceftriaxone and piperacillin/tazobactam, vancomycin and meropenem, vancomycin and erythromycin as well as ciprofloxacin and gentamicin. However, he did not respond to these treatments. At this point, his fever had persisted for 35 days. A fundoscopic



**Figure 1:** Photographs of an 11-year-old boy with (A) scattered nodular-like erythematous lesions over the arms, (B) a petechial rash over the *dorsa* of both feet and (C) itchy maculopapular urticarial rashes over the thighs.



**Figure 2:** Funduscopy image showing white preretinal infiltrates with a cheese-like appearance, extending up to the *macula*.

examination revealed white preretinal infiltrates with a cheese-like appearance, extending up to the *macula* and obscuring the retinal vessels [Figure 2]. No haemorrhage was observed. Finally, a Weil-Felix test using the OX2 (titre 160) and OXK (titre 80) antigens was positive; combined with the clinical features, this was suggestive of a rickettsial infection. The patient was subsequently prescribed doxycycline. Within four days, he showed a marked reduction in fever and his serological titre decreased after 10 days of treatment. Regular follow-up ophthalmological examinations showed substantial improvement.

Despite the presence of potential tick vectors in Oman, clinical rickettsial infections were not reported until the late 1990s.<sup>1</sup> However, a serological survey in the Dhofar province of southern Oman revealed that these infections are common among the rural population.<sup>2</sup> The patient in the current case was diagnosed with a rickettsial infection following observation of typical clinical features, including rashes, headaches, hepatosplenomegaly, *myalgia*, meningism, hyponatremia, and elevated liver transaminase levels.<sup>3</sup> Moreover, evidence of retinal changes supported the diagnosis as ocular manifestations have been a key element in previous reports of similar conditions.<sup>4-6</sup> Although the Weil-Felix test is considered to have low specificity, the clinical features, exclusion of other differential diagnoses and the improvement of symptoms after treatment with doxycycline are suggestive of a rickettsial infection.<sup>3</sup> Testing of the OX2 and OXK antigens was positive. Unfortunately, further testing to confirm the diagnosis could not be carried out due to the unavailability of indirect immunofluorescence antibody and polymerase chain reaction assays at SQUH at the time. In addition, national public health laboratories were not consulted due to the delay in serological test results and the patient's prompt clinical response to treatment. Despite these factors, the current case is indicative of the existence of rickettsial infections in Oman. Ophthalmological examinations for characteristic features of rickettsial infection can aid in diagnosis, within the context of clinical presentation and response to treatment.

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## References

1. Scrimgeour EM, Mehta FR, Suleiman AJ. Infectious and tropical diseases in Oman: A review. *Am J Trop Med Hyg* 1999; 61:920-5.
2. Idris MA, Ruppel A, Petney T. Antibodies against rickettsia in humans and potential vector ticks from Dhofar, Oman. *J Sci Res Med Sci* 2000; 2:7-10.
3. Mittal V, Gupta N, Bhattacharya D, Kumar K, Ichhpujani RL, Singh S, et al. Serological evidence of rickettsial infections in Delhi. *Indian J Med Res* 2012; 135:538-41.
4. Agahan AL, Torres J, Fuentes-Páez G, Martínez-Osorio H, Orduña A, Calonge M. Intraocular inflammation as the main manifestation of *Rickettsia conorii* infection. *Clin Ophthalmol* 2011; 5:1401-7. doi: 10.2147/OPTH.S21257.
5. Smith TW, Burton TC. The retinal manifestations of Rocky Mountain spotted fever. *Am J Ophthalmol* 1977; 84:259-62. doi: 10.1016/0002-9394(77)90860-1.
6. Abroug N, Khairallah-Ksaa I, Kahloun R, Khohtali S, Zaouali S, Khairallah M. Parinaud's oculoglandular syndrome revealing subclinical *Rickettsia conorii* infection. *Int Ophthalmol* 2015; 35:717-19. doi: 10.1007/s10792-015-0094-2.