

CASE REPORT

ENDEMIC TYPHUS (MURINE TYPHUS) IN AN 18 YEAR OLD LIBYAN ADULT

Pavan Sable¹ and Mohammed Maayuf²

¹Liverpool School of Tropical Medicine, Liverpool, UK; ²Department of Infectious Diseases, Misurata Central Hospital, Misurata, Libya

Abstract. We present a case of an 18 year old Libyan with a history of fever, frontal headache, bodyache, malaise, abdominal pain, nausea and vomiting, followed by macular to maculopapular rash. A diagnosis of endemic typhus (murine typhus) was made based on the typical clinical findings and epidemiological history given by the patient. Routine blood investigations were inconclusive and a chest x-ray was normal. The patient was treated by oral doxycycline. The patient responded favorably to treatment.

INTRODUCTION

Endemic typhus (murine typhus) is a rickettsial infection caused by *Rickettsia typhi*. The disease is transmitted by a rat flea, *Xenopsylla cheopsis*. However, other rodents and their ectoparasites have been implicated as alternative competent reservoirs and vectors of *R. typhi* (Traub *et al*, 1978; Loftis *et al*, 2006). House mice are highly susceptible to experimental infection with *R. typhi* (Philip and Parker, 1938) and mice, in the absence of rats, have been implicated in several outbreaks of murine typhus (Traub *et al*, 1978). In United States, contrary to the classic rat-flea-rat cycle, the most important reservoirs of infection are opossums and cats; the cat flea, *Ctenocephalides felis*, has been identified as the principal vector (Sorvillo *et al*, 1993).

Endemic typhus occurs in tropical, sub-

tropical, and temperate zones throughout the world, principally in Southeast Asia, Africa, Central America, and the Mediterranean region. The disease is seen in seaports, urban areas, and certain rural areas infested by wild rats *eg*, grain storage facilities (Civen and Ngo, 2008). Murine typhus is often unrecognized and underreported in Africa; however, from northern Africa, 7 cases in Tunisia were documented in 2005 (Letaief *et al*, 2005) and in 2 cases in Algeria (Mouffok *et al*, 2008). The seasonal incidence peak occurs in late spring and early summer (Fauci *et al*, 1998). Globally, a drop in endemic typhus cases has occurred because of reduction in the oriental rat flea, *X. cheopsis*, by the use of DDT and improved rat control (Wallace *et al*, 1998).

CASE REPORT

An 18 year old unmarried Libyan presented with a history of fever, frontal headache, bodyache, malaise, abdominal pain, nausea and vomiting, followed by a macular to maculopapular rash. The rash was ini-

Correspondence: Dr Pavan Sable, DTM&H student Liverpool School of Tropical Medicine, Pembroke Place, L3 5QA, United Kingdom.
Tel: 0044 75 0174 2112
E-mail: pavhappy@yahoo.com



Fig 1–Maculopapular rash of the right arm.



Fig 2–Rash of the right leg.

tially macular, started on the arms and legs, then spread to the rest of the body, including the palms and soles. No eschar was seen. Lymphadenopathy was absent.

The patient gave a history of regular contact with sheep and cats, but denied a history of insect bites. The patient also reported living in poor housing conditions and the presence of rat burrows and rat infestation around the house. The patient gave no history of a similar illness or contact with similar cases in past.

Routine blood investigations were not conclusive, urine examination and chest x-ray showed no major abnormalities. No serological tests were done. The diagnosis was made on clinical grounds and response to treatment. The patient was treated with doxycycline and his condition gradually improved.

DISCUSSION

Endemic typhus was postulated by Maxcy in 1926 to be a distinct disease, with rats as a reservoir and fleas as the vector. Dyer isolated *Rickettsia typhi*, the causative agents from rats and fleas in 1931 (Fauci *et al*, 1998).

Endemic typhus is more prevalent in warm and coastal areas (Longmore *et al*, 2005). The patient was a resident of the periurban area of Misurata City where rat infestation is fairly common and the housing conditions are favorable for transmission.

The actual mode of transmission is not the bite of the rat flea but by inoculation onto the skin feces of infected fleas, and possibly by inhalation of dried infective feces. However, some authors (Shulman *et al*, 1997; Last and Wallace *et al*, 1998) have reported the bite of infected fleas as a mode of transmission as well. Although patients seldom recall a bite or exposure to fleas, but exposure to animals such as cats or rats is usually present (Fauci *et al*, 1998). Dog and cat fleas have been suspected as occasional vectors for humans. This case had documented close contact with cats and sheep prior to the onset of illness. There have been no documented cases of person to person spread (Wallace *et al*, 1998).

The incubation period ranges from 1 to 2 weeks, which is fairly constant (Park, 2005; Bannister *et al*, 1996). The clinical features include fever, persistent headache, myalgia,

nausea, vomiting, abdominal pain and macular rash or maculopapular rash (Axford and O' Callaghan, 1996). The initial rash is often seen in the axilla or inner surface of the arm. Subsequently, the rash becomes maculo-papular, involving the trunk more than the extremities (Fauci *et al*, 1998). The signs and symptoms resemble that of louse borne typhus, but are milder, shorter in duration and murine typhus is rarely fatal (Axford and O' Callaghan, 1996; Shulman *et al*, 1997; Haslett *et al*, 2002). The main pathology with this disease is endovasculitis (Bannister *et al*, 1996), which causes a rash and bleeding. Rarely, the disease may present as an acute febrile illness and retinitis or neuroretinitis (Hudson *et al*, 1997). Complications are rare and mortality is less than 1% (Shulman *et al*, 1997).

The diagnosis is usually made by clinical findings, epidemiological history and response to treatment (Shulman *et al*, 1997). Sometimes a travel history may point to the diagnosis (Bannister *et al*, 1996). An exact diagnosis is often difficult (Longmore *et al*, 2005). Serology is the mainstay of laboratory diagnosis and routine blood tests are usually unhelpful (Haslett *et al*, 2002). An IFA test is the widely used serologic diagnostic method. However, *R. typhi* may cross-react with other rickettsial antigens, including spotted fever group (SFG) rickettsiae, and especially, *R. prowazekii*, the agent of epidemic typhus (La Scola *et al*, 2000). The complement fixation test (CFT) and Weil-Felix reaction are also used, but both lack sensitivity. Immunohistology may demonstrate rickettsia in the skin lesions. Polychromatic stains, such as Giemsa stain, have been used to identify intracellular rickettsia (Shulman *et al*, 1997). PCR has a high sensitivity and specificity for the diagnosis of rickettsial infections (Singhsilarak *et al*, 2005; Stenos *et al*, 2005).

Antibiotic treatment with tetracycline

or chloramphenicol is usually effective (Souhami and Moxham, 1997). The drugs inhibit the organism's growth rather than kill them; general supportive measures and the host's immune response are important factors in recovery. Doxycycline is the drug of choice (Hardman and Limbird, 1995). Permanent sequelae are rare, and one attack confers immunity (Shulman *et al*, 1997; Wallace *et al*, 1998). Residual insecticide application (such as with malathion) and rodent control measures should be implemented to control the disease in the community. No endemic typhus vaccine is currently available (Park, 2005).

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