Oculoglandular Tularemia From Crushing an Engorged Tick

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We report on an unusual case of oculoglandular tularemia acquired after crushing a tick removed from a dog. As a droplet sprayed into the patient's eye the eyelids became inflamed, and on the fourth day, a high fever started. Prompt antibiotic treatment prevented serious complication.

Keywords. oculoglandular; dog-related infection; tick-borne infection; tick-borne tularemia; tularemia.

A 25-year-old man removed an engorged tick from his dog. As he crushed the tick, a droplet accidentally sprayed into his left eye. Two days later, his left eyelids and the surrounding skin of the face became swollen and sensitive to touch. A lymph node became enlarged and moderately painful in front of the left ear. The conjunctivae were red with minimal purulent discharge, and his eyes started to intensively tear (Figure 1). He had a temperature of 37.2°C 3 days after the incident. His family doctor initiated treatment for erythema migrans with 500 mg of amoxicillin b.i.d. and an eye drop containing dexamethasone and gentamycin. His temperature elevated to 39°C on the fourth day, and then he visited our clinic. Suspecting tularemia, we immediately changed the treatment to doxycycline 100 mg b.i.d. for 20 days and changed the eyedrops to tobramycin instead of the steroid and gentamycin combination. His routine laboratory tests showed a sedimentation rate of 5 mm/h; his white blood cell count was 3.3 G/L (normal range, 4–10.0 G/L), C-reactive protein was 16.3 mg/L (normal, <8.0 mg/L), procalcitonin was <0.05 ng/L (normal, <0.50), alanine aminotransferase (ALT), aspartate aminotransferase (AST) and gamma-glutamyltransferase (GGT) were normal, but total bilirubin was elevated: 44.2 μmol/L (normal, 5.1–17.1 μmol/L) and direct bilirubin was 11.1 μmol/L (normal: <6.8 μmol/L), tested on the fifth day after the incident.

All the other blood tests were in the normal range. His temperature decreased rapidly and returned to normal within 3 days after the doxycycline treatment. He became symptom-free 2 weeks after the start of the treatment (Figure 2) and was healthy at the time of the 6-week follow-up visit.

The serum samples drawn on the fourth, 19th, and 42nd days after the accident were positive for Francisella tularensis antibodies examined by tube agglutination (in-house; 0, 1:160, 1:320) and immunofluorescence test (IgM: 0, 1:64, 1:64; IgG: 0, 1:256, 1:1024). Polymerase chain reaction was not performed because of the biohazard concern. All serum samples tested for Borrelia burgdorferi s.l. by Western blot and Anaplasma phagocytophilum indirect immunofluorescence tests remained negative for both IgM and IgG.

Tularemia is a zoonotic infection caused by F. tularensis. It is extremely contagious. The infectious dose in humans is 10 to 50 organisms [1]. Rodents, lagomorphs, and ticks are the main reservoirs. Ticks and biting flies are the most important vectors of transmission. Animal bites, contaminated water, processing or touching cadavers of wild game (especially hares), and tick bites are frequent routes of transmission. In Slovakia, a neighboring country to Hungary, it was found that 12.8% of tularemia cases were tick-borne [2]. There are 3 subspecies of Francisella tularensis; holarctica has less virulence in comparison with subsp. tularensis, which is missing from Europe but common in North America.

There are 6 major patterns of illness: ulceroglandular, glandular, oculoglandular, pharyngeal, typhoidal, and pneumonic [1]. Tick-borne spread is a leading form of transmission of ulceroglandular disease, the most common subtype of tularemia [3].
and doxycycline are the drugs of choice. As our patient has no delay, long before the diagnostic serological test result is available. The first-line treatment of tularemia is streptomycin and gentamycin, especially in serious cases (if the patient has no meningitis). These antibiotics are preferred in the United States as cases are more serious there. In milder cases, quinolones and doxycycline are the drugs of choice. As our patient has no serious general symptoms and we treated him in the very early phase of his infection, we used doxycycline because of its favorable side effect profile [1]. For local treatment, gentamycin, ciprofloxacin, and tobramycin eye drops may help the healing process [8, 9].

Our patient has an elevated serum (mainly unconjugated) bilirubin level. Although tularemia may complicate granulomatous hepatitis [10], in our patient this was not the case, as he had no elevated liver enzymes. Later, in a repeated test, results showed similar bilirubin levels with otherwise normal hepatic function. Based on these characteristics, we diagnosed him with Gilbert’s syndrome, which had no connection to the tularemia. Gilbert’s syndrome is a common hereditary benign condition that affects the bilirubin conjugation pathway with no liver damage.

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**Patient consent statement.** The patient whose photograph is included in this paper gave written consent to Dr. Lakos to use the photo in which his eyes appear and describe his illness in a way in which his identity is not revealed. The written and signed consent form is on file with the corresponding author (Dr. Lakos) of this manuscript.

**Ethical approval.** The manuscript conforms to the standards currently applied in Hungary. The study does not include factors necessitating ethical committee approval.

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**Figure 2.** Oculoglandular tularemia; 2 weeks after initiating doxycycline treatment.