Treatment of tularemia with levofloxacin

Tularemia is an infection caused by *Francisella tularensis*, a small, Gram-negative, rod-shaped bacterium that does not grow on ordinary culture media [1]. This infection is not commonly diagnosed in Spain [2]. The antimicrobials currently considered for treatment of tularemia are streptomycin, which has a clinical cure rate of 97%, and gentamicin and tetracyclines, which have rates of 88% and 86%, respectively [3]. Recently, quinolones have been shown to be an excellent therapeutic option for tularemia [4,5]. We describe an immunocompetent patient who developed oculoglandular tularemia and was treated successfully with levofloxacin.

A 66-year-old man was admitted to hospital for evaluation of fever, swelling of the left side of his face, and pain and swelling of left lower eyelid; the patient had had the symptoms for 2 days. He had recently hunted a hare, which had appeared lethargic. He used gloves while flaying it. He denied other medical conditions.

Physical examination showed an axillary temperature of 39 °C, swelling of the left side of the face, enlarged neck lymph nodes (submandibular left), erythema and swelling in the internal ocular angle of the left eye.

Results of biochemistry were: WBC 7400 mm^{-3} (normal), sedimentation rate 62 mm/h, AST 102 U/L (0–38), ALT 116 U/L (0–41), gammaGT 216 U/L (11–50), serum sodium 128 mEq/L(135–145). Chest radiograph and abdominal ultrasound were unremarkable. Cervical CT scan showed lymphadenopathy of left submandibular cluster and preauricular space making a conglomerate, single lymphadenopathy in the right vascular space. Blood cultures obtained on the day of admission were negative. A titre of serum agglutinins towards *F. tularensis* of 20 (0–40) was recorded initially (test-tube agglutination). A presumptive diagnosis of tularemia was made and intravenous therapy with levofloxacin (500 mg daily) was administered. Within 48 h the patient became afebrile. Levofloxacin dosage was changed to 500 mg orally daily. The patient was discharged on the 8th hospital day and completed a 14-day course of levofloxacin therapy. During convalescence, increasing titres (640) of agglutinating serum antibodies to *F. tularensis* were demonstrated. At a 4-month follow-up, the patient was well and without evidence of relapse.

F. tularensis causes epizootics in lagomorphs (hares and rabbits) and rodents. These animals are the main sources of tularemia in man [1], who is infected by contact with contaminated animal products and water, by the bite of an arthropod, by inhalation of small particles and by animal bite [2]. Hunting and handling of, or flaying, dead animals have been associated with a larger risk of infection [6].

Depending on the mode of transmission, tularemia presents in various clinical forms [1]. The less frequent entity is oculoglandular tularemia (0–5% [1]), which our patient had. In this form, the access of microorganism is across the conjuntiva.

Outside manifest outbreaks, the diagnosis of sporadic cases is, generally, reached more by chance than by clinical suspicion. Some of these infections may be subclinical and it is possible that atypical tularemia (febrile illness without organ manifestation) will remain undiagnosed [7]. Some clinical forms of tularemia may be easily confused with other diseases and this may lead to inadequate treatment. Serologic studies of the prevalence of *F. tularensis* have been done, indicating that a significant proportion of cases escape being reported.

F. tularensis is rarely isolated from human blood without highly nutrient media and it is very contagious to laboratory workers [7]. Because of this, the usual diagnostic method is serology: detection of specific antibodies to structural antigens of *F. tularensis*; the test is easily applied and avoids infection risk. Seroconversion is the criterion for definitive diagnosis: and was defined as a fourfold or greater increase in titre of *F. tularensis* antibodies between initial and convalescent sera (3 or more weeks apart) [1].

Clinical experience of quinolones as alternative agents for treatment of tularemia is limited [5]. In a MEDLINE search of the English-language literature (up to April 2000), 10 cases of tularemia treated with quinolones were found. A favorable clinical response was documented in all cases. Quinolone was administered orally in eight of 10 patients. The advantages of quinolones in tularemia are [8,9]: (1) they are generally well tolerated; (2) they achieve adequate blood levels and MICs after oral administration; (3) they have excellent intracellular penetration; and (4) the relapse rate is 0% compared to 6–12% in standard treatment.

Our case represents the eleventh successfully treated with quinolones. Another case of oculoglandular tularemia was treated with ciprofloxacin [4] with a good result. This small number will demand additional experience. In conclusion, levofloxacin may be an effective agent for treating tularemia.

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