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CLINICAL REASONING: CASE REPORT

An unusual cause of a necrotic bullous skin lesion: a case report

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Summary

BACKGROUND: Tularaemia is a zoonotic infection uncommon in Switzerland, but its incidence is increasing. Thus, tularaemia should also be considered in returning travellers with compatible exposure history. We report a case of ulceroglandular tularaemia presenting with a necrotic bullous skin lesion.

CASE PRESENTATION: A man in his 30s presented with a necrotic bullous lesion on the right palm, accompanied by ipsilateral axillary and supraclavicular lymphadenopathy. Eleven days prior, during a stay in Canada, he developed an itchy skin lesion and reported direct contact with a hare carcass five days before symptom onset. He initially received antibiotic therapy with a cephalosporin, which did not result in clinical improvement. A swab obtained from the lesion tested positive for *Francisella tularensis* subsp. tularensis by polymerase chain reaction (PCR), and serology confirmed the result.

TREATMENT AND OUTCOME: Antibiotic therapy was initially switched to doxycycline (100 mg twice daily), but discontinued after 6 days because of a sore throat suggestive of oesophageal irritation. Ciprofloxacin (500 mg twice daily) was subsequently administered for 10 days, during which the lesion, lymphadenopathy and general symptoms resolved rapidly.

This case highlights the importance of thorough exposure history and the early consideration of tularaemia in patients with necrotic skin lesions and regional lymphadenopathy, particularly when there is no response to standard antibiotic therapy. Early diagnosis allows for appropriate antimicrobial treatment and favourable outcomes.

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Introduction

Tularaemia is a zoonotic infection caused by the Gram-negative bacterium *Francisella tularensis,* and presents with a broad spectrum of clinical manifestations depending on the route of infection [1, 3]. Two clinically relevant subspecies are distinguished: *Francisella tularensis* subsp. *tularensis* (Type A), found almost exclusively in North America and typically associated with more severe disease, and Francisella tularensis subsp. holarctica (Type B), which is endemic across Europe, including Switzerland [1, 3, 6].

Tularaemia is a notifiable disease in Switzerland, with 194 cases reported in 2024, an increase of 77 cases compared to the previous year. Incidence has risen over the past decade, and tularaemia is increasingly recognised as a rare but emerging zoonosis in Central Europe, including Switzerland. [4, 5]

Tularaemia may be overlooked in non-endemic regions, particularly when presenting with atypical necrotic skin lesions that mimic common bacterial soft tissue infections. Imported cases of tularaemia are rare in Switzerland but may occur in returning travellers. Here, we report a case of imported type A tularaemia presenting as a necrotic bullous palmar lesion with regional lymphadenopathy, highlighting the diagnostic challenges and the importance of a detailed exposure history.

Case description

A man in his 30s presented to our emergency department with a necrotic bullous lesion on the right palm. He had returned the same day from a four-month stay in Canada. Eleven days earlier, while still in Canada, he developed an initially itchy skin lesion on the right palm, which subsequently increased in size and was accompanied by fever, night sweats, and painful right-sided axil-

lary and supraclavicular lymphadenopathy. There, an outpatient nurse, suspecting a superinfected insect bite, initiated antibiotic therapy with oral cephalexin. As there was no improvement, hospitalisation was arranged with a suspected diagnosis of cellulitis. Inflammatory markers were markedly elevated at that time (C-reactive protein [CRP] was 183 mg/l [reference range of 0–5 mg/l]). During hospitalisation, intravenous antibiotic therapy with cefazolin (Ancef), ceftriaxone and vancomycin was administered. Following clinical improvement, treatment was de-escalated to oral cefadroxil. Under this regimen, inflammatory parameters decreased, and the fever subsided. However, the palmar lesion persisted, as did ongoing pain and a weakened general condition; thus, the patient sought medical attention again after returning to Switzerland. Clinically, a circular necrotic-bullous lesion was observed on the right palm, along with tender right-sided axillary and supraclavicular lymph nodes. Laboratory testing revealed only mildly elevated inflammatory markers (CRP was 27 mg/l [reference range of 0–5 mg/l], and the leukocyte count was 13.14 × 10^9/l [reference range of 4–10 × 10^9/l]).

The patient reported multiple insect stings, including possible spider bites, during hunting activities in Canada. Therefore, a bacterial superinfection or soft-tissue infection was initially considered in the Canadian hospital. However, this hypothesis was contradicted by the slow healing despite nine days of antibiotic therapy. Moreover, the clinical presentation of a necrotic bullous lesion (figure 1) was atypical of bacterial superinfection, which usually presents with local inflammation, displaying redness, swelling, warmth and possibly purulent lesions.

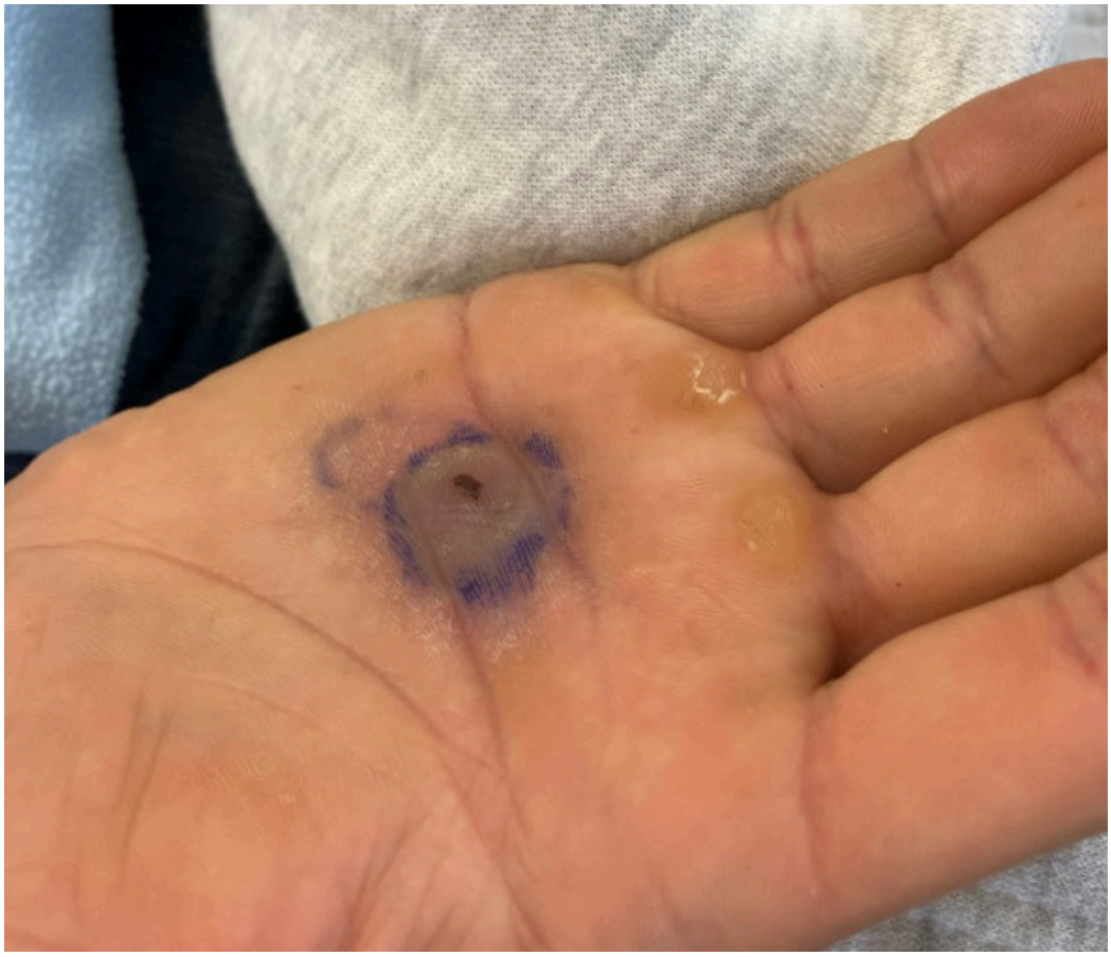

Figure 1: Necrotic bullous skin lesion.

The painful regional lymphadenopathy suggested lymphadenitis, which is the typical manifestation of ulceroglandular tularaemia and may present with tender, enlarged lymph nodes without pronounced superficial inflammatory changes. Another differential diagnosis was bartonellosis; how-

ever, this condition usually shows a longer latency between the onset of the primary skin lesion and the development of lymphadenopathy. The patient also denied any contact with cats. The necrotic lesion further raised suspicion of cutaneous anthrax, which has been reported sporadically in Canada. Given the history – particularly the patient's report of skinning a hare and direct contact with its carcass five days before symptom onset – and clinical findings, tularaemia appeared to be the most likely cause. A wound swab was taken for PCR testing for *Bacillus anthracis* and *Francisella tularensis,* and microbiological culture (bacteria, mycobacteria and fungi) was carried out. In addition, serology for *Francisella* and *Bartonella* species was performed. Antibiotic therapy was switched to doxycycline (100 mg twice daily for at least 7 days), which is effective against tularaemia, bartonellosis and cutaneous anthrax. Both the serological rapid test and the PCR from the wound swab were positive for *Francisella tularensis* subsp. *tularensis*. Six days after switching to doxycycline, the patient was seen for follow-up in the outpatient clinic for infectious diseases. He reported subjective improvement in his general condition and was afebrile. However, he continued to experience marked pain at the lesion site on the right hand and in the right axillary lymph nodes. Clinically, the palmar lesion appeared less prominent compared with the previous examination, but pronounced right-sided axillary and supraclavicular lymphadenopathy persisted. He also developed sore throat symptoms, which coincided with the start of doxycycline therapy. Because of the suspected oesophageal side effects, the antibiotic was changed to ciprofloxacin (500 mg twice daily) and extended for an additional ten days to prevent relapse and adequately treat the persistent symptoms. Given the overall improvement in the patient's condition, no additional laboratory testing was performed at this visit.

Ciprofloxacin treatment resulted in a rapid resolution of the sore throat and substantial regression of all other symptoms.

Discussion

Francisella tularensis is a Gram-negative, facultative intracellular bacterium and the causative agent of the zoonosis tularaemia ('rabbit fever'). The disease occurs predominantly in the Northern Hemisphere, including North America, Europe and Asia, sporadically or as small, localised outbreaks. Because of its high infectivity, low infectious dose and potential for airborne transmission, *Francisella tularensis* is classified by the U.S. Centers for Disease Control and Prevention (CDC) as a Category A bioterrorism agent [1, 2]. Clinical manifestations vary depending on the portal of entry and include ulceroglandular, glandular, oculoglandular, oropharyngeal, typhoidal and pneumonic forms [1, 3]. The present case is consistent with ulceroglandular tularaemia, the most common clinical form.

Only *Francisella tularensis* subsp. *holarctica* (type B) is found in Europe, whereas subsp. *tularensis* (type A) occurs almost exclusively in North America and may be associated with more severe, systemic and potentially fatal courses [1, 3, 6]. In Switzerland, infection is usually transmitted via tick bites or contact with infected wild animals, especially hares and rodents. Less commonly, it occurs through contaminated water or the inhalation of infectious aerosols [3, 5, 6]. Clinically, the ulceroglandular and glandular forms with localised lymphadenopathy predominate. Complications such as suppurative lymphadenopathy, myocarditis or sepsis are rare but have been described [5]. An increase in reported tularaemia cases in Switzerland has been observed in recent years, likely due to environmental changes, expansion of tick habitats, larger reservoir populations, improved diagnostics and greater physician awareness. The disease is considered endemic and affects both humans and animals [6].

Therapy depends on disease severity. Aminoglycosides (gentamicin or streptomycin) have been traditionally considered the gold standard for severe cases because they demonstrate rapid bactericidal activity and have been associated with improved clinical outcomes, particularly in systemic disease [1-3, 10]. By contrast, fluoroquinolones (ciprofloxacin or levofloxacin) or tetracyclines (doxycycline) are recommended for mild-to-moderate disease [1-3, 10]. However, recent CDC recommendations (2025) increasingly support fluoroquinolones and doxycycline as first-line treatment options, reflecting an evolution in therapeutic strategies [10]. In clinical practice (including in Switzerland), doxycycline and ciprofloxacin are frequently used even in more advanced cases because of their oral availability, tolerability and extensive clinical experience [1, 2]. Fluoroquinolones have been associated with favourable clinical outcomes and may be linked to lower relapse rates than tetracyclines [2].

In the present case, the patient initially received cephalosporins intravenously and orally. However, beta-lactam antibiotics and macrolides are ineffective against *Francisella tularensis* [3, 7] because the bacterium produces β-lactamases (e.g. FTU-1) and β-lactam antibiotics exhibit poor intracellular activity, a resistance mechanism that applies to all subspecies [3, 7, 8]. Thus, for Type A infections, aminoglycosides, fluoroquinolones or tetracyclines are recommended, as they demonstrate reliable *in vitro* and *in vivo* efficacy [2, 3, 8, 10].

PCR (from lesion material or lymph node aspirates) and serology are the diagnostic methods of choice for tularaemia. Laboratories must be informed when tularaemia is suspected because routine culture of F. tularensis should be avoided given the biosafety risks [1, 3].

The initially reported spider bites were most likely unrelated to the tularaemia infection because spiders are not competent vectors for *Francisella tularensis*. There is no evidence that spiders can acquire, replicate, or transmit the bacterium to humans. Transmission by arthropods is limited to a few specialised groups, particularly ticks and blood-sucking insects [3, 9]. Human-to-human transmission has not been documented. Therefore, standard hygiene precautions are sufficient in hospital settings; isolation of the patient or prophylactic treatment of contacts is not necessary [3, 10].

A strength of this case was microbiological confirmation, which enabled targeted therapy. However, a limitation was the delayed consideration of tularaemia due to its rarity. Hence, even in non-endemic regions, tularaemia should be considered in the differential diagnosis of ulceroglandular or lymphadenopathic lesions following animal contact, particularly in cases with an inadequate response to β-lactam antibiotics. The clinical presentation and, in particular, the exposure history, remain the key factors guiding the diagnosis.

Notes

Informed consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Use of AI: The authors declare that no generative artificial intelligence (AI) tools or AI-assisted technologies were used in the drafting, writing or creation of this manuscript.

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