

Necrotizing fasciitis as a result of a black widow spider bite

Martina Zavacká , Peter Zavacký, Jana Pobehová

Eastern Slovakia Institute for Cardiovascular Disease and P.J.Šafárik University – Medical Faculty, Košice, Slovakia



INTRODUCTION

There are approximately 970 species of spiders in Slovakia, more than half of which are poisonous. At the current rate of climate change, the migration of more dangerous exotic species is expected, the bite of which can cause life-threatening complications, especially in elderly, immunocompromised patients, pediatric population and allergy sufferers. Identification of the causative agent of a bite injury is often impossible because the insect cannot be caught, but the site after the bite can be a gateway to secondary infection, which makes differential diagnosis particularly challenging. In our work, we will focus on a patient who developed life-threatening complications after being bitten by an unknown insect

AIM

The poison ivy does not normally occur in Slovakia, like in the Czech Republic, but it can be introduced. The venom of the black widow spider is an effective weapon for capturing prey. It is a mixture of various active substances containing a protein neurotoxin called α -latrotoxin (α -LTX). Necrotizing fasciitis (NF) is a rapidly progressive soft tissue infection caused by fulminant tissue destruction with severe systemic toxicity and high mortality

Fig. 1, 2: Necrotising fasciitis – right leg



Fig. 3: Granulation of the lateral and medial wound



METHODS

The homeland of the poisonous weaver is North and Central America. It can be found in Canada (British Columbia, Alberta, Saskatchewan, Manitoba, Québec), the United States, Guatemala, Belize, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, the Dominican Republic or Hawaii. Due to shipping and other transport, it also reached other parts of the world, to all continents except Antarctica (1).

The poison ivy does not normally occur in Slovakia, like in the Czech Republic, but it can be introduced. It can get here, for example, in a shipment from abroad. However, she probably wouldn't survive this winter. However, it can be expected that as long as the climate changes continue and the winters become milder, the poisonous weaver (or some form of it) can "deal" with us as well. Occurrence is already reported from, for example, Austria, Croatia, Slovenia, Italy, Spain, the south of France, the islands of Corsica and Sardinia, or also in Greece (however, it is probably already widespread on the entire Balkan Peninsula) (2). The clinical diagnosis of a black widow spider bite depends mainly on the history, wounds, non-specific clinical manifestations and corresponding epidemiological findings. Visualizing the bite along with associated symptoms and taking a detailed history will allow for an accurate diagnosis. Therefore, patients with a suspected diagnosis should actively collect evidence to identify the spider. To officially confirm the diagnosis, the patient must isolate the spider after the bite, which is identified by a qualified professional such as an entomologist, medical toxicologist or other qualified professional. However, it is not necessary and patients are not advised to catch, harm or handle the spider (9).

Fig. 4, 5: Healing of the lateral wound



Fig. 5, 6: Healing of the medial wound



RESULTS

Black widow spider venom is an effective weapon for capturing prey and defending against enemies. It is a mixture of various active substances containing a protein neurotoxin called α -latrotoxin (α -LTX). The toxin receptor is also a member of the G-protein coupled receptors (GPCR) (2). Black widow spider toxin is a glycoprotein with a relative molecular weight of 130 kDa that can act on a variety of synaptic and sodium ion and potassium ion channels. In humans, it can cause depolarization of the presynaptic membrane, causing the release of acetylcholine from synaptic vesicles. Massive release of acetylcholine can cause excessive muscle depolarization. It causes excessive hyperactivity of autonomic and cerebral cortical neurons, and most patients suffer from headaches, lethargy, irritability, myalgia, tremors, and ataxia (3). Unfortunately, the patient developed a streptococcal infection secondary to the bite. *Streptococcus pyogenes* group A is the cause of a wide range of diseases, namely pharyngitis, impetigo, pneumonia, necrotizing fasciitis, cellulitis, streptococcal bacteremia, osteomyelitis, otitis media, sinusitis, meningitis or brain abscess (a rare complication resulting from the direct spread of an ear or sinus infection cavities or from hematogenous spread). The result of streptococcal infection can be acute kidney failure, rheumatic heart disease - chronic damage to the valves, especially the mitral valve, or acute glomerulonephritis. In the treatment of severe cellulitis, *Staph.aureus* should be considered as a possible alternative pathogen or co-pathogen. Empiric treatment with vancomycin or ceftriaxone may be considered, and antibiotic therapy should be adjusted based on culture. Clindamycin should be used to inhibit toxins in sepsis or septic shock. It is necessary to take into account the patient's allergies. An alternative can be linezolid, which has broad-spectrum effects on gram-positive bacteria and has the property of inhibiting toxins (8).

CONCLUSIONS

Traditional treatment for black widow bites is aimed at providing symptomatic relief until the effects of the venom wear off. These include primarily opioid analgesics and muscle relaxants. Conducted studies of providing symptomatic treatment have had at best partial success (11,12,13,14). Calcium treatment was once considered an antidote to black widow poisoning. Calcium was thought to stabilize the permeability of nerve membranes, leading to a decrease in neurotransmitters (15,16). Although this effect was demonstrated in vitro and reported in some early clinical series, (14,15,16) subsequent experience did not demonstrate its efficacy. Therefore, calcium therapy has fallen out of favor in the medical toxicology community. The only treatments with proven efficacy are opioid analgesics and black widow spider antidote. *Latrodectus mactans* antidote is a horse antidote based on immunoglobulin G (10).

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