The Brown recluse spider (Loxosceles reclusus) is one of the most elusive of insects known to cause clinically significant envenomation. Despite the characteristic features and course of the spider’s bite, it is rare that the culprit is identified. Commonly the victim is unaware of any injury until hours later and it is only the onset of swelling, redness and finally pain that marks the start of the more common reaction, cutaneous loxoscelism. The wound evolves over several days, progressing to necrosis and the characteristic “red, white, and blue” sign: a blue, necrotic centre with a white border and surrounding erythema. Over the next few days, this develops into an eschar that later ulcerates, but the lesion is usually well healed in 2–3 months and commonly does not require debridement or skin grafting. Cutaneous manifestations are not as severe. Associated symptoms tend to be mild and may include fever, malaise, headache, and pruritus. Systemic loxoscelism, although much more rare, is far more serious and usually develops 2–3 days after the bite. Early fever, malaise, chills, nausea, vomiting and rash may lead to haemolytic syndromes resulting in haemoglobinemia, haemoglobinuria, haematuria, and renal insufficiency or failure. Haematological effects may include leucopenia or leukocytosis, thrombocytopenia, anaemia, hyperbilirubinaemia and disseminated intravascular coagulation. Finally, there are reported cases of respiratory compromise, severe haemolysis and death.

Treatment of loxoscelism is controversial. Little empirical evidence exists to support the variety of treatments used in humans but anecdotal evidence abounds. Much of what we know about the treatment of Brown recluse spider bites in humans comes from case studies, retrospective reviews and individual clinical experience. A meaningful study of Brown recluse spider envenomation in humans would be extremely difficult. Not surprisingly the only controlled studies to date have been performed in animals.

Case report

We present a case that is noteworthy in three ways. Firstly, a Brown recluse spider was found in immediate proximity to the victim. This is in comparison to most reported cases, in which the bite is not felt and the spider remains at large. Secondly, progression of the lesion was aggressive leading to tissue necrosis warranting debridement and subsequent split skin grafting. Finally, the bite occurred in the dorsum of the foot, an anatomic location rarely reported.
A previously healthy 38-year-old man, having recently returned from a 14-day holiday in Missouri, USA, sought treatment at the Derriford Hospital Emergency Department for significant right leg swelling following a history of a spider bite to his foot. He was initially managed conservatively by the emergency physicians who started him on clarithromycin because of a penicillin allergy. Investigations were performed to rule out deep vein thrombosis. His condition improved after a week of intravenous antibiotics and was discharged home with oral antibiotics.

He remained systemically well for the following 2 weeks at home but the wound failed to heal. It continued to ooze and required regular dressings. The general practitioner was suspicious of a possible abscess that may need incision and drainage, or possibly athlete’s foot, so referred him back to Derriford for a Plastic Surgical opinion.

On arrival the patient was alert, oriented and not acutely distressed. His main symptom was pain. There was a small ulcer on the dorsum of the left foot. It was not possible to detect any evidence of spider bite at that stage (Figs. 1–3).

Two days after the admission the oedema had progressed further inferiorly and medially to involve the medial malleolus. It was decided to examine the wound under anaesthesia and proceed with debridement if needed.

Firstly, the wound was thoroughly washed and the necrotic wound edges debrided. Skin was harvested for future application of a split skin graft. His wound worsened and he developed another abscess. This required a further washout and debridement under anaesthesia. A small abscess in the web space of 1st and 2nd toe was found, incised and drained. Wound swabs taken from the second operation were negative so we went ahead with planned split skin grafting with meshing into 1:1.5.

The graft was checked on 4th day with 100% take. The patient was subsequently discharged with instructions from the occupational therapists. He has regained full movement of the ankle joint and there was no contracture or keloid formation.

Discussion

The Brown recluse (L. reclusus) is the best-known species of spiders belonging to the genus Loxosceles. Although found throughout North, Central and South America Loxosceles spiders in the United States are most prevalent in southern and central states including Arkansas, Oklahoma, Missouri and Kansas. These spiders are some of the most easily identified because of their characteristic markings. Commonly referred to as “fiddle back” spiders, they possess a dark, violin-shaped marking on the cephalothorax. The Brown recluse is known not only for its...
unique appearance but feared because of its bite. Research has identified specific components of the spider’s venom responsible for the pathophysiologic features of the bite. In 1978, Forrester et al. identified sphingomyelinase D as the component that causes haemolysis. This factor is thought to be involved in both cutaneous and systemic reactions. Patel et al. later proposed a possible sequence that accounts for the dermo-necrosis. The venom first activates vascular endothelium inducing the expression of E-selectin and causing release of interleukin-8 and granulocyte macrophage colony-stimulating factor. These two cytokines are key mediators in the attraction and activation of neutrophils. As soon as they are present, the neutrophils bind to E-selectin, degranulate and cause tissue destruction.

Our case illustrates the typical course of cutaneous loxoscelism and is noteworthy in three ways. Firstly, although the patient neither felt nor witnessed the bite, a Brown recluse spider was found inches away from the site of envenomation. It is rare in the literature to find cases in which the victim found the spider in the immediate vicinity soon after envenomation, but not feeling or witnessing the bite is well reported.

The identified spider, combined with the characteristic history, presentation, and course of the lesion, substantiates the diagnosis of Brown recluse spider bite.

Secondly, the progression of the lesion is well documented photographically. A review of existing literature reveals very few cases documenting the changes that occur during the early course of a Brown recluse spider bite.

Finally, the bite occurred in the dorsal aspect of foot, an uncommonly reported location. Anderson noted that in more than 30 years experience with loxoscelism he has “never seen a proven bite on the hand, foot, or face.” Our review of the literature identified only a few reported cases of loxoscelism involving the foot. Although these cases described lesions consistent with bites caused by the bite of a Brown recluse spider, none of them provided conclusive evidence that the lesions were indeed caused by L. reclusus. We noted remarkable similarities among documented cases and our own in terms of the progression of the lesions. Each case describes early swelling, redness and pain leading to significant oedema. The lesions became necrotic, formed black eschar and resulted in some degree of scarring, all over a similar period of time. Each case reported satisfactory overall outcomes. Not unexpectedly, there were differences in medical and surgical management.

We attribute differences in treatment approach to variations in the exact location of the injury, extent of envenomation, age and general state of health of the patient and lack of an established standard of care for this clinical entity. Management decisions demand consideration of all of these factors. Although Anderson and Wasserman and Anderson noted the rarity of severe systemic reactions, Wilson and King also stated that complications occur more frequently with bites to the eyelids, hands and feet. Because of a lack of empirical support for various treatment methods some authors have recommended a conservative approach. Treatment of Brown recluse spider bites with dapsone and hyperbaric oxygen remains controversial.

However, a more recent controlled study using New Zealand white rabbits failed to support the use of either of these treatments. Another area of research involves the use of antivenom. In 1981, Rees et al. reported the benefit of antivenom in the prevention of eschar formation and skin sloughing. Unfortunately antivenom is not readily available and must be administered early following injury.

Although the management of this case is not presented as a therapeutic model, we believe that the travel history of the patient, the potentially dangerous location of the bite and the severe clinical presentation warranted aggressive treatment. Because they are readily available and could be administered in a carefully controlled and monitored setting, it is impossible to predict what the clinical outcome would have been had we approached this case more conservatively.

References


