Clinical presentation and management of necrotic arachnidism

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ABSTRACT
A case of necrotic arachnidism is described to alert the general practitioner and hospital emergency room physicians of the possible complications of spider bites. The range of presenting signs and symptoms and management strategies are discussed.

Keywords: Necrotic arachnidism, spider bite, presentation, management, United Arab Emirates.

Spider bites can cause a wide variety of local and systemic effects from mild irritation at the site of bite to death of the victim. Signs and symptoms range from local pain and pruritus to chills, sweats and fever, gastrointestinal disturbance, malaise and myalgia, dyspnea, dizziness and headache, erythema, blistering, rash, urticaria, angioedema, lymphangitis, cellulitis and skin necrosis. The severity of presenting features and progression of pathogenesis are related to the type of spider and hence the nature of its venom and the amount injected. The victim’s age and size determine the unit dose response per kilogram body weight and the site of the bite may also affect outcome.1,2

In the Al-Ain District of Abu Dhabi Emirate of the United Arab Emirates (UAE), instances of arthropod envenomation are regularly seen in the emergency rooms (ER) of hospitals. In 1992 and 1993, 1402 and 1663 patients respectively were seen in the ER of one of the hospitals. Most of the patients were stung by ants,3,4 or bees, wasps and scorpions, but in 31.3% and 28.3% of the total cases in the two respective years, the arthropod was not identified and could have been a spider. Most cases were discharged after palliative treatment but some required hospitalization with death due to anaphylactic shock reported in at least two cases stung by ants. Spider bites go unreported either because the clinical manifestations are mild or the offending arthropod is not identified owing to its furtive nature. A case report of necrotic arachnidism is presented in order to alert general practitioners and ER physicians of the potentially serious consequences of spider bites.

Case report
A 19 year old male student was bitten on his left thigh by a medium sized pale-brown spider, which had crawled up the leg of his trousers. He had felt the bite and managed to squash the spider, so that identification was rendered difficult. He attended the ER on the same day with a swollen and painful thigh and itching at the site of the bite and mildly swollen lips. He was given an antihistamine injection and was discharged home. Over the next 4 days, he gradually developed a rash all over his body, had ‘red eye’, passed dark urine and suffered severe headache accompanied by fever and vomiting on two occasions. He had had jaundice three years earlier; otherwise he had been in good health.

Examination findings. He was not in acute distress. Temperature was 38.2 °C, pulse 88/min, respiration 22/min and BP 120/80 mm Hg. He was not jaundiced. There was neither lymphadenopathy nor hepatosplenomegaly. However, the whole body was covered by a morbilliform rash. The medial aspect of the left mid-thigh showed a central vesicular oval area of 4 x 3 cm, surrounded by a purpuric necrotic zone of 10 x 8 cm around which was an erythematosus papular area of 30 x 18 cm.

Investigations. Laboratory findings were: Hb

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Received July 1996. Accepted for publishing in final form December 1996.

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13.6 g/dl, Hct 39.8, WBC 16.8 x 109/l with neutrophils 86.6%, lymphocytes 5.7%, monocytes 2.6%, eosinophils 2.7% and basophils 2.4%, BUN 2.86 mmol/l, sodium 137 mmol/l, potassium 3.9 mmol/l, chloride 100 mmol/l, glucose 7.16 mmol/l, creatinine 97.24 μmol/L. Bleeding time was 3.8 min, prothrombin time 14.5 sec. (control 12), APTT 28 sec. (control 34) and platelets 99 x 109/l. Liver function test showed raised values and blood culture for microorganisms, was negative. G6PD was deficient and HBsAg non-reactive. MSU and chest x-ray were normal. On the third day following the first investigations, he was noted to be pale which prompted a further hemoglobin check which was down to 4.1 g/dl and WBC 9.9 x 109/l. ESR (150 mm/hr) remained high though the other blood parameters were within normal range. He was given 6 units of matched whole blood.

**Treatment and progress.** He was treated symptomatically. Pirion (4 mg) was prescribed twice daily for 5 days and he was given a course of velosef as an antibiotic cover. He improved gradually, the fever subsided and the rash disappeared. He was completely well at the time of discharge on the 16th day. The lesion on the thigh was reduced to a grey scab of 8 x 6 cm. (Fig. 1). A further 2 weeks later, he was re-admitted. The thick black scab of 7 x 6 cm was removed under general anesthesia. This revealed granulation tissue bathed in pus. The pus grew Staph. aureus, sensitive to most antibiotics. He was put on augmentin 375 mg t.i.d. The scab involved the whole thickness of skin and subcutaneous tissue and was histologically composed of coagulative necrosis. The wound was cleaned with salveon solution and a sterile dressing applied. Further daily dressings after cleaning the wound, were applied in the ward. Ten days later the wound was clean enough for covering with a split skin graft from another area of the same thigh. Seventy-five percent of the graft took well and the rest became covered gradually by epithelium ingrowing from the surrounding area.

**Discussion** Spiders are arthropods that belong to the order Araneae and are characterized by 2-segmented bodies: fused head and thorax called the cephalothorax and the abdomen; 4 pairs of legs; spinnerets which release the web-forming silk and the biting mouth-parts consisting of chelicerae which have distal openings through which the venom is ejected into the victim. Relatively few of the 30,000 or so known species of spiders are of significant medical importance. These include members of the family Loxoscelidae (e.g. brown recluse), Theridiidae (e.g. black widow), Lycosidae (e.g. wolf spider), Theraphosidae (e.g. tarantulas), the funnel web spiders of Australia (Atrax robustus) and the banana spiders of South America (Phoneutria fera), and the hobo spider (Tegenaria agrestis) native to Europe. In the UAE there is no documented distribution of these arthropods, though we have collected both Loxosceles and Latrodectus species from gardens and sheds.

Our index case of necrotic arachnidism was most likely bitten by a Loxosceles sp. brown spider whose bite generally goes unnoticed although a transient stinging sensation may be felt. Severity may range from mild irritation to full-thickness skin necrosis as seen in our patient. In the latter instance, symptoms usually begin within 6-12 hours of the bite with local pruritus, pain, swelling, induration, erythema and blister or pustule formation. The development of the 'red, white and blue' sign is typical of severe brown spider envenomation and results from incipient necrosis due to thrombosis, seen as a central area of deep blue to purple mottling. This is surrounded by a vasconstricted blanched halo within a larger area of reactive erythema.

Systemic signs and symptoms associated with severe brown spider bite were seen in our patient included headache, fever, malaise, anorexia, arthralgia and a generalized maculopapular rash. In addition, reported signs of hemolysis were evidenced by hemoglobinuria and a significantly lowered Hb, which required blood transfusion.

The management strategy for necrotic arachnidism is manifestly based on the presenting signs and symptoms, but should consist of identification of the spider, if possible, the time elapsed, the age and size of the patient and the site of bite. Basic elements of first aid are essential and should be continued throughout the course of treatment. Cooling with ice compress and rest are useful in limiting the action of the dermonecrotic component, a phospholipase, of the venom. The fact that systemic signs appear early suggests that the spread of venom is rapid, therefore, the practice of early excision of the site is probably unhelpful. The use of corticosteroids systemically or locally is debatable, though it is considered...
'prudent' to use 1-2 mg/kg/day in cases of suspected systemic loxoscelism. Dapson (4,4'-diaminodiphenylsulfone) is now recommended for treatment of necrotic arachnidism because of its powerful dampening effect on neutrophil numbers and function. Though care has to be exercised by assessing the G6PD status of the patient, the drug can cause massive hemolysis in enzyme deficient patients. Our patient responded well to an oral antihistamine under a broad spectrum antibiotic cover.

Surgery is only reserved for lesions that progress to full thickness necrosis and eschar formation. When the latter is well delineated with no further sign of enlargement, a wide excision and split-thickness autograft produces good results. Following this procedure our patient, despite the complication of wound infection which was treated with augmentin, made good progress and was discharged.

References