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Approximately 90% of venomous bites and stings are treated on clinical diagnosis rather than specific identification of the insect, spider, or snake involved. Treatment objectives are to modify a life-threatening situation to one of safety, to prevent or limit damage, and to relieve the pain of the injury as soon as possible. Treatment that can accomplish these objectives without specific vector identification is of value.

A technique of multiple high voltage low amperage direct current (HVDC) shocks utilizing a handheld electronic device (Stun Gun) has been developed based on information from J&K Industries[1] and Outdoor Life[2] and used since September 1988. With a Stun Gun of known voltage, shocks of 40-50 kV seconds (50 kV for 1 second, 25 kV for 2 seconds, etc) are delivered with one contact on the bite or sting and grounded with an extension to shock through the bite or each puncture twice; additional shocks are done from margin to margin, or from center to margin, spoke fashion, to cover the affected area.

In 304 "spider" bites, relief of local and systemic symptoms occurred within a 15- to 20-minute (minimum) observation period. No progression of venom damage was evident in the 80% of patients who came or reported back. Results in the entire series are consistent with the first 147 cases of this series previously reported.[3]

In 42 stings, common name identification was made by the patient or family in 17: 3 bumblebees, 9 wasps, 2 scorpions, 2 yellow jackets, and 1 tick, with 25 unknown. Local relief of pain and itching occurred within 10 to 15 seconds. Decreasing local reaction and improving systemic symptoms were apparent within 15 minutes. Follow-up beyond the 15- to 20-minute observation period was unnecessary, though some who had previously had severe allergic reactions were later questioned and had no residual or delayed reaction after treatment.

Case Report, Insect Sting

A 12-year-old white male was stung on the bridge of the nose by a "red wasp" and was given 50 mg diphenhydramine at home. Three hours later he was led into the emergency room by his mother. He had a swollen forehead, eyes swollen shut, and slight dyspnea. He was given epinephrine on arrival at 9:45 PM, and 80 mg Solu-medrol at 9:50 PM (both IM). At 10 PM, a picture (Fig 1) was taken and shocks were administered with one contact on the sting and the other on the midline of the forehead hairline, then past the swelling under each eye (3 shocks total) with immediate relief of discomfort. A second picture (Fig 2) was taken at 10:25 PM when the patient walked out unassisted with no dyspnea and reduced swelling. While some of his response may have been due to medication, the immediate relief of discomfort within 10 to 15 seconds would not be expected from medication. The reduction of swelling was more than usually observed within 20 to 25 minutes of medication. Since similar responses have been observed in cases where no medication has been given, I feel HVDC made a major contribution to the patient's rapid recovery.

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bites when first seen and each bite was individually treated. Five patients were seen on successive occasions with new bites. Improvement was seen by the author or reported by the patient in every case with adequate follow-up, although some required medication change. The progression of venom damage was stopped with the first treatment. In a few cases repeat treatments were done with good effect to relieve residual itching or discomfort. Early treatment obviously gives best results, but late treatment may be beneficial and is not harmful other than the momentary discomfort of the shocks. Doxycycline, ampicillin or amoxicillin, or cephadroxil usually controls infection well. Fifty-seven of the last 67 cases were managed without steroids with good results.

In this series the vector was identified as the brown fiddleback spider *(Loxosceles reclusa)* in 16 cases. Two other unidentified brown spiders also caused symptomatic bites that responded immediately to treatment. One black spider (not *Lactrodectus mactans)* also caused a symptomatic bite that responded well. While specific vector identification is desirable, delay of treatment for this purpose is unnecessary.

HVDC therapy is recommended in all cases of confirmed or suspected venomous spider bites, with appropriate supportive therapy. The practice of lesion excision and medication injection into a bite should be abandoned in order to avoid the tissue loss and scarring from these procedures.

Method

The effect of electricity on biological venoms published in *Outdoor Life* by L. Mueller,[2] based on the work of Ronald Guderian, MD, and associates[3] generated interest in this method. Further information was obtained from J & K Industries,[4] whose recommendations for the number and duration of treatments for different types of bites served as the foundation of the specific technique described here. The electric impulse is delivered to the lesion with a hand-held electronic device (Stun Gun) powered by a small 9V alkaline or rechargeable battery (Fig 2).

In order to standardize dose, each impulse is given in Volt-Seconds with 40-50 KV seconds at 4.5 milliampere or less per shock recommended. Since different makes and models of Stun Guns vary in voltage output, the duration of each shock varies with the model used — 25 KV - two seconds, 50 KV - one second. One electric contact is placed on the bite, and an extension wire from the other contact is placed against the skin to direct the current through the lesion (Fig 3). Two shocks of 40-50 KV seconds are then administered with a 5-to-10 second pause between shocks. Shocks of 40-50 KV seconds are then given across the bite from margin to margin of the inflamed area in an x-shaped pattern; usually four or more for a large area are needed (Fig 4). After observation for 15 minutes, the patient is released with instructions to return or report in 3 to 7 days. Tetanus booster is given if protection is not current, and an antibiotic is prescribed.

ALTERNATING CURRENT (AC) IS ABSOLUTELY CONTRAINDICATED.

Discussion

The results previously reported in detail on 21 cases[1] have been confirmed in the total series of 147 cases of spider bite. In all cases, where follow-up observation or report occurred, the first series of shocks

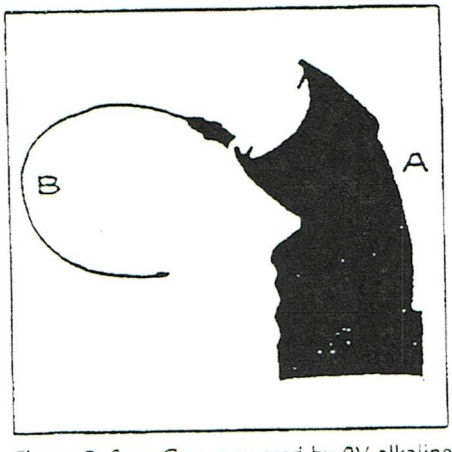

Figure 2. Stun Gun, powered by 9V alkaline or rechargeable battery, and extension wire.

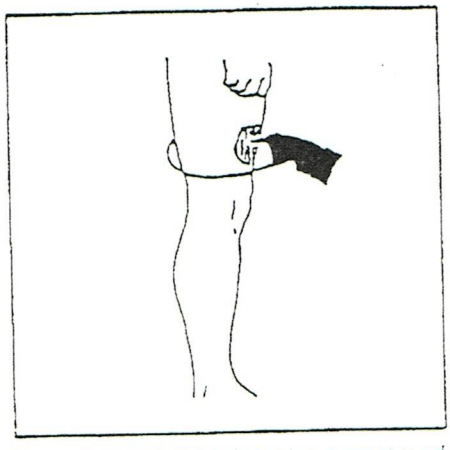

Figure 3. Using extension wire, current is administered through lesion.

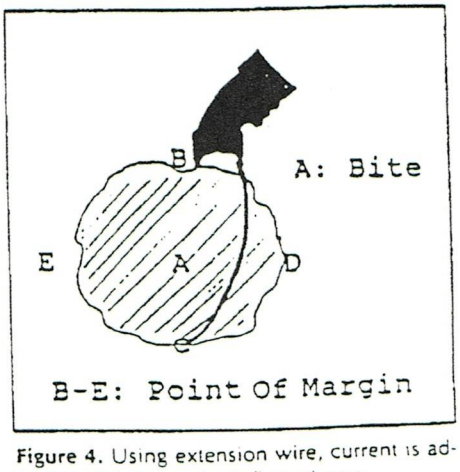

Figure 4. Using extension wire, current is administered across the inflamed area.

arrested the progression of venom damage. Steroids are no longer routinely prescribed by the author. None of the followed cases required surgery or skin graft subsequent to treatment by HVDC, and no adverse effects were observed or reported. The author believes that injection of any material into a bite or excision of the bite results in increased tissue loss and scarring. Prophylactic antibiotics are necessary since these spider bites are "dirty."

According to C. Kroegel and K.H. Meyer zum Buschenfelde,[5] HVDC alters venom and modifies or stops its action. The results in this series support that conclusion.

Conclusion

HVDC is an effective therapy for venomous spider bites, and limits venom damage and reduces pain. Specific identification of the vector has not been necessary for good results. The benefits of treatment outweigh the discomfort of shocks for short duration. The author hopes the utility of this method will be confirmed by other physicians.

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The Author

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