NEWS FROM THE PIT

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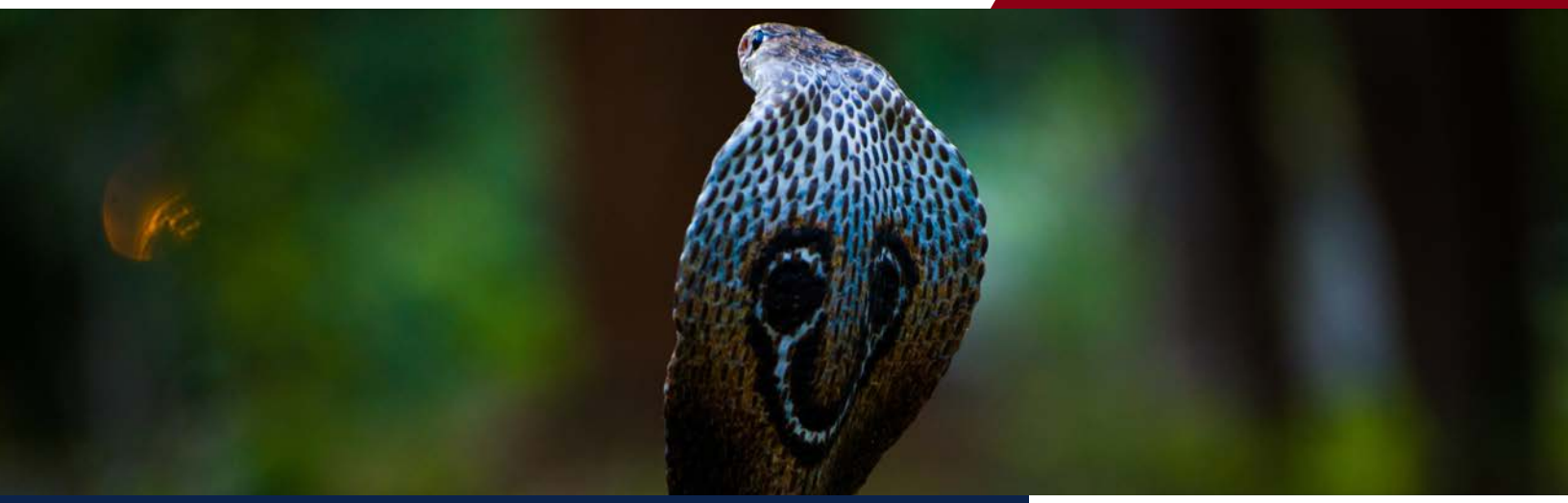

Antivenom Index

What happens when an envenomation by a non-native species occurs?

By Denise Holzman, PharmD CSPI

Regional poison centers are uniquely equipped to manage and offer consultation on envenomations caused by native species in their respective coverage areas. Covering 14 of the 15 counties in Arizona, the Arizona Poison and Drug Information Center (APDIC) offers 24/7 “in the moment” consultations on bites and stings from rattlesnakes, scorpions, gila monsters, spiders, bees, wasps, centipedes and other creatures whose defense mechanisms present potential harm to humans. The APDIC has also been involved, and continues to participate, in clinical studies to evaluate new treatment modalities for the management of exposures to venomous creatures found here in the Southwest.

It presents a dilemma, however, when an envenomation by a non-native species occurs. Where to turn for help? Where to look for potentially life-saving antidotes?

Fortunately, there is a system in place to address this unusual, and yet critical, situation.

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History bestows the honor of the development of the first therapeutic antivenom used in humans to the French scientist Albert Calmette.[1] As director of the Pasteur Institute-Saigon in Vietnam, he was particularly interested in finding a treatment for cobra envenomation. And, in 1895 a human was effectively treated with the first horse-based cobra antivenom as snake bite therapy.[1]

Researchers in other parts of the world took note of this auspicious discovery. In Brazil, Vital Brazil Mineiro da Campanha was instrumental in pioneering an antivenom for envenomation from snakes indigenous to South America and in establishing the Butantan Institute and Vital Brazil Institute.[1,2] Similarly, researchers from around the world, Australia, Costa Rica, South Africa, and Mexico, joined in the exploration of antivenoms.

In 1926 a researcher from the Butantan Institute of Brazil, Afranio do Amaral, came to the United States to share his expertise with American scientists .[1] Working with Mulford Biological Laboratories, antivenom for treatment of North American pit viper envenomation was realized in 1927.[1,3] The new product, called Antivenin Nearctic Crotalidae, was recommended to be dosed as "10 cc administered subcutaneously, as soon as possible after infliction of the bite, but necessarily within 12 to 24 hours."[3] It came in 10 cc syringes, with its own needle, making it "ready for immediate use."[3] The manufacturer advocated for the stocking the antivenom in first-aid kits.[3]

Dr. Amaral was also involved in creating the Bulletin of the Antivenin Institute of America.[4] The Bulletin, published from 1927-1932, was dedicated to expanding the knowledge of venomous creatures.[4] It covered a broad range of subjects, such as snake identification, geographical distribution of diverse species of snakes, methods of snake bite prevention, clinical effects observed from snake envenomation and the corresponding treatment of the day, the process of snake venom collection and procedure for production of antivenom.[4] Essentially, as described in the Bulletin, it was created "to face the problem of snake bite in all its aspects."[5]

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For example, a chapter outlining the treatment of North American snake bite includes instructions for self-administration of antivenom. The authors recommend the administration of antivenom to be "in the same manner as a diabetes patient treats himself with insulin," in the event that no medical aid is available at the time of envenomation.[6]

With growing interest in development of antivenoms, a mutually beneficial exchange system was created. Zoos and aquariums holding exotic creatures began trading venom from captive, exotic species for antivenoms produced by researchers and manufacturers.

In the early 1970's the Oklahoma Children's Memorial Hospital worked together with the Oklahoma City Zoo to develop a method of keeping track of the available antivenoms for exotic snake species held in the zoo's reptile collection. This collaboration allowed for zoo members to have direct contact with experienced toxicologists for help in the event of the rare envenomation from an exotic, captive species, and provided the poison center personnel with information on the most current antivenoms that were available and stored by the zoo.

By the late 1980's, this system, now known as the Antivenom Index (AVI), came to reside at the APDIC. Initially it existed in three ring notebooks. The notebooks contained a list of the names of exotic, venomous snakes from around the world.

The entries included both scientific and common names for each species, the names of the corresponding antivenoms which were indicated, or considered possibly indicated, for the particular species, the zoo or aquarium where the antivenom was held, the amount of antivenom available, the expiration date of the antivenom, and the contact phone number for the aquarium or zoo representative who was willing to be available to assist with procurement of the antivenom in case of an emergency. Each year, a request was sent to accredited members of the Association of Zoos and Aquariums (AZA) asking for updated inventories of their available antivenoms and contact personnel. During the early 1990's, health care providers from around the United States who found themselves treating an exotic, venomous snake envenomation began calling the APDIC to request information found in these notebooks. Medical toxicologists, such the world-renowned snake bite expert Findlay Russell, consulted on these cases. Having access to the AVI made it possible to provide information on the availability and location of the nearest antivenom, along with expert guidance in the management of snake bites rarely seen in the United States.

In the early 2000's two HRSA grants obtained by the APDIC made it possible for the creation and implementation of an online version of the AVI.

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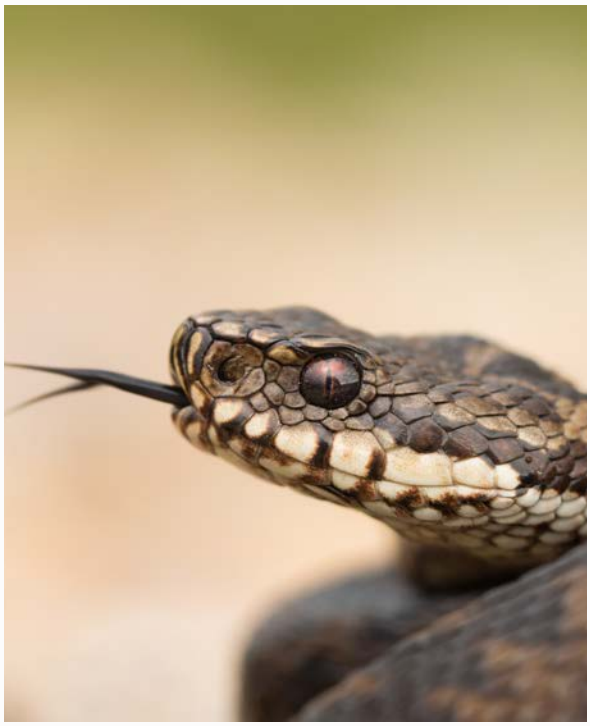

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The new web-based AVI included the added benefit of links to respective package inserts for the antivenoms with translations in English, along with a resource section that addresses topics from how to import antivenom to general guidance for facilities that maintain venomous creature. In addition, with the advent of an online version, the American Association of Poison Control Centers (AAPCC) could now provide regional poison centers across the United States with their own immediate access to the AVI. In 2006, the new, improved version of the AVI became a reality.

Today, the AVI continues to be a repository of invaluable information, and is a collaboration built on trust between the AAPCC and AZA. It is still maintained and updated by members of the University of Arizona College of Pharmacy (APDIC and Information Technology department), Viper Institute and AZA. As a resource, it provides critical information that can only be accessed by members of the AZA and AAPCC. It is intended to help obtain emergency treatment for exotic envenomations, with the guidance of a toxicologist and in conjunction with the patient's own treating physician, while taking into consideration the potential risks and benefits. Administration of an antivenom produced by a manufacturer outside of the United States that does not have FDA approval, transport time from the zoo or aquarium holding the antivenom to the treating health care facility, and the possible use of an expired antivenom when no other antivenom is available, are all factors that must be considered. The potential benefit, however, from the acquisition and administration of an exotic antivenom is the reduction in morbidity and mortality. Access to the AVI, and continued collaboration between the AZA and AAPCC to maintain and update the database, make this opportunity available.

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