

THE NEW THERAPY PROCEDURES FOR VIPER ATTACK

Kresánek J., Placková S., Cagánová B., Klobušická Z., Bátora I., Kresánek I.

Toxicological Information Center, Clinic of Occupational Diseases and Toxicology, Faculty of Medicine, Comenius University, Derer Hospital, Bratislava, Slovak Republic

SUMMARY

In Slovak Republic and the region of Central and Eastern Europe the viper is the only species of venomous snake living in wild. During the last nine observed years (1993-2002) the Toxicological Information Center (TIC) was consulted in 81 cases of individuals attacked by snakes. 51 of these cases were by viper, rattlesnake 6, and green mamba once. 23 cases were by non-venomous snakes; adder 22 times and royal snake once. The viper and adder attacks occurred in the wild and the other cases with snake keepers. None of affected individuals died.

Our contribution contains the new recommended therapy procedures for viper attack.

Key words: viper, therapy by snake attack, clinical criterion for anti-serum implication

Address for correspondence: J. Kresánek, Toxicological Information Center, Clinic of Occupational Diseases and Toxicology, Faculty of Medicine, Comenius University, Derer Hospital, Ďumbierska 3, Bratislava, 833 03 Slovak Republic. E-mail: tic@healthnet.sk

INTRODUCTION

In the term of fatality, snake bites do not pose a significant threat (1:1000) especially when compared with statistics of deaths by snake venom to statistics of automobile accidents, underfeeding, malaria, or AIDS (1). According to some estimates, the probability of a person bitten by a venomous snake dying is 15-20 times lower than being struck by lightning (2).

Venomous snake bite incidents have been on the rise in the last few years. It is the result of a higher occurrence of snakes, probably due to better ecological situation (3). The strength of snake venom is highly overestimated. There is only a small number of species which can actually kill or seriously wound a human considering the multiplicity and difference of species. The contributing fact is that venom injection does not occur in every snake bite, thus intoxication does not take place (so called "dry bite"). That is the reason why it is hard to state which snake in the world is the most venomous. Another fact is that human encounters with truly dangerous snakes are rare. Perhaps the most effective venom has the taipan from central Australia. One bite can contain enough venom to kill 250,000 mice. Its teeth are relatively short and it also does not produce as much venom as viper. The number of deaths differs throughout the world. It is alleged that 30-50 thousand people die annually, however the number of bites could be over a million (1).

The most deaths occur in Asia (densely populated with a large number of venomous snakes) with more than 25,000 victims. There are about 2-3 thousand in South America and the number of victims in Africa is negligible considering the large quantity of venomous species. France and Italy account for 17-22 deaths by venomous animals yearly, of which one quarter are snakes. And finally in Australia where most of venomous species of snakes in the world occur only a few people die (4).

There is only one species of venomous snake in Slovak republic and the rest of Europe which is the North viper (*Vipera berus*). It can be found at an altitude of 800+ meters above sea level near glades, sunny, warm, even damp places. The male viper can grow up to 60 cm and female up to 80 cm in length. The head is slightly separated from the flattened body. Males are ash-gray or brown-grey in color with black zigzag stripe. Females have a dark-brown stripe on a yellowish or red-brown back. However we quite often find black vipers, and sometimes copper colored species with a barely visible stripe. Unlike other species of snakes living in Slovakia viper's pupils are vertical.

During the last nine observed years (1993- 2002) the Toxicological Information Centre (TIC) in Bratislava was consulted in 81 cases of individuals attacked by snakes. 51 of these cases were by viper, rattlesnake 6, and green mamba once. 23 cases were by non-venomous snakes; adder 22 times and royal snake once.

Snake venoms are similar containing mostly proteins. They are liquid, milky white to yellow in color (5). It is a complex combination of biologically active matter; enzymes, such as proteasis or hyaluronidasis (including about 20 digestive enzymes), metal ions, amines, lipids, released amino acids and more than 80 large and small polypeptides (such as hydrolasis toxic polypeptides, numerous albumins with specific properties, and inorganic components) which were only partially identified. Many particles such as phospholipasis and others, which can be found in different types of snake venom as secretions of venom gland are phylogenetically connected with digestive glands. Viper venom contains in vitro proteolytic, fibrinolytic, anticoagulant and phospholipasis activity (1, 6). It consists of proteolytic enzymes which eliminate different types of proteins, including proteins of vascular wall, white and red blood cells (7, 8).

The usual manifestations of a viper bite are usually two symmetric bleeding wounds approximately 1 cm apart. They are frequently located on limbs – 51% on arms and 38% on legs. The main aspects

of a viper bite are significant pain and swelling around the bite area. The pain can be sometimes minimal despite the spreading venom throughout the organism. The most dangerous locations for a bite are head, neck and heavily replete areas. The amount of venom produced by the snake differs and depends on many factors. About 40% of all bites are so called 'dry bites' where no venom is present.

FIRST AID FOR SNAKE BITES

Affected limb should be immobilized and the wounded transported to the hospital as soon as possible. According to the latest study, based upon medical records **it is self-contradictory**:

- Excision - could lead to damage of blood-vessels and nerves!
- Sucking - could infect the wound!
- Stifling - could cause absorption of the venom by the deep bone blood-vessels to arterial circulation increasing the original trauma. Upon release of stifle cardiovascular collapse may occur due to release of toxic matter from the saturated tissue!
- Burning or icing – worsens local damage!

TREATMENT

We manage most cases with unspecified treatment (corticosteroides, vitamins C and K, liquids. Cave salicylic acid (inhibition aggregation of trombocytes). We always apply tetanic antitoxin and if serious symptoms exist we utilize an antiserum (European venom antiserum).

It is necessary to strictly abide by the clinical indication for application of the serum with regards to the possible occurrence of a life threatening anaphylactic reaction!!! (9, 10).

Serum indications:

- intensification and recurrence of the shock;
- serious digestive or neurological symptoms;
- lasting disorders of coagulation;
- extreme local symptoms.

It is of a great risk to apply serum to allergic persons (>30% of the population). Serum should only be provided in a facility with complete resources for dealing with anaphylactic reaction (intensive care).

In the case of a viper bite without any clinical symptoms it is indispensable to observe adults for at least 7 hours and children 24 hours.

REFERENCES

1. **Marais J:** Fascinating world of snakes. Rebo productions, Praha, 1995, 26-27. (In Czech.)
2. **Weidensaul S:** The snakes of the world. Ina, Bratislava, 1997, 70-79. (In Slovak.)
3. **Valenta J, Kornalik F:** Bite by *Vipera berus*. Čas Lék čes 2000; 139: 419-421. (In Czech.)
4. **Riedl O et al.:** Clinical toxicology. Avicenum, Praha 1980, 681-691. (In Czech.)
5. **Lesman L:** www.Vipern.de, 2000.
6. **Calderon L et al.:** Biological and Biochemical activities of *Vipera berus* (European Viper) venom. Toxicom 1993; 31: 743-753.
7. **Poddubaya G:** The Toxicologic center of Kazakhstan. www.snspsz.lorton.com/aids/ill_eng/1999.
8. **Bruno C, Cuppini R:** Study of morphological changes of human erythrocytes by the action of *Vipera berus* venom and properties. Bol Soc Ital Biol Sper 1980; 56: 1519-1522.
9. **Zilker T:** *Vipera berus*. www.toxinfo.org, 1995.
10. **Ellenhorn MJ et al.:** Ellenhorn's Medical Toxicology, Williams & Wilkins, Baltimore, 1997, 1745- 1746.