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SNAKE VENOM: FROM DEADLY POISON TO BOON

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ABSTRACT

There are many species of snakes all over world, out of which few are poisonous and the rest are non-poisonous. In India, only four are the deadliest namely cobra, krait, Russel viper and saw scale viper. Snakes inject poison in human body known as venom, venom is the combination of different types of protein and enzymes. Besides its harmful effect venom can be a boon for the field of medicine. From very long period of time, it is being used in many drugs in several pathies in the form of anti-hypertensive, pain killer, anti-pyretic and severe disorders like ascites and also for the treatment of poisoning caused by plants. In this article an attempt is made to compile the therapeutic uses of snake venom.

KEYWORDS: Venom, boon, protein, enzymes, anti-hypertensive, anti-pyretic.

INTRODUCTION

Snakes are elongated, limbless, carnivorous reptiles of the suborder Serpentes like all other squamates, snakes are ectothermic, amniote vertebrates covered in overlapping scales.[1] There are 3000 species of poisonous snake worldwide. Of these, 600 are venomous. Out of 600 only 200 species are capable of harming or killing human beings. There are nearly 300 snake species in India, out of which 60 are venomous, 40 mildly venomous, and about 180 non-venomous. Out of 60, four species are widespread on the Indian mainland – also known as the “big four.” They include cobra, common krait, Russell's viper and saw-scaled viper.[2]

Nomenclature[3]

Phylum- Chordata

Class- Reptilia

Order- Squamota

Suborder- Serpentesnaske.

According to *Acharya Sushrut* there are eighty types of *Sarpa* mentioned in *Kalpa sthana*. *Darvikara sarpa* are twenty-six (26), *Mandali sarpa* are twenty-two (22), *Rajiman* are ten (10), *Nirvisa sarpa* are twelve (12) and *Vaikaranja sarpa* are three (3+7) in numbers.[4]

Snakebite in India causes the highest annual death rates (58,000) and disabilities (four times the death rate) than any other nation. According to WHO In the past 20 years, nearly 1.2 million people have lost their lives as a result of snakebites.[5]

Snake venom- Snake venom is a very toxic saliva[6] that contains zootoxins to help with prey digestion and immobilization. Additionally, this offers threat defense. When a snake bites, its distinctive fangs inject venom; nevertheless, some species can also spit venom.[7]

A muscular sheath surrounds the glands that emit zootoxins, which are modified versions of the parotid salivary glands present in other vertebrates. These glands are typically placed on each side of the head, below and behind the eyes. Before being released via the base of channelled or tubular fangs, the venom is first stored in huge glands called alveoli and then transported there by a duct.[8,9]

Venom is a combination of proteins and enzymes. 90 % of protein by dry weight and most of them are enzymes. 25 different enzymes are found in various venoms out of which 10 are common in most venoms. Nearly bulk of the biological effects of venom are caused by proteins. Numerous enzymes, particularly hydrolytic ones, and hundreds or even thousands of proteins, including toxins, particularly neurotoxins, harmless proteins, and nontoxic proteins, are all present in venom. In addition to digestive hydrolases, L-amino-acid oxidase, phospholipases, thrombin-like pro-coagulants, kallikrein-like serine proteases, and metalloproteinases that harm vascular endothelium, enzymes make up 80–90% of viperid and 25-70% of elapid venoms. Cytotoxins, cardiotoxins, and postsynaptic neurotoxins are polypeptide toxins that bind to acetylcholine receptors at neuromuscular junctions. Metals, peptides, lipids, nucleosides, carbohydrates, amines, and oligopeptides are examples of

molecules with low molecular weight that inhibit the angiotensin-converting enzyme (ACE) and potentiate bradykinin (BPP). Geographical and onto genic factors influence the chemical makeup of venom between and within species. In order to reduce blood pressure, phosphodiesterase affect the prey's cardiovascular system. Red blood cell phospholipid cell membranes are lysed by phospholipase A2, which results in hemolysis. Digestive enzymes including proteases and amino acid oxidases are employed. The yellow color of some species' venom is caused by amino acid oxidase, which also activates a few other enzymes. To hasten the absorption of other enzymes into tissues, hyaluronidase improves tissue permeability. The venom of some snakes, such as mambas, contains, which inhibit cholinesterase and cause the victim to lose, control of their muscles.[10,11]

Properties

- VENOM may be acidic, basic or neutral
- Snake venom has pH value of 7.35 to 7.45, indicating its slightly basic nature
- Specific gravity is 1.03 and is water soluble
- Yellowish color, white.

Medicinal uses of *Sarpa visha* according to *Ayurveda*

- According to *Acharya Charaka* in *Vishachikitsa,* there is an indication to use ***Sthavara visha*** in ***Jangama visha chikitsa*** and ***Jangama visha*** in ***Sthavhara visha*** **chikitsa** as they have opposite direction of movement.[12]
- In ***Udara roga chikitsa-*** *Acharya Charaka* in *Chikitsa sthana* has mentioned use of *Sarpa visha* in *Udara roga (Dushyodara, Badhagudodara* and *Sannipaatodara)* management. As it acts as *Virechaka* in action due to its *Ashu* and *Pramathi guna.*[13]

Procedure

To get a cobra to spew its venom, anger it and force it to devour a fruit. After giving it some thought, the doctor ought to suggest that the patient consume the fruit. The substance known as *Pramathi,* which by itself has the ability to clear the accumulated doshas from the bloodstream, is the snake venom. This leads to the instantaneous separation and extrusion of compact doshas that are fully submerged and stabilized in the tissues but have diverted into other routes. Depending on the patient's strength, the doctor should offer him either milk or *Yavagu* (thick gruel) in little quantities once the aggravating doshas have subsided. The patient should also be doused with cold water.

Subsequently, the patient had to abstain from cereal for a month and rely solely on the leaves of *Trivrit*, *Mandukaparni*, barley, *Vastuka* and *Kalasaka*. These green vegetables can be consu med either boiling or raw; no acidic medication, salt, or fat should be added to them.

These can be prepared by adding water or by themselves with juice. During this month, if the patient feels thirsty, he should be given the juice of the plants described above, especially *Kalasaka*.

Eating these leafy vegetables will help to release the collected doshas, and after a month, cam el milk should be administered to the patient to help him regain his strength.

- *Acharya Vagbhatt* in *Asthang Hridaya Uttarsthana* has mentioned ***Krishanasarpamukhadaghdhaanjana*** along with *Khasa* and *Tejpatra* to apply as *Anjana* in management of *Timir roga*.[14]
- *Acharya Vagbhatt* also mentioned ***Sarpavasaadyaanjana*** (*sankha, kataka phala, anjana*) as "*Andhanaam darshanprada.*"[15]
- In *Bhaishjya ratnavali, Jwarrogadhikar* there are some *Ayurvedic* formulations containing *Sarpa Visha*, mentioned in the table-

S.no	FORMULATION	USES
1.	*Suchikabharana rasa*[16]	*Sannipataja jwara, Murcha*
2.	*Brihat suchikabharan rasa*[17]	*Sannipataja jwara, Visuchika, Atisara, Kasa*
3.	*Sannipatabhairava rasa*[18]	*Sannipataja jwara, Vatabalasak jwara, Kasa, Swaas*
4.	*Brihatvadvanal rasa*[19]	*Sannipataja jwara*
5.	*Ardhanarishwara rasa*[20]	*One side Jwara,*
6.	*Panchanano rasa*[21]	*Sannipataja jwara*

In other systems of medicine[22,23]

In the Unani system of medicine, cobra venom is referred as a tonic, aphrodisiac, hepatic stimulant and for revival in collapsed conditions. Some excellent homeopathy medicines are prepared from venoms of Vipera russelli (Daboia russellic), Crotalus atrox, Naja naja and Lachesis muta. Snake venoms have also been used in allopathic medicine for more than a century to treat thrombosis, arthritis, cancer, immune dysfunction, viral infections, delirium, hallucinations, cholera and melancholia.

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