



Review Article

COMPREHENSIVE ACCOUNT OF SARPAVISHA WITH SPECIAL REFERENCE TO BRIHATTRAYI

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ABSTRACT

Agadatantra (Ayurvedic toxicology) being the sixth branch of *Ashtaanga Ayurveda* deals with the study of *Jaangam* (animate) and (*Sthavara*) inanimate poisons, their symptoms and management. Here is an attempt to collect all references regarding *Sarpa Visha* described in *Brihatrayi*. As theory and practice are the two wings of knowledge, literature review is the foundation of applied sciences. Ancient man is forests dweller. There is a dire need of protection from plant and animal poisoning, hence branch of *Agadatantra* (toxicology) is well established at that time. **Material and methods:** *Brihatrayi* (Major classics) of *Ayurveda* had been referred for literature review. Past studies and researches regarding the topic also been probed. **Objectives:** To present a comprehensive account of snake management in Ayurveda. **Discussion:** Data is presented under the headings of snake identification, specific signs and symptoms and *Vega* (stage) wise treatment with *Agadas* and role of *Agadatantra* in snakebite management as a first aid. **Conclusion:** Systematically presented data will prove a ready reckoner for UG, PG Scholars and researchers, zoologists for easy referencing. Snake bite management through different antidotes mentioned as *Agadas* in classical texts. These formulations need to be researched with modern parameters of *In vivo* and *In vitro* studies.

KEYWORDS: Ayurveda, *Agadas*, *Sarpavisha*, Classification, Management.

INTRODUCTION

Major texts i.e. *Charaka Samhita*, *Sushruta Samhita*, *Ashtang Samgraha Samhita* and *Ashtang Hridaya Samhita* are the time tested and most authenticated resource of Ayurveda knowledge. This *Acharya's* are forest dwellers and are having hypervigilant aspect about the signs and symptoms of snake poisoning, *Vega* (stages of poisoning) wise treatment of different snakes etc. are all astonishing and are relevant today also. Lakshmikutty, is a tribal woman from Kallar forest area at Thiruvananthapuram in Kerala, India who received the India's fourth highest civilian honour Padma Shri (2018) for her breakthrough in practicing traditional medicine. Lakshmikutty is a famous poison healer practicing traditional medicine in the past 50 years.

Recently, Shree Bharadi Ayurvedic pharmaceuticals, Pune had received patent for their product "Pinak" from Indian government, which is an Ayurvedic antivenin and formulated using accurate composition of four herbs. Company had claimed that action of the drug starts immediately and results can be observed in terms of reduced swelling and fast recovery. Patients suffering with Neuro paralysis shows recovery within minutes; and total recovery in

24 hours after the intake of their tablets. Now it is the high time to explore the rich heritage of Ayurveda medicine in the context of snake poisoning. Present article is an effort to lighten up the hidden gems of *Vishachikitsa* in *Agadatantra* in context of snakebite.

Snakes are the most despised animals in the world. Most of the people get chilled even on the sight of snake. In Indian culture worshipping the snakes (*Naag Panchami*) is still prevalent. Ample narrations about snakes are present in *Brihatrayi* (major classic) and *Laghutrayi* (minor classics). These references are the most authentic sources, influencing contemporary Ayurveda (The science of life). With some 50,000 citizens dying annually from snakebites, India is compelled to explore a range of effective methods to deal with the problem, which the WHO characterizes as a neglected tropical disease. India accounts for about half of all global snakebite deaths. India has around 60 different species of poisonous snakes but most fatalities are caused by the 'Big Four' the spectacled cobra (*Najanaja*), the common krait (*Bungaruscaerulus*), the saw-scaled viper (*Echiscarinatus*) and Russel's viper (*Daboia russelii*).^[1]

Ancient classification of snakes

The origin of *Visha* is a part of mythology about *Samudramanathana*. Depending on the mythological habitat, they are divided into *Divya* (celestial) and *Bhauma* (terrestrial).

| | | |
|----------------------|--|--|
| <i>Divya Sarpa-8</i> | <i>Ananta, Takshaka, Vaasuki, Gulika, Karkotaka, shamkhalapa, Padma, Mahapadma</i> | they exert their <i>Visha</i> through their mere sight or exhalation |
| <i>BhaumaSarpa</i> | <i>Darvikaara, mandali, Rajimana, Nirvish, Vyantara</i> | poison in their fangs and they bite |

The term '*Sarpa*' means that which spreads the hood; *Phanee* means that possesses *Phana* (hood). The preview of our discussion is terrestrial snakes, they are again classified according to their features and *Prakriti* (*Tridosha* theory) as follows.

Table 1: Description about snakes

| Snake Name | <i>Darvikaara</i> | <i>Mandali</i> | <i>Rajimana</i> | <i>Nirvisha</i> | <i>Vaikaranja</i> |
|---|--|---|---|-----------------------|---|
| Zoological interpretations with modern classification | Cobra and king cobra, Hooded | <i>Viper</i> and nonpoisonous snakes like Python, <i>Gonus</i> | hoodless and striped | Non poisonous | <i>Vyantara</i> Hybrid type |
| Appearance | hooded snakes odd shaped symbols like wheel of chariot (monocled cobra), umbrella, swastika, hook, plough (spectacled Cobra). speedy movements | without hood but have rounded mandalas (patches) over the body. They are almost sluggish in movements | Those snakes are decorated with different intercepting lines. | Non poisonous | <i>Vyantara</i> is more or less a generic snake term implying the cross over species of the mentioned above |
| <i>Doshaprakopata</i> (Effect on Tridoshas) | <i>Vaata</i> | <i>Pitta</i> | <i>Kapha</i> | According to habitate | with mixed <i>Doshas</i> predominance |
| <i>Vicharanakaal and Ghatakakaal</i> (Time of movement) | Day time | 1,2,3, quarter of night | last quarter of night | - | It sits and blocks the road or path |
| <i>Awastha, rutu Prabhava</i> (fatal period of life) | Young | elderly | middle | - | <i>Ritusandhi</i> (in union of seasons) |
| <i>Sarpavisha Rasadi</i> (properties of visha and rasa) | <i>Ruksha, Katu</i> | <i>Ushna, Amla</i> | <i>Sheet, Madhur</i> | - | - |
| Poison vitiation time | rainy season | <i>cold</i> | <i>Atap</i> | - | - |

Snakes

There are more than 3500 species of snakes, but only about 250 are venomous in the world. [2] In India 216 species are found, of which 52 are poisonous. Since the majority of snakes are non-venomous. For medico legal purposes, snakes are classified into two groups, viz, poisonous (*Savish*) and non-poisonous (*Nirvisha*). This classification is not quite correct as some of the non-poisonous snakes can kill small animals by their poison.

Common Classification of poisons

According to mode of action, poisons are classified in six groups, viz (1) corrosives (2) irritants (3) neurotics (4) cardiac (5) asphyxiants and (6)

miscellaneous. Snakes come in the category of irritant poisons. [3]

Classification

Acharya Charaka classified *visha* mainly into two categories. One of them is *Jangamavisha* (animal poison) and the another is *Sthavaravisha* (plant and mineral poisons). [4]

Acharya Sushruta classified *visha* into two types. One of them is *Sthavaravisha* and its sites are ten and the another one is *jangamavisha* and its sites are sixteen. [5]

Acharya Vagbhata classified visha into two types. One of them is the *Akratrimavisha* (natural poison) and this is again sub divided into two i.e. *Sthavara* and *Jangama*. The other one is the *kritrimavisha* which is called as *Garavisha* (unnatural or chemically prepared poison).^[6]

Jangama Visha which mainly deals with the poisonous animals. Acharya Charaka described about the types of the poisonous animals. The poison of serpents, insects, rats, spiders, scorpions, house lizards, leeches, fishes, frogs, hornets, lizards, dogs, tigers, jackals, hyenas, mongooses and other fanged animals is known as *Jangamavisha*.^[7]

Classification of the Snakes

In the basic classification of the snakes are two types

1) *Divya*- divine (mythical) and 2) *Bhaumya*-terrestrial (living on the earth).^[8]

i. *Divya*-divine *Sarpa*-eight in no.

They are *Vasuki*, *Takshaka*, *Anantasagara*, *Sagaralaya*, *Nanda*, *Upananda* etc. are *divya* they are like fire in the fire alter (of the sacrifice), they always roar, cause rain, shine with brilliance and makes other things also shine by their light, support and maintain the world always;, when enraged convert the world to ashes by their sight and breath; our

salutations to them, for there is no treatment for their wrath (which is definitely fatal).^[9]

ii. **Bhaumyasarpa**. -Eighty in no.- Celestial/terrestrial

| Type | Number |
|---|--------|
| <i>Darvikara</i> | 26 |
| <i>Mandali</i> | 22 |
| <i>Rajimanta</i> | 10 |
| <i>Nirvisha</i> | 12 |
| <i>Vaikaranja</i> and <i>Vaikaranjaudabhava</i> | 10 |
| Total | 80 |

The terrestrial snakes are classified into five types. A) *Darvikara* (hooded), B) *Mandali* (hoodless and painted with circular paths or rings of varied colors on their skin), C) *Rajimanta* (hoodless and striped), D) *Nirvisha* (non-poisonous) and E) *Vaikaranja* (hybrid species). These five types of snakes are sub classified into eighty type.^[10]

Ayurvedic classification of snake bite marks- Many of the ancient books show difference of opinion in describing bite marks as follows-

As per *Charakasamhita*, *Goodhasampeedita*, *vrutta*, *peedit*, *lambit*, *sarpit* are the names of types of snake bite

Table 2: Types of Bite marks as per Sushruta

| name of bite mark | no. of teeth mark/s | other findings |
|--------------------|---------------------|---|
| 1.Sarpitam | 1,2 or many | Oozing of very little blood, deep but raised wounds, abnormal in appearance, oedema, confined to the particular site. |
| 2.Raditam | 1,2 or many | Bitten area presented with reddish/yellowish/ bluish or whitish lines |
| 3.Nirvisham | 1,2 or many | No oedema, little bleeding, no other signs and symptoms of poisoning in the body. |
| 4.Sarpangabhihatam | No Marks | Little oedema may present; No organic signs or symptoms. |

Table 3: Identification of bite marks as per Ashtanghrudaya

| S.No. | name of bite mark | No. of teeth marks | other findings | poisonous/Non poisonous |
|-------|------------------------|--------------------|--|-----------------------------------|
| 1 | <i>Tundahatam</i> | Nil | No bite marks presence of saliva | Non poisonous |
| 2 | <i>Vyaleedham</i> | 1 / 2 | No bleeding | Non poisonous |
| 3 | <i>Vyaaluptam</i> | 2 | bleeding from the site of the bite | poisonous but curable |
| 4 | <i>Dashtakam</i> | 3 | Cut open wounds with continuous bleeding | poisonous with moderate prognosis |
| 5 | <i>Dashtranipeetam</i> | 4 | same as above | fatally poisonous |

Specific symptoms of bites by snakes of different sexes the sight or the pupils of the eyes of a person bitten by a male snake, is turned upwards. A bite by a female serpent exhibits such as downcast eyes and appearance of vein on the forehead while that by a hermaphrodite (*Napunsaka*) snake makes the patient look sideways.^[11]

Table 4: Gender variation of Sarpa

| S.No. | Gender type | characteristics/ appearance |
|-------|-------------------------------|---|
| 1 | Nara (male) | 1.Large or big eyes, tongue, mouth and rounded head; bitten person looks upwards. 2.Hood with large body, looks upwards and forceful inhalation. 3.Large or big body, eyes, tongue, head, sound, hood and looks upwards |
| 2 | Nari (Female) | 1.Small eyes, tongue, mouth and head; bitten person looks downwards. With engorged blood vessels on the forehead scalp. 2.Large head with average body |
| 3 | Napumsaka (Her - rmophrodite) | 1.Mixed characteristics, less poisonous, poorly excitable, bitten person looks sideways 2.small head, elongated slender body |

In addition, depending upon the appearance *Sushruta* categorises the snakes into *Brahmana*, *Kshatriya*, *Vaishya* and *Kshudra*. This division may be seen as the influence of 'Chaturvarnya'- The deep-rooted caste system of ancient India. Practically no significance can be found in these arrangements. Biologist and zoologist may search for logic in this context. There may be possibility of genetical differences.

Characteristics of *Brahmana*, *Kshatriya*, *Vaishya* and *Kshudra* serpents w.s.r. *Vicharanakaal* (time of wandering), *Danshadisha* (direction) and *Doshaprakopata* (vitiatio of Humors)

| Sr.No. | type | characteristics/ appearance |
|--------|------------------|--|
| 1 | <i>Brahmana</i> | 1.pearly, silvery, golden, <i>Kapila</i> and sweet smelling 2.Irritable, bluish, whitish, reddish with red face, yellow eyes, moves in holy places (<i>Medhadesh</i>); <i>Brahmana</i> signs on the hood and with the smell of <i>Vilwa Pushpa</i> , <i>Chandan</i> , <i>Ushira</i> , <i>Padma</i> , <i>Guggulu</i> , Go out in the morning and bite from the front and increases all the three <i>Doshas</i> . |
| 2 | <i>Kshatriya</i> | 1.Oily body, short tempered, and easily excitable and with symbols like moon, umbrella or lotus (Su.Kalp4/26.) 2.self-esteemed, brave, reddish eyes, easily irritable; colour- similar to <i>Pakwa</i> , <i>Jambu</i> , <i>Kharjura</i> , <i>Draaksha</i> , broken <i>Anjana</i> etc. On the hood signs like <i>Ardha Chandra</i> , <i>Shreevatsa</i> , <i>Shankha</i> , <i>chakra</i> , <i>Hala</i> etc. smell- <i>Jati</i> , <i>Champaka</i> , <i>Punnaga</i> , <i>Parthara</i> , or <i>Jonkaka</i> ; go out at noon time; bite from right side and increases <i>Vaatadosha</i> |
| 3 | <i>Vaishya</i> | 1.Black, diamond like, reddish, dull, or pigeon coloured 2. Colour - <i>Paravata</i> (pigeon), <i>Vajra</i> (diamond), <i>Gomedaka</i> (cats eye), <i>Ghrhadhuma</i> (soot like), reddish and with rounded marking on the body. Smell- <i>Basta</i> , <i>Aavi</i> , <i>Kushtha</i> , <i>Ksheera</i> , <i>Ghrutam</i> , ;go out in the evening, bite from left side and increases <i>Pitta dosha</i> . |
| 4 | <i>Kshudra</i> | 1.Mixed colors (described as bufellowish, tigrish and with rough skin. 2.Colour- <i>Godhoom</i> , <i>Mahisha</i> , elephant, <i>Kardama</i> and decorated with dots or lines, rough. Smell - <i>Suraa</i> , <i>Shonita</i> ; go out after sun set, bite from back and increases <i>Kaphadosha</i> . |

Table 5: Doshika influence of Sarpavisha

| Type | Rasa | Guna | Dosha predominance |
|------------------|----------------|---------------|---------------------|
| <i>Darvikara</i> | <i>Katu</i> | <i>Ruksha</i> | <i>Vaataakopana</i> |
| <i>Mandali</i> | <i>Amla</i> | <i>Ushna</i> | <i>Pitta kopana</i> |
| <i>Rajimanta</i> | <i>Madhura</i> | <i>Sheeta</i> | <i>Kaphakopana</i> |

Table 6: Symptoms of the different stages of poisoning from *Dansha* (the bite) of a *Darvikarasarpa*, *Mandalisarpa*, *Rajimantasarpa*

| <i>Vega</i> | <i>Darvikarasarpadansha</i> | <i>Mandalidansha</i> | <i>Rajimantadansha</i> |
|-----------------|---|--|---|
| 1 st | In first impulse (<i>Prathamavega</i>) <i>Rakta</i> (blood) gets vitiated, becomes blackish and there by produce darkish complexion of the body. The person feels as though ants are running all over his body. [12] | Spreads in the <i>Raktadhatu</i> , and changes the colour to yellow. burning sensation all over the body, oedema on the bitten limb, | Affects the <i>Raktadhatu</i> ; and changes the colour to dull white. Horipillations, person becomes pale, |
| 2 nd | In second impulse (<i>Dvitiyavega</i>) <i>Mamsadhatu</i> (muscular tissue) gets vitiated. Swelling occurs on the bitten site. | Vitiates <i>Mamsadhatu</i> , deepening of yellowish discolouration; burning sensation all over the body, oedema on the bitten site. | Spreads in <i>Mamsadhatu</i> , Heaviness of body, becomes more pale, fatigue, oedema in the head. |
| 3 rd | In third impulse (<i>Trutiyavega</i>) <i>Medo dhatu</i> (adipose tissue) gets vitiated. Heaviness of the head, loss of vision, moistness at the site of bite. | Affects <i>Medo dhatu</i> , blurring of vision, intense thirst, putrefaction at the site, sweating | spreads in <i>Medodhatu</i> , dimness of vision, Putrefaction at the site, excessive secretion of mucus from the nose, eyes, mouth etc. |
| 4 th | In fourth impulse (<i>Chaturthavega</i>) the poison enters into <i>Koshtha</i> and vitiates the <i>Kaphadosha</i> there and produces symptoms such as excessive salivation, vomiting, joints pains and lethargy | Enters <i>Koshtha</i> and produces fever. (in addition to the above Lakshanas) | spreads in <i>Koshtha</i> , stiffness of neck, Heaviness of head, stiffness of neck (in addition) |
| 5 th | In fifth impulse (<i>Panchamavega</i>) the poison enters into <i>Asthidhatu</i> (osseous tissue) and vitiates the <i>Pranavayu</i> and <i>Agni</i> . This causes joints pains, hiccups and burning sensation. | Burning sensation all above the body (in addition to the above <i>Lakshanas</i>) | difficulty in speaking(dysphonia), (dysarthria); fever (in addition) |
| 6 th | In sixth impulse (<i>Shashthavega</i>) the poison enters into <i>Majjadhatu</i> (bone marrow) and also vitiates the <i>Grahani</i> (<i>Pittadharakala</i>) causes severe pain in the chest, heaviness in the chest, delirium and diarrhoea. | same as that of <i>Darvikarasarpadansha</i> | same as that of <i>Darvikarasarpadansha</i> |
| 7 th | In seventh impulse (<i>Saptamavega</i>) the poison enters into <i>Shukradhatu</i> (generative tissue) thereby extremely aggravates the <i>Vyanavayu</i> , dislodges the <i>Kapha</i> even from the minute capillaries, producing secretions of lump-like phlegm from the mouth, a breaking pain in the waist and the back. Impaired functions of the mind, body, excessive salivation, perspiration and suppression of breath leading to death. | same as that of <i>Darvikarasarpadansha</i> | same as that of <i>Darvikarasarpadansha</i> |

Significance of the *Visha Vega* and *Vegantara*

Literally Vega means speed. According to *Vishajyotshnika*, 'Vega is the ability of poison to invade the *Dhatu*s quickly and consequently.' In other words it is the stages of subsequent invasion of the

*Dhatu*s by poison. In *Sushruta Samhita*, instead of *Dhatu*s; the term '*Kalaa*' is used. So, "Vega is the ability of *Visha* supported by *Vayu* to spread into the *Kalaas* one by one and manifestation of the particular

signs and symptoms". The importance of *Vegantara* is that the medication and treatment procedures should be carried out during this interval. Many *Acharyas* show difference of opinion regarding the number of *Vegas*. Some say it as seven and others as eight. But actually the eight *Vega* is death."

The signs and symptoms expressed in each *Vega* (stage) denotes the spread of the poison from one tissue to the other and is also therapeutically significant because the management depends on the stage at which the poison has spread in the body. When the poison has affected deeper tissues such as *Majja* and *Shukra*, it turns to be *Asadhya* (incurable). It is mandatory for a *Vishvavidya* to have thorough knowledge of seven *Vegas* or stages to bring about effective therapy.^[13]

IV) Treatment

1) General treatment

The twenty-four remedial measures for the poisoning can be understood in the following way.

a) To check Entry and Circulation of Blood

- i) *Arista bhandana*- Binding- application of tourniquet
- ii) *Utakartana*- Incision
- iii) *Nishapidana* - Compression
- iv) *Chushana*-Sucking
- v) *Agni*-Heating, cauterization
- vi) *Parisheka*-Sprinkling, hot or cold
- vii) *Avagaha*- Tub Bath (merging in medicated decoction)

b) Eliminative Therapy

- viii) *Raktamokshana*- Blood-letting
- ix) *Vamana*- Emesis
- x) *Virechana*-purgation
- xi) *Nasya*-Snuffing

c) Symptomatic Therapy

- xii) *Hridayavarana*- Protection of heart
- xiii) *Sangyasthapana*-Resuscitation
- xiv) *Mritasanjivana*- Revitalization

d) Counteracting Measures

- xv) *Mantra* - Incantation
- xvi) *Ousadha*- medicament
- xvii) *Prativisha* -Antidotes

e) Pacificatory Measures

- xviii) *Lepa*- Pastes
- xix) *Pratisarana*- Local application
- xx) *Anjana* - Collyrium
- xxi) *Pradhamana*- Blowing up powder through nose
- xxii) *Dhuma* -*Dhumapana*/fumigation
- xxiii) *Leha* - Linctus

xxiv) *Upadhana*-Medication on incised scalp^[14]

In snake poisoning cases emergency treatment is required as the poison remains for a period of 100 *Matra* only at the site of the bite and then spreads throughout the body vitiating the blood and other tissues. Within this period itself, incising the site of bite and other treatments should be done quickly so that the poison does not grow in the body.^[15] *Acharya vagbhatta* still explain that the person who is bitten by snake, one should bite the same snake or a lump of stone or mud tearing it teeth violently.

i. *Aristabandhana* (Application of tourniquets): *Arista* (bad omen or bad prognosis) means unfavourable or which gives the indication of death. Obviously when the intensity of the poison increases it signifies the *Arista*. As poison starts combining with the blood and gets separate all over the body successively it invading the other organs in the body. Thus, to prevent or stop the disasters, created by the poison the physician has to option the *Bandhana*. -to stop the *Arista* can be called *Arista bandhana*. There is analogy of dam which tries to control the heavy flow of river.

ii. *Dansanigraha* (Removing the fangs): The teeth which are not on vital spots should be pulled out by squeezing the area of bite, symptoms of toxicity of poison will not develop (if the fangs are removed) when the seed is destroyed. Removing the teeth which are on *Marma* (vital spots) leads to death and on the joints to distortions or permanent deformity of the body. This concept is more relevant to removal of stings in honey bees as the venom sacs are sacrificed with the stings. In the cases of snake bites the poison present at the site of bite can be removed by pressing the area around the site (*Nishpidana*)

iii. *Agnikarma* (Cauterization)

iv. *Achusana* (sucking)

v. *Siravyadhana* (veinous section)- Bloodletting

vi. *Hridayavarana* (protecting of the heart) through medications

vii. *Vamana* (emesis) removal of the poison present in the stomach.

About snake venom

Snake venom is nothing but a complex structure of proteins (enzymes, non-enzymatic polypeptide toxins and non-toxic proteins). These include either activators or deactivators of physiological processes such as blood clotting, nerve transmission and mitochondrial activities like energy production. Some of these enzymes break down membranes to promote the spreading of venom while some others increase vascular permeability

causing edema, blistering, bruising and necrosis at the site of bite.

The action of venom on our body depends on the quantity of venom injected at the site of bite. This is variable depending on the species of snake, size of snake, the mechanical efficiency of the bite, whether both fangs penetrated the skin, whether there were repeated strikes. This modern theory about the snake bite is exactly matching the Ayurvedic theory of four fangs containing different amount of venom, Injection of venom depends on the condition of the snake, at what time he was biting.

Treatment of hooded snake bites. i.e., Root of *Sinduvaraka* macerated in its own juice, added with *Madhu* and consumed is the recipe for poison of hooded snakes. Root of *Sinduvaraka* and *Shvetagirikarnika* made into paste (with water) and consumed, *Pakala (kustha)* and *Honey* made use of as

nasal drops are for the person bitten by hooded snake. [16]

ii. If bitten by a *krishnasarpa* the blood should be removed from the site and paste of *Charati* and *nakuli* or of powerful root poison should be applied.

iii. *Ghruta* added with *Madhu*, *Manjishtha (Rubia cordifolia)* and *Gruhadhuma* (kitchen soot) should be drunk.

iv. *Agada* (antipoisonous recipe) prepared with *Tanduliyaka (best antitoxic vegetable)*, *Kashamarya*, *Kinihi*, *Girikarnika*, *Matulunga*, *Shita (Shvetavacha)* and *Shelu* used for drinking, nasal medication and collyrium is beneficial in powerful poison of hooded snakes and also snakes with stripes.

The following formula is for bite by *Vasuki* (snake king): Soot, Haridra, Daruhardra, *Tanduliyaka* with [its own] root with plenty of Honey and Ghee.

Table 7: Treatment according to impulses^[17]

| Vega | Darvikarasarpa | Mandali | Raajimanta |
|------|---|--|---|
| 1st | <i>Raktamokshanabysiravyadhana</i> blood letting | Same as <i>Darvikara</i> | bloodletting should be done with <i>Alabu</i> (gourd) and anti-poisonous formulation mixed with honey and ghee should be given to drink |
| 2nd | <i>Madhu</i> , <i>Ghruta</i> and <i>Agadapana</i> (anti poisonous formulation with honey and ghee should be given to drink) | anti-poisonous formulation with honey and <i>Ghee</i> should be given to drink. Then vomiting is induced and patient is served with gruel. | Emesis should be applied followed by anti-poisonous formulation |
| 3rd | <i>Vishanashakanasya</i> , <i>Anjana</i> (anti poisonous snuff and collyrium should be applied. | After <i>Virechana</i> (purgation), he should be given wholesome gruel | Same as <i>Darvikara</i> |
| 4th | <i>Vamana</i> , after the <i>Vamana</i> , <i>Yavagupana</i> is advised which was described in the context of the <i>Sthavaravisha Chikhitsa</i> | Same as <i>Darvikara</i> | Same as <i>Darvikara</i> |
| 5th. | <i>Shitalaupachara</i> (Cooling procedure) and giving the <i>Virehcanayavagu</i> | Same as <i>Darvikara</i> | Same as <i>Darvikara</i> |
| 6th | Same as in the fifth <i>Vega</i> | Intake of <i>Kakolyadi</i> group and sweet antipoisonous recipes | irritant collyrium |
| 7th | <i>Tikshanaanjana</i> , <i>Nasya</i> , making the <i>Kakapada</i> shape incision on the scalp and applying the blood mixed flush over the incision. | <i>Agadas</i> (anti poisonous formulation) should be used as a snuff | one pressed snuff should be applied |

Table 8: Vishagna Yogas according to Sarpa

| Darvikarasarpa | Mandali | Raajimanta |
|--|---|--|
| 1.The following potion is for the bite by Darvikara type of snake: Sindhuvara root, Shveta and Girikarnika 2.The following snuff is for the bite by Darvikara type of snake: Kustha+honey | Manjishta, Madhuyasti, Jivaka, Rishabhaka, Shveta, Kashmarya with leaf buds of Vata | powder of- Trikatu, Ativisa, Kusthaa, Gruhdhuma (soot), Harenuka, Tagara, Katuka with honey mix all of the above together. |

Vishaghna Yoga /Agada**Table 9: According to Acharya Charaka^[18]**

| Sr.No | Yoga | Sr.No | Yoga |
|--------------|-------------------|--------------|-----------------------|
| 1 | Amruta ghruta | 8 | Mahagandhahasti agada |
| 2 | Chandanadi yoga | 9 | Mansayadi yoga |
| 3 | Gandhahasti agada | 10 | Mrutsanjivana agada |
| 4 | Hingwadi yoga | 11 | Nagdantyadighrita |
| 5 | Kakanda yoga | 12 | Panchashirisha agada |
| 6 | Kapithadi yoga | 13 | Rushabhakadi agada |
| 7 | Kshara agada | 14 | Shirishapuspadi yoga |

Table 10: According to Acharya Sushruta^[19]

| Sr.No | Yoga | Sr.No | Yoga |
|--------------|----------------------|--------------|----------------------------|
| 1 | AjitMahagada | 9 | Rushabha agada |
| 2 | Amruta ghruta | 10 | Sanjivana agada |
| 3 | Drakshadi agada | 11 | Sarvakarmika agada |
| 4 | Ekasara agada | 12 | Sarpavishaghnakshara agada |
| 5 | Kalyanakaghruta | 13 | Sleshmatakadichurna |
| 6 | Kshara agada | 14 | Tarkshya agada |
| 7 | Mahasugandhi agada | 15. | TrivrutadiMahagada |
| 8 | Panchashirisha agada | | |

Table 11: According to Acharya Vagbhata^[20]

| | | | |
|---|--------------------|---|----------------------|
| 1 | Bilvadya agada | 5 | Nakulyadi agada |
| 2 | Himvana agada | 6 | Shirishapuspadi yoga |
| 3 | Koshatakyadiyavagu | 7 | Vajra agada |
| 4 | Meghanada agada | 8 | Vyantardasta agada |

Table 12: According to Acharya Vrudha Vagbhata^[21]

| Sr.No | Yoga | Sr.No | Yoga |
|--------------|----------------|--------------|--------------------------|
| 1 | Asthanga agada | 7 | Mahagada |
| 2 | Bilvadi agada | 8 | Mandalivishanashak agada |
| 3 | Garuda anjana | 9 | Rushabha agada |
| 4 | Churna anjana | 10 | Tarkshya agada |
| 5 | Himvana agada | 11 | Vajra churna |
| 6 | Lodhradi agada | 12 | Vyantardasta agada |

According to *Acharya Bhavamishra*^[22]-*Mrityupashachedighrita*

For *Vyantara Sarpa* - special "*Sarvakarmika Agada*" is mentioned by *Vagbhata*.

According to *sarpas*- 1.*Darvikarsinduvarmula and honeys* 2.*Mandali- Himvaan Agada*, 3. *Rajimaan- Gonus*, - *Ashtaang Agada*, 4. All types of snakes- *rushabha Agada and taarkshya Agada*

Prognosis

Fatal Times and Locales

The person bitten in cremation ground, religious tree, ant hill, sacrifices, hermitage, temple, on the last days of the fortnight, in noon and on the 8th day of the fortnight, in midnight, and also in places of *Tantrika* practices do not recover.

Fatality of *Ashivisa* Snakes (dreadful snakes with poisoned vision and breath)

People inflicted by *Asivisa* serpents with poisons through vision [being looked at by the snake], breath, excrements and touch and also bitten in all vital parts die soon. [if the person is bitten in any of the vital parts (i.e., heart, head, bladder) he will die soon. But if he has been bitten on a non-vital part (i.e., a leg) he may recover.] This rule is true of both snakes as well as insects born of them (including spiders, centipedes and scorpions).

Importance of *Hema- Suvarna* (Gold) for Treatment of Poisoning *Hema* (gold) controls all poisons and poisonous combinations. Poison does not adhere in the body of the person taking *Hema*, just like water does not adhere to the surface of a lotus leaf, but roles right off.

So, it is the time need to evaluate the Anti venom activity of medicinal plant. Since ancient time many herbs are use in the treatment of scorpion bite and it is also scientifically proved. There are so many plants which has a therapeutic value in the scorpion bite treatment.

Table 13: snake venom constituents and their important clinical features

| Constituents | Mechanism | Clinical effects |
|---------------------------|---|---|
| neurotoxins | act on the pre and post synaptic area of nerves and myoneural junctions. | Paralysis of muscles causing respiratory failure, weakness etc. |
| cardiotoxins | Affects cardiac musculatures | Contraction of the heart muscles and cardiac arrest. Reduces BP |
| Haemolysin | act on RBC | Contraction of the heart muscles and cardiac arrest. Reduces BP |
| coagulinity | converts fibrinogen to fibrin and pro thrombin to thrombosis | deranged clotting cascade, bleeding from the site of bite, gums, aall orifices, hair follicles etc |
| Crotamine proteases | acts on nerve endings proteolytic and esterase activity | paralysis of muscles, Deranged clotting mechanism; necrosis |
| phospholipase A | act on RBC and hydrolyze lecithin to lysolecithin | erythrolysis |
| Cholinesterase | hydrolyzes acetyl choline | Block transmission of nerve impulses resulting in curare- like actions |
| Ophio amino acid oxidase | activate proteases and peptides in the cells | cell autolysis and suppuration |
| Nucleases (DNase & RNase) | Hydrolyzes phosphodiester bonds of DNA & RNA | enhance the activity of other enzymes |
| Hyaluronidase | Hydrolyzeshyaluronic acid which is the cementing material between the cells | Reduces natural resistance of tissues and increases the permeability; helps spread of other factors; local swelling |

Other Preventative Routines

One should always walk with a umbrella and a rattle in hand day and night. By the shade of the umbrella and the sound of the rattle, the serpents get

frightened and flee away. One should wear diamond, emerald, *Sara*, *Picuka*, *Visamusika*, ruby, snake's gem, cat's eye, elephant pearl and anti-poison stone or

excellent anti-poison herbs. Birds such as Sarika, demoisella crane, peacock, swan, parrot etc. should be kept. [Perhaps these birds kill snakes and poisonous insects, or alert their owners about these intruders.

Further Emergency Treatment for Bites (by Snake):

If bitten, one should immediately bite the same serpent. (Yes, apparently this says to bite the snake back who just bit.) or he should bite a clod of earth. He should also bind a tourniquet above the sight of the bite. He should also excise the part or cauterize it.

Vega, literally means speed. According to *Vishjyotshnika*, *Vega* is the ability of (poison) *Visha* to invade the *Dhatu*s quickly and consecutively. In other words it is the stages of subsequent invasion of the *Dhatu*s by poison. In *Sushruta Samhita* instead of *Dhatu*s, *Kalaa*' is used. So, "*Vega* is the ability of *Visha* supported by *Vayu* to spread into the *Kalaas* one by one and manifestation of the particular signs and symptoms".

The science of toxicology is so developed at that time they observed seven *Vegas* with different symptoms and treatment for poisoning is also prescribed as per *Vegas*. Here is huge scope for further research.

Table 14: Comparison of Vega- wise signs and symptoms of Darveekarsarpa (cobra)

| Vega | Sushruta | Ashtanga samgraha | Ashtanga Hridaya |
|------|---|--|---|
| 1 | spreads in the <i>Rakta Dhatu</i> s; and changes the colour to black, tingling sensation and the black discoloration at the site of bite | spreads in the <i>Rakta Dhatu</i> and changes the colour (cyanosis) so cyanosis in the face and all over the sensation | Spreads in the <i>Rakta Dhatu</i> ; eyes, mouth, urine etc. appear with into blackish tinge. Colouration at the tingling sensation. |
| 2 | Vitiates <i>Mamsa Dhatu</i> , discoloration, oedema enlargement of lymph glands | enlargement of lymph nodes | enlargement of lymph nodes |
| 3 | Affects <i>Medas</i> , suppuration at the site, sweating, heaviness of head, blurring of vision | heaviness of head, dimness of vision, putrefaction at the site. | heaviness of head, dimness of vision |
| 4 | Enters <i>Koshtha</i> and increases <i>Kapha</i> , fatigue, salivation, pain in the joints. | excessive salivation, vomiting, weakness of joint, fatigue | excessive salivation, vomiting, weakness of joint, |
| 5 | enters <i>Asthi Dhatu</i> and vitiates <i>Praana</i> and <i>Agni</i> . Arthralgia, burning sensation all over the body hiccough, | pain in the joints, burning sensations, hiccough | pain in the joints, burning sensations, hiccough |
| 6 | Enters <i>Majja Dhatu</i> , and affect grahani, heaviness of body, diarrhoea | Chest pain, heaviness of body, loss of consciousness; indigestion; diarrhea | Chest pain, heaviness of body, indigestion, diarrhea, giddiness. |
| 7 | Enters <i>Shukradhatu</i> vitiates <i>vyaana</i> ; increases secretions resulting in excessive salivation; sweating incoordination of movements; paralysis of muscles of back and low back regions dyspnoea and arrest of respiration | spreads in <i>Shukradhatu</i> ; paralysis/weakness of muscles of shoulder, back. later complete paralysis | spreads in <i>Shukradhatu</i> ; paralysis/weakness of muscles of shoulder, back and low back. Later complete and low back. later complete paralysis |

Due to over expansion of the article same comparative charts in major classics of Ayurveda of *Rajimanta* and *Mandali* are not presented here.

Probable mode of action

Every drug acts by virtue of its *Rasa*, *Guna*, *Vipaka*, *Veerya* and *Vrabhava*. In *Samaana Pratyayarabdha Dravya*, three properties such as

Guna, *Vipaka*, *Veerya* are as per *Rasa*. *Tikta* is having the property of *Vishaghna*.^[23]

Amla Rasa, which is also present in the drug acts as *Hridayamtarpayati*, *Balya*, *Preenana*, *Bruhana*.^[24] which also may be helpful. Most of the *Vishaghna* drug act by their *Prabhava*.^[25]

Medicinal plant that possesses snake venom neutralization property in experimental animal

models usually follows three protocols. First is venom-medicinal plant mixed together, second is medicinal plant administration followed by venom and third one is venom followed by medicinal plant administration. Among these third technique is similar to clinical conditions. In first two experimental protocol, test drug was administered prior to envenomation and in third after envenomation. Generally many uses incubation method i.e. venom and test drugs were incubated and then administered to animals, as they use extracts this method is idea.^[26] Dr, Sarang Lakhmale concluded in Pharmacological study of Seeds of Badichang -Symphoremepolyandrium Wight. is having significant activity against Najanaja (Cobra) venom induced changes in various hematological and biochemical parameters. However, further investigations are necessary to establish the exact nature of the biologically active components present in test drug which neutralizes the toxic components of snake venom to some extent. Such types of experiments are necessary to flourish the authenticity of this anti poisonous recipes. The exact mechanism involved in such recipes of antitoxins should be studied pharmacologically on different system.

Nature God has its own values. Everything in it is interrelated to each other. Ayurveda is a herbal medicinal therapy. *Adhyatma* is a spirit of nature depicting some of its important rules. Science is an instrument to enact some values. Ayurveda have combined all of three together for the benefit of mankind single omission will be fruitless.

CONCLUSION

Data mentioned above clearly envisage the knowledge of Ayurveda scholars was quite impressive in the field of snake identification and snake bite management. As till date for exact treatment of snake bite first doctor has to know whether the snake is poisonous or not, otherwise patient will die due to ASV (anti-snake venom injection). Ancient methods of research were so rigorous and scientific that the conclusions they had mentioned in the texts are as so relevant in the present-day scenario also. If those people kept the record and documents of all researches will prove the boon for the modern-day pharma industries. Hence reverse pharmacology is the need of the time. *Agada*-the herbal medications have excellent potential to treat various ailments including snake bite. *Vegas* of snake poisoning is still a gray area of research and has a ample scope for future researchers and use of medicines accordingly. From above discussion one can understands the types of snakes in different dimensions, their symptoms, management in

different *Vegas*, various *Agada* in major classics of Ayurveda elaborately. In south India, there full-fledged Ayurvedic hospitals for management of post snake bite injuries after taking ASV-anti snake venom. This paper also helps to explore future possibilities of researches in use of *Agada* with the help of various modern techniques of standardization. In vitro and in vivo studies are the way forward for this work. ASV injections are not easily available except government hospital and also not cost effective for a layman. So, these remedies can play a role at least to extend the time period between spreading the poison and help the culprit to reach the nearest hospital also play an important role in post bite management.

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