DARVIKARA VISHA AND ITS TREATMENT WITH SPECIAL REFERENCE TO KERALEEYA VISHA CHIKITSA: A REVIEW

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ABSTRACT
There are more than 2000 species of snake in the world, and about 216 species in India, of which 52 are venomous.¹ Cobra is responsible for large number of snake bite causalities reaching 65% of envenomation in the country. The appearance and symptoms explained in the classical texts for darvikasarpa similar to cobra. There are 26 types of darvikara (Cobra) variety explained in classics.² The main signs and symptoms in darvikara bite are twak (skin), nayana (eye), nakha (nail), vadana (face), mootra (urine), purisha (faeces), damsha (bite site) become Krishna (black) in colour., sandhivedana (joint pain), katiprushtagreevadhourbalya (weakness in waist, back and neck), jrumbha (yawning), vepathu (trembling), swarasadha (hoarseness of voice), jadatha (dullness), sushkaudgara (dry eructation), kasa (cough), shwasa (dyspnoea), hikka (hiccough), urdhagamana of vayu (upward movement of vayu), laalasrava, (salivation), phenagamana (froth coming from mouth), srothoavrodha (obstruction of channels) and different type of vatika pain.³ Darvikara bite is vata predominant, so vatashamaka drugs should be used in this condition.⁴ Many treatment modalities explained in keraaleeya text books for darvikara (cobra) bite as nasya, anjana, pana, lepa etc. Based on the signs and symptoms appropriate treatment should be selected according to yukthi.

INTRODUCTION
Snakes are the most feared venomous animals in the world due to their induced morbidity and mortality worldwide which represent 5,400,000 bites over 2,500,000 fatalities followed by about 125,000 deaths. However, some retrospective studies reported that the incidence, mortality and long term disability due to snakebites were shown to be much higher. They are poikilothermic and carnivorous reptiles. India records a staggering 10,000 to 15,000 death annually from snake bite. While many of this death occur due to envenomation, a significant few result from terror following a non-lethal venomous or non- venomous snake bite.⁵ Snake bite is more prevalent in rural than urban areas, commonly seen
in summer. Most of the bite in tropical countries are on lower extremities since the victim are bitten by treading on or near the snake, while in non-tropical countries most bites are on fingers and hands because of deliberate handling of snake.

**Cobra bite (DarvikaraDashta)**

Cobras belong to the sub-group of snakes known as elapids; there are over 270 species of cobras and their relatives are found in the world. There are 26 types darvikara snake explained in our classics.

**Physical appearance**

The common cobra is usually brown or black in colour. It is a distinctive snake growing up to 5 to 6 feet in length, with a distensible neck that can be expanded into a hood. On the dorsal side of the hood there may be a monocel late or binocellate mark. The hood markings distinguish the cobra from other species and its habit of rearing up, when alarmed make it distinctive but not definitive. On the ventral surface of the hood are faint, broad, black, stripes above which are two dark spots that extend over 3-4 scales. The head is small and pupil is round. The most important distinguishing feature of this snake is the fact that the 3rd supra-labial shield touches the eye and nose shield. Also a small wedge shaped scale is present between the 4th and 5th infra-labials. Another important feature is said to be the presence of 3 small scales just behind each eye. According to classics snake which have mark of radhanga (wheel), langa-la(plough), swasthika, hook (angu)/goad of the elephant on their hood which move sheeghragati (very fast) are known as darvikara.

**Kingcobra**

This species is the world's longest venomous snake with a maximum length (including tail) of 18.5 to 18.8 ft (5.6 to 5.7 m). The king cobra is a dangerous snake that has a fearsome reputation in its range, although it typically avoids confrontation with humans when possible. King cobras are generally larger than other cobras; the hood of the king cobra is narrower and longer. A key to identification, clearly visible on the head, is the presence of a pair of large scales known as occipitals, located at the back of the top of the head. These are behind the usual "nine-plate" arrangement typical to the king cobra. A king cobra, receives chemical information via its forkes tongue which picks up scent particles and transfers them to a special sensory receptor (Jacobson's organ) located in the roof of its mouth. King cobras are able to detect moving prey almost 100 m (330 ft) away.

**The Indian cobra**

It varies tremendously in colour and pattern throughout its range. The ventral scales or the underside colouration of this species can be grey, yellow, tan, brown, reddish or black. Dorsal scale of the Indian cobra may have a hood mark or colour patterns. The most common visible pattern is a posteriorly convex light band at the level of the 20th to 25th ventrals. Salt-and-pepper speckles, especially in adult specimens, are seen on the dorsal scales. The Indian cobra is a moderately sized, heavy bodied species. This cobra species can easily be identified by its relatively large and quite impressive hood, which it expands when threatened. This species has a head which is elliptical, depressed, and very slightly distinct from neck. The snout is short and rounded with large nostrils. The eyes are medium in size and the pupils are round. The majority of adult specimen range from 1 to 1.5 meters (3.3 to 4.9 ft.) in length.

**Habitat**

They are found mainly in grassy plains, fields, mountainous regions. They usually reside
among piles of bricks, termite mounds, tangles of root at the base of trees etc. The cobra is diurnal but bites from the cobras occur during both day and night\textsuperscript{13}.

**Properties of Darvikara Sarpa**

Darvikara has rooksha (dry), katu (pungent) property, these snakes are vata predominant, they become loaded with more poison during their youth (tarunya), and in varshartha (rainy season). Its praharakala is day time\textsuperscript{14}.

**Properties of venom**

An elapid's venom contains postsynaptic neurotoxins that spread rapidly in its victim's bloodstream, causing respiratory failure and eventually death. Cobra venom is an example of a molecule that prohibits the interaction of acetylcholine molecules (transmitted from nerve endings surrounding the diaphragm muscle) with the receptor sites on the diaphragm muscle. The venom disrupts the neuromuscular junctions involved in human respiration by reacting with the receptor sites in place of the acetylcholine molecules, thus blocking the receptor sites\textsuperscript{15}. There are approximately 20 types of toxic enzymes found in snake poisons throughout the world known to man. Each of these enzymes has its own special function. The enzymes in the snake venom can speed up chemical reaction going on in an organism so much, that they can kill the organism. The enzymes are Proteolytic enzymes, Phosphomonooesterase, Arginine ester hydrolase, Phosphodiesterase, Thrombin-like enzyme, Acetylcholinesterase, Collagenase, RNase, Hyaluronidase, DNase, Phospholipase A2 (A), 5'-Nucleotidase, Phospholipase B, L-Amino acid oxidase, Phospholipase C, Lactate dehydrogenase, Adenosine triphosphate\textsuperscript{16}.

**Cholinesterase:** Attacks the nervous system, relaxing muscles to the point where the victim has very little control.

**Amino acid oxidase:** plays a part in digestion and the triggering of other enzymes

**Adenosine triphosphates:** believed to be one of the central agents resulting in the shock of the victim and immobilizing smaller prey.

**Peptide bradykinin potentiators:** Greatly enhance one of the body’s natural responses to injury (dilation and increased permeability of blood vessels, stimulation of pain receptors, and contraction of some smooth muscles), thereby enhancing diffusion of venom in the bloodstream and increasing bleeding.

**Polypeptide toxins:** Directly disrupt nerve-impulse transmission, usually causing heart or respiratory failure.

**Proteolytic enzymes:** Catalyse the breakdown of structural components of tissues. **Hyaluronidases:** Catalyse reactions that break mucopolysaccharide links in connective tissues, thereby enhancing diffusion of venom.

**Proteases:** Catalyse reactions that disrupt protein peptide bonds in tissues, causing blood-vessel wall damage and hemorrhage and muscle-fibre deterioration.

**Phospholipases:** Catalyses reactions that harm musculature and nerves.

**Nerve growth factor** (an enzyme) - Disrupt normal cellular function, causing death of the affected cells.

**Glycoproteins:** Suppress normal immune response of tissues through anti-complementary reactions.

**Biogenic amines:** Disrupt normal transmission of nerve impulses and other types of signaling between cells.

**Cholinesterase:** It causes neuro muscular block.

**Phospholipase:** Early penetration of the venom.

**Hyaluronidase:** Hyaluronidase is involved in the inflammatory response of venom, with the softening of tissue and the facilitation of flow of the other substances.

**Proteases:** Catalysereactions that disrupt protein peptide bonds in tissues, causing blood-vessel wall damage and hemorrhaging and muscle-fibre deterioration.
Action of visha according to Ayurveda
The *visha* enter the body and vitiates *raktha* (blood) first then *kapha, pitta, vata* along with their respective seat then invades the *hrudaya* (heart) leads to death of the body\(^{17}\).

Types of *SarpaDamsha*:
According to Sushruta\(^ {18} \)
- *Sarpita*-deep punctured
- *Radita*-superficial punctured with less venom injected
- *Nirvisha*-non poisonous

According to Vagbhata\(^ {19} \)
1. *Tundahata*-stained by Saliva
2. *Vyalidha*-one or two bite marks & no bleeding
3. *Vyalupta*-one or two bite marks & bleeding
4. *Dashtaka*-three marks accompanied with tearing of muscles
5. *Dashtanipidita*-four bite marks

Causes for Snakebite:
Reasons for *SarpaDamsha*
They are *Bhaya* (fear), *Krodha* (anger), *Aaha-rartha* (for food), *Padasparsha* (touch by foot), *Ativishat* (excess amount of poison), *Vairadhyya*, Papa karma, *Deva-rishi-yama kopa*\(^ {20} \).

Signs and symptoms\(^ {21} \):
- **Local symptoms** start within 6-8 minutes. A small reddish wheal develops at the site of bite. Bitten area is tender with burning pain. They can be severely swollen and can bleed and blister.
- **Nervous system effects:** The effect on the nervous system can be experienced locally close to the bite area or affect the nervous system directly stopping the breathing muscles, resulting in death without treatment. Initially, victims may have vision problems, speaking and breathing trouble, and numbness close to or distant to the bite site.
  - **Muscle death:** muscle of the extremities become weak. Paralysis start in the lower limb, which ascends gradually affecting the respiratory muscles, including the diaphragm and respiratory muscle paralysis is indicated by poor neck lift, falling single breath count.
  - **Eyes:** Spitting cobras can actually eject their venom quite accurately into the eyes of their victims, resulting in direct eye pain and damage.

According to Susrutha

Veganusaralakshana
In the first stage of darvikara bite the blood becomes *shyava* (blue) in colour, because of that there is blue colour of the mouth, etc. and the person feels as though insects are crawling on his body. In the second stage there is formation of *granthi* (enlarged glands). In the third stage there is *moordnigaurava* (feeling of
heaviness of head), *drikrodha* (obstruction of vision), *damshavikleda* (moistness at the site of bite). In the fourth stage there is *vamichi* (vomiting), *sandhivishlesh* (looseness of joint) and *tandra* (stupor). In the fifth stage *parvabhedana* (cutting pain in the joints), *daha* (burning sensation), *hidhma* (hiccough). In the sixth stage there is *hruthpeeda* (pain in the region of heart), *gathragourava* (heaviness of the body), *moorcha* (fainting), *avipaka* (indigestion) and *atisara* (diarrhea). In the seventh stage the poison reaches the semen produces distortions of the shoulder, back, waist and loss of all activities.

**Diagnosis**

**Vishahari Lehya**

This Lehya is very useful in diagnosing venomous and non-venomous snake bites. 250g of seeds of *Luffa amara* ground in the juice of about 500 betel leaves should be tied in a cloth and hung on a hook. The juice flowing down is collected and an equal quantity of old neem oil is to be added. One-fifth quantity (by weight) each of purified mercury and purified sulphur is added to it, mixed in a mortar and water is removed by evaporation and kept in a glass jar. 50-100mg of lehya spread on a betel leaf is given to the victim. If the victim tastes *amla* Rasa then it is inferred to be bitten by MandaliSarpa (Viper bite). Similarly, *katu* Rasa inferred as bitten by darvikaraSarpa (cobra), madhura Rasa by RajimanthaSarpa (krait) and Kashaya Rasa then there is slight envenomation.

**Treatment of Darvikaravisha**

**Ashtanga hrdaya**

1. Sindhuvaramoola (*Vitexnigundo*) and swethagirikarnika juice should be consumed.
2. Kusha (*Saussuralappa*) mixed with honey should be used as nasal drops
3. Tanduleyaka (*Achyranthuspnnoues*), kinihi (*Achyranthusaspera*), matulunga (citrus), shelu (*Permeliaperlapata*)

**Charaka samhitha**

1. Sindhuvaramoola (*Vitexnigundo*) and *swethagirikarnika* should be consumed.
2. Kusha (*Saussuralappa*) mixed with honey should be used as nasal drops

**Treatment mentioned in Keraleeyavishachikitsa**

**VishaVaidhya Jyothensika**

**Lepa yoga**

1. External application of Hingu (*Ferula nartex*), Maricha (*Piper nigrum*) and Vacha (*Acoruscalamus*) ground in the juice of Kimsuka (*Buteamonosperma*) on the bite mark subside cobra bite
2. Lepana with Tankana (borax) and Gruhadhooma (soot) ground in urine
3. Paste of dried leaves of Sivamalli (*Aristalochia indica*) and Hingu (*Ferula nartex*)
4. Lepana with root of mithighathi (*Datura metal*) and Hingu (*Ferula nartex*) with human urine

**Pana yoga**

1. Internal administration of Vyoosa (*Piper longum*, *Piper nigrum*, *Zingiberofficinal*) with water nullifies all visha.
2. Intake of *Ashwanganda* (*Withaniasomnifera*) with pure water
3. The root of *Nandyarvattam* (*Tuber nalmontana* divaricate) and Kola (*Piper cubeta*)
4. Oral administration of root of Sarngestam (*Trichasanthestricuspida*) and Maricha (*Piper nigrum*)
5. Mixed paste of Guduchi (*Tinosporacordifolia*) and Kola (*Piper cubeta*).

**Nasyaانانادي práyoga**

1. Saindhava ground in the juice of Tamba-lapatra (*Piper betel*), and Dhaturapatra (*Daturametel*) is used as nasya in unconscious poisoned person.

2. Nasya or anjana with Gunabjeela (seed of *Abusprecatorius*), Maricha (*Piper nigrum*) and seeds of Bakula (*Mimusopes lengi*) ground in human urine or juice of Dronapushpi (*Leucasaspera*).

3. Nasya with swarasa of Tulasi (*Ocimum sanctum*), Dronapushpi (*Leucasaspera*) with Maricha (*Piper nigrum*).

4. Nasya with swarasa of Bhringaraja (*Eclipta alba*) and Maricha (*Piper nigrum*)

**VishaVaidhya Sara Samuchchaya**

1. Tankana (borax) is immersed in the resin of Arka (*Calotropisgigantea*), Snuhi (Euphorbia nerifolia) for seven days. This tankana is given internally or used as nasya or lepana.

2. Peeled Rasona (*Allium sativum*), Sunthi (*Zingiberofficianale*), Maricha (*Piper nigrum*), Pippali (*Piper longum*), Hingu (*Ferula nartex*) are kept in Arkaksheera (*Calotropisprocera*). These drugs should be brought into use for nasya and pana and it alleviates darvikara visha.

3. Saindhava (rock salt) triturated with swaras of Datura (*Datura metal*) and Nagavalli (*Piperbetle*).This is used for nasya.

4. Maricha (*Piper nigrum*) is given bhavana for 21 days in the extract of Shirisha (*Albezialebbeck*) flower. This Marichais used for nasya, anjana etc.

5. Arkapatra and Saindhavalavana are triturated in Chandanavari (*Santalum album*) and is applied all over the body.

**Prayoga Samuchchaya**

In this book treatment of different type of *Darvikarasarpa* is explained

1. In Krishna visha there is blackish discoloration of the skin, so lepa with Kayyonni (*Eclipta alba*)should be done.

2. There is blackish colour of nails in case of swetha bite. So, lepa of leaf juice of Arka can be done.

3. There is blackish discoloration of faeces in case of sankapaalanlepa of Sirisha (*Albezialebbeck*) is effective in this condition.

4. Pana of Ashwaganda (*Withaniasomnifera*) with Kanji in case of blackish discolouration of Dantain Valahan

5. Punarnava (*Boehraviadiffusa*)lepa in case of kakodharan


7. Onion paste application in sarvanga in case of weakness of the neck in kalastakan bite.


9. Lepa or application of Trikatu in case of swedana of anga in vatakarnar bite.

14. Sunthi, pippali-lepa should be done in case of blackish discoloration of urine in maha-sarpa bite

KriyaKaumadi
1. Sunthi (Zingiber officianale), Lashuna (Al-lium sativum), Hingu (Ferula narthex) macerated with Arkapatra (Calotropis gigantea) rasa can be used as nasya, lepa and paana.
2. In karimoorkha (Dark cobra) vishapuna-rnava (Boerhavia diffusa) mixed with milk can be applied as lepa.
3. Pippali powder (Piper longum) can be mixed with honey should be given in case of char-dhi (vomiting) in moorkha visha.
4. Bark of Shigru (Moringa oleifera), Dronapushpi (Leucas aspera), Nirgundi (Vitex negundo) with ginger juice can be given as nasya.
5. Dhara with Panchagavya, Grtha, Kanjika, Kerathailam (coconut oil) or with Goomutra (Cow’s urine).
6. Saindhava (rock salt), Vyosha (Piper longum, Piper nigrum, Zingiber officianale), Nara moostra (Human’s urine) lepa.
   - Neervalathailam, Mayurandagulika, Garalaghatutika, Agasthyakuzhabmu these are the preparation mentioned in Kriya-kauamdhi for cobra bite.

Veganusarachikitsa of Darvikaravisha
In the first stage of poisoning from the bite of darvikara snake, blood should be let out and then agada mixed with honey and ghee should be given to drink immediately. In the second stage vamana (emesis) therapy should be administered and agada should be taken. In the third stage application of anjana (collyrium) and nasya (nasal medication) should be adopted. In the fourth stage vamana (emesis) should be administered and take yavagu also. In the fifth stage and sixth stage the patient should be sprinkled and bathed with cold water, administered a strong emetic and made to drink and yavagu prepared with anti-poisonous drugs. In the seventh stage strong agada should be used, so also collyrium and nasal medication, a deep incision should be made on the head and a piece of muscle or skin containing blood should be placed over the wound.

DISCUSSION
Visha Chikitsa has been explained since Vedas. By knowing the importance of Visha Chikitsa for Manacharyas have included this as one among the Ashtanga of Ayurveda i.e., Eight Folds of Ayurveda.

- The rookshaguna (roughness) of visha vitiates vatadosha in the body, ushnaguna causes raktha pitta prakopa, buddhi (intellect), marma (vital organs) which is affected by theekshnaguna of visha, due to sooshmaguna it spreads the body very fast, dosha, dhatu and mala naashana occur due to vikashiguna of visha, by the property of vyavayiguna it is absorbed and circulated all over the body, due to aashuguna it spreads in the body very fast. Due to vaisadhyaguna it will not stick anywhere, due to laghuguna it is unstable and difficult to hold by treatment and it is not digested, it is difficult to eliminate and as such troubles for long. So, based on the dosha predominant the visha has to be treated.

- Darvikaravisha is vata predominant, so vata alleviating medication is preferred first. Veganusara treatment is to be adopted to prevent the poison from reaching the sapthamadhatu. The poison first vitiates rakthadhatu then reaches the hrudaya. So protection of hrudaya is also significant. Many medicines have been proved to have anti venom effect. These drugs
can be given with various mode of administration like Anjana (collyrium), Nasya (Nasal drop), Kakapada (scalp incision), etc.

**CONCLUSION**

Cobra is responsible for large number of snake bite causalities reaching 65% of envenomation in the country. Most common symptom in cobra bite are pain and numbness of an ascending nature. The spread of venom is very fast in cobra bite and if a lethal quantity of venom (12g) is injected the patient may die within 30-40 minute. Anti -snake venom being the only therapeutic option available, but having many drawbacks, herbal plants provide a solid platform for the natural treatment of cobra bite that is explained in our classical text books. Studies show that many of the herbal drugs having anti- venom activity also. The formulation explained in our classics for darvikaravisha can be given in the form of lepa,pana,anjana,nasya,etc based on the severity.

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