



Review Article

AYURVEDIC ASPECT OF RABIES AND ITS MANAGEMENT

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ABSTRACT

Rabies also known as Hydrophobia is an acute, highly fatal 'Viral Disease' of Central Nervous System caused by Rabid Animal Bite that is transmitted by infected secretions. Most commonly, transmission to humans takes place through exposure to saliva during a bite by an infected animal. The rabid virus is belonging from family Rhabdoviridae, with at least seven distinct types within the genus *Lyssa virus* are responsible for Rabies. In Ayurveda, Rabies is mentioned under the heading of *Alark Visha*. The infected rabid pet as well as wild animal like Dogs, Jackals, Foxes, Wolves, Bears, Tigers, Mule, Horses, Panther are responsible for Rabies. After bite the *Sangyavah Strotas* (Central Nervous System) will be affected due to vitiation of *Doshas* (body constitution). Local feature like penetrating wound with blackish blood along with numbness around the wound while prodromal and encephalitic phase along with *Jalsantras* (Hydrophobia) will be produced after systemic involvement. Squeeze out the blood from the wound and cauterization by warm ghee just after bite, followed by local application of *Agad* will be helpful to prevent the rabies. Internal medication after purgation by milk of *Calotropis Procera* will be helpful to control the rabies. Folk ware medicine are also highly used all over India to treat the rabies. Thus by using the concept of *Ayurveda*, Rabies (*Alark Visha*) can be easily prevented by means of first aid just after bite. It can be also treated by giving anti rabies herbal drug (*Agadpan*) and purification (*Tikshna Sanshodhan*) which is already mentioned in *Ayurveda*.

INTRODUCTION

Rabies is a virulent and fatal viral zoonosis, widely prevalent in developed as well as developing countries including India. The highest numbers of cases are reported in Africa and Asia, particularly the Indian sub-continent. Considering the years of human life lost, rabies ranks seventh among all infectious diseases prevalent in the world.^[1] India is reported to have the highest incidence of rabies globally. The annual incidence of animal bite was 1.7%; it was more in children (2.5%) and 68% of them were males. Each year, an estimated 12 million people throughout Asia receive treatment after being exposed to animals that are suspected of rabies. Asia's annual expenditure due to rabies has been estimated to be more than US\$ 563 million. Management & Prevention of Rabies along with name of the responsible animal, clinical features is also found in the Text of Ayurveda under the heading of *Alark Visha* in Detail. The Clinical Hydrophobia from modern medicine & *Jalsantansa* described in Ayurveda are also similar. This article gives evaluation,

elaboration & discussion of *Ayurvedic* aspect of Rabies & its management with scientific justification.

Name of Animal responsible for Rabies

Dogs, Jackals, Foxes, Wolves, Bears, Tigers, Mule, Horses, Panther these animals are found in *Sushrut Samhita, Ashtang Samgraha & Hridaya* which are responsible for Rabies (*Alark Visha*).^[2-4] Same has been revised by modern medicine along with the entire domestic & wild animal including bat.^[5]

Pathogenesis (*Samprapti*)

Sushrut has stated that Poison originated from rabid animal vitiated the Wind- God (*Vata*) & Phlegm (*Khaph*) situating in *Sangyavaha Strotas* causes *Sangya Vinasha* (loss of sensation).^[6] *Charak* stated Dog bite causes vitiation all the body constituent (*Tridosha*) & Essence (*Rasadi Dhatu*) while another carnivorous causes vitiation of vitiated the *Vata-Khaph*, while *Vagbhat* stated Dog bite causes vitiation of Phlegm (*Kapha*), invading the channels carrying sensation after situating in Nervous System (*~Sangyavaha Strotas*)

causes *Sangya Vinasha* (loss of sensation).^[7-9] As per Modern Medicine the first event in rabies is the inoculation of virus through the skin, usually through a bite that delivers virus-laden saliva. Initial viral replication appears to occur within striated muscle cells at the site of inoculation. The peripheral nervous system is exposed at the neuromuscular and/or neurotendinous spindles of unmyelinated sensory nerve cell endings, with neurotransmitter receptors such as acetylcholine implicated in viral attachment and internalization. The virus then spreads centripetally up the nerve to the CNS, probably via

peripheral nerve axoplasm, at a rate of 3 mm/h. Viremia has been documented in experimental conditions but is not thought to play a role in naturally acquired disease. Once the virus reaches the CNS, it replicates almost exclusively within the gray matter and then passes centrifugally along autonomic nerves to other tissues-the salivary glands, adrenal medulla, kidneys, lungs, liver, skeletal muscles, skin, and heart. Passage of the virus into the salivary glands and viral replication in mucinogenic acinar cells facilitate further transmission via infected saliva.^[10]

Table 1: Clinical Feature of Rabid Bite (Local)

S. No.	Clinical Feature	Sushrut ^[11] / Ashtang Sangrah ^[12] / Ashtang Hridaya ^[13]	Charak ^[14]	Medicine ^[15]
1.	Wound	Penetrating	Wound	Abrasion/ Laceration/ Penetrating
2.	Bleeding	Blackish	--	In penetrating wound
3.	at or around the site of inoculation of virus	Numbed	Itching, pain, discolouration, numbness, rotting, burning, redness & inflammation	Paresthesia and/or fasciculations

Though the entire clinical features are not similar, but most of the clinical features of Rabies (Modern Medicine) are similar to Alark Visha (Ayurveda). Local feature like penetrating wound with bleeding & numbness at-around the wound are found most of time which is mentioned in both medical sciences.

Table 2: Clinical Feature Rabies (Systemic)

Phase	Clinical Feature	Modern ^[16]	Ayurveda ^[17, 18 & 19]
The prodromal period usually lasts 1 to 4 days	Fever	+	+
	Headache	+	+
	Malaise	+	+
	Myalgias	+	+
	Increased fatigability	+	-
	Anorexia	+	-
	Nausea	+	-
	Vomiting	+	-
	Sore throat	+	-
	Non-productive cough	+	-
Acute Neurologic The encephalitic phase 1-2 days to < 1 week	Excessive motor activity	+	-
	Excitation	+	-
	Agitation	+	Run up towards & attack
	Confusion	+	-
	Hallucinations	+	-
	Combativeness	+	-
	Bizarre aberrations of thought	+	-
	Muscle spasms	+	-
	Meningismus	+	Whole Body rigidity
	Opisthotonic posturing	+	
	Seizures	+	
	Focal paralysis	+	Hanged down of Neck
	Hyperesthesia with excessive sensitivity to bright light, loud noise, touch, and even gentle breezes.	+	-
	dilated irregular pupils	+	-
	increased lacrimation, salivation and perspiration	+	Excessive dripping of Saliva
postural hypotension	+	-	
upper motor neuron paralysis	+	Hanged down of shoulder,	

	with weakness, increased deep tendon reflexes, and extensor plantar responses		Neck & Jaw
	Paralysis of the vocal cords	+	Hanged down of Neck
	Hydrophobia	+	Jalsantransa
Coma, death Several days to 1 Week	Autonomic instability	+	-
	Hypoventilation	+	-
	Apnea	+	-
	respiratory arrest	+	-
	hypo-/ hyperthermia	+	-
	Hypotension	+	-
	pituitary dysfunction	+	-
	Rhabdomyolysis	+	-
	cardiac arrhythmia & arrest	+	Syncope

Prodromal feature like fever, headache, malaise, myalgia & excitation, agitation, Meningismus, focal paralysis, Excessive dripping of Saliva, Hanged down of shoulder, Neck & *Jalsantansa* (Hydrophobia) these Neurologic features are also similar. As per Modern Medical Science the painful, violent,

involuntary contraction of the diaphragmatic, accessory respiratory, pharyngeal, and laryngeal muscles initiated by swallowing liquids called as Hydrophobia^[20] and as per Ayurveda Fear of water by the sight, touch & sound called as *Jalsantansa* (Hydrophobia).^[21-23]

Table 3: Ayurvedic Aspect of Prevention & Management of Rabid Bite (Local)

S.No.	Drug/ Procedure	Sushrut ^[24]	Ashtang Sangrah ^[25]	Ashtang Hridaya ^[26]
1.	Squeeze out the blood	+	--	--
2.	Cauterization	By warm ghee	By warm ghee	By warm ghee
3.	Application of	Mixture of Antidote	Mixture of Antidote (<i>Agad</i>) applied as a warm poultice, Repeated application of paste of <i>Tila, Guggulu, Durva & Guda</i> (Warm poultice), <i>Nala Mula</i> Paste	Mixture of Antidote

Squeeze out the blood from the wound & it should be thoroughly scrubbed with *Neem* Soap & then flushed, washed by running *Neem Quath* (Decoction) for minimum 5 minutes. In case of Punctured Wound-Catheter should be used to irrigate the wound. Residual Virus should be inactivated by irrigating with virucidal agent like Alcohol Tincture, Iodine 0.1% or Pro-iodine.

Ayurveda suggested the cauterization by warm ghee & application of Mixture of Antidote on wound to inactivate the virus. Today Modern medicine has suggested Anti-Rabies-Serum (ARS) locally 10 iu/kg. Suturing if requires should be done after 24-48 hours with minimal stitches.

Table 4: Ayurvedic Aspect of Prevention & Management of Rabies (Systemic)

S.No.	Drug/ Procedure	Sushrut ^[27]	Ashtang Sangrah ^[28]
1	Ghee	Old	Old
2	Induced Purgation	Milky Juice of Calotropis	Milky Juice of Calotropis
3	Medicine	<i>Dhatura + Shweta Aparajita + Punrnava</i>	<i>Nala Mula</i> macerated with water
		<i>Tila kalka + Tila Tail + Milky Juice of Calotropis</i>	Fruits of <i>Dhardhurak Mula</i> , Root of <i>Kakodumbarika</i> with fermented beverage or rice-wash
		<i>Sharaqpunkha 1 karsh + Dhatura ½ karsha</i> with rice water	<i>Palal</i> (dried meat), Tail (oil), milky sap of <i>Rupika & Guda</i> mixed together consumed
			<i>Lashuna, Ushan, Vaidehi & Vara</i> macerated with Ox-bile and used as oral, nasal drops, collyrium, external application
		Decoction of leaves, bark, root of <i>Jalavetasa</i> or medicated ghee used for oral, nasal drops, collyrium, external application	

Old ghee will be given 20ml with milk twice a day. Then milky Juice of Calotropis will be given with rock salt or *Tila kalka + Tila Tail + Milky Juice of Calotropis* daily the morning for purgation. Equal part

of *Dhatura* with *Shweta Aparajita /Punrnava* or *Sharaqpunkha 1 Karsh + Dhatura ½ Karsha* with rice water will be given to relieve the Rabies (*Alark Visha*).

Table 5: Folk Herbs for Dog Bite

Sr.	Latin & Family Name	Sanskrit Name	Part Used
1	<i>Achyranthes aspera</i> ^[29 & 30] Amaranthaceae	<i>Aghata</i>	Paste of leaf with onion is applied externally on the bitten site of dog and Seed also used in Hydrophobia
2	<i>Abelmoschus manihot</i> ^[31] Malvaceae	<i>Latakastri</i>	Fresh root are chewed for curing the dog bite
3	<i>Aristolochia indica</i> ^[32] Aristolochiaceae	<i>Eesvari</i>	Root paste given with a cup of water (90-100 ml) twice a day for about 2-3 days
4	<i>Equisetum diffusum</i> ^[33] Equisetaceae	Himalayan Horsetail	Plant juice used in dog bite
5	<i>Calotropis procera</i> ^[34 & 35] Asclepiadaceae	<i>Arka</i>	The entire plant made into extract and mixes with sugar (3:1) and applied over dog bites. Seven fresh flower are eaten with 50gm Old Jaggary
6	<i>Datura innoxia</i> ^[36] Solanaceae	<i>Dhatur</i>	An ounce of the leaf extract is taken with curd once a day for three days as an anti-rabies medicine
7	<i>Santalum album</i> ^[36] Santalaceae	<i>Chandana</i>	An ounce of the wood infusion is taken twice a day for three days as an anti-rabies medicine
8	<i>Brasica camprestris</i> ^[37] Cruciferae	<i>Sarshapa</i>	Seed, Oil
9	<i>Capsicum annum</i> ^[37, 38 & 39] Solanaceae	<i>Katuvira</i>	Fruit & Stem and Paste of Red Chillies is applied on the wounded part. 10ml juice of Onion mixed with 15gm honey & applied on the wounded part
10	<i>Allium cepa</i> ^[39] Liliaceae	<i>Palandu</i>	10ml Juice of Onion mixed with 15gm honey applied on the wounded part
11	<i>Commelina benghalensis</i> ^[40] Commelinaceae	<i>Kanchara</i>	Leaf for Rabies
12	<i>Leucas aspera</i> ^[41 & 42] Labiatae	<i>Dronapushpi</i>	Whole plant Used against rabies
13	<i>Leucas plukentii</i> ^[43] <i>Spreng Labiatae</i>	<i>Dronapushpi</i>	Whole plant Used against rabies virus
14	<i>Aloe vera</i> ^[44] Liliaceae	<i>Ghrita-kumari,</i> <i>Kumari</i>	Whole Plant Juice internal & External
15	<i>Blepharis maderaspantesis</i> ^[44] Acarantheceae	<i>Naikalli</i>	Leaves Juice Internal
16	<i>Cassia alata</i> ^[44] Caesalpinaceae	<i>Dadrughna</i>	Leaves Paste Internal
12	<i>Curcuma angustifolia</i> ^[44] Zingiberaceae	<i>Tavakshira</i>	Rhizome Paste External
13	<i>Eclipta alba</i> ^[44] Asteraceae	<i>Bhringaraja</i>	Leaves Juice Internal
14	<i>Gloriosa superba</i> ^[44] Liliaceae	<i>Langli</i>	Tuber Paste External
15	<i>Moringa olifera</i> ^[44] Molingaceae	<i>Shigru,</i> <i>Shobhanjana</i>	Root Bark Paste External
16	<i>Murraya koeinegii</i> ^[44] Rutaceae	<i>Girinimba</i>	Leaves, Bark, Root Bark Juice internal & External
17	<i>Musa paradisiaca</i> ^[44] Mucaceae	<i>Kadali</i>	Bark Juice internal
18	<i>Phyllanthus emblica</i> ^[44] Euphorbiaceae	<i>Amalaki</i>	Flower Juice internal
19	<i>Ricinus communis</i> ^[44] Euphorbiaceae	<i>Eranda</i>	Seed Infusion External
20	<i>Solanum Nigrum</i> and <i>S.</i> <i>Myriacanthus</i> ^[45]	<i>Kakamachi</i>	Leaf paste and fruit decoction of <i>S.nigrum</i> used orally for 7-8 days

Local management by Ayurveda in Dog Bite (Self-Created)

- **Triple wash** – At first washed wound by running *Neem Quath* (Decoction) for minimum 5 minutes, then scrubbed with *Neem Soap* & then flushed,

washed by running *Neem Quath* (Decoction) for minimum 5 minutes.

- **Application** of *Indigofera tinctoria* Leaves paste in & on wound daily for 7 days after washing with *Neem Quath* (Decoction).

Systemic management by Ayurveda in Dog Bite (Self-Created)

- *Indigofera tinctoria* leaf juice 50-60ml with milk once time a day for 3 days.
- *Mahavatvidhvansa Ras* 250mg twice a day for 5 days.
- *Punarnava Ghrit* 20ml with milk twice a day for 5 days.
- Pure Sulphur (*Gandhak*) 500mg with milk twice a day for 5 days.

DISCUSSION

Rabid Animals are the animals having the Saliva or other body fluid contaminated with *Lyssavirus*. Modern medical science now accepted that all the animals are responsible for rabies (*Alark Visa*) which is already mentioned in *Ayurvedic* Text along with some edition. Ayurveda has stated that after bite of rabid animal visa produced causes *Sangyavaha Strotas Vikriti* causing *Sangya Vinasha* (loss of sensation), though as per *Sushruta* it is due to vitiation of *Vata-kapha* and as per *Charak* it is due to vitiation of *Tridosha*. Modern medicine also says that the virus from saliva of rabid animal first incubated in wound then speeded centripetally to brain & then centrifugally to peripheral nervous system. Local clinical signs stated by *Sushruta* after bite like nature of wound & associated sings at or around the site of inoculation of virus are more about the similar to modern medicine. *Charak* also included the signs of infected wound along with signs just after the bite. Prodromal clinical feature like fever, headache, myalgia, malaise are mentioned only in Ayurveda along with some encephalitic feature. Hydrophobia has been described in both Ayurveda & Modern Medical sciences in details. Basic principle of Ayurvedic Local Management of Doge Bite like Squeeze out the blood, cauterization & application antidote just after bite are very important and applied, more similar to modern sciences. But Tourniquet application is found in Ayurveda instead of Triple wash of wound just after bite, which is not practically important. Hence most of the Traditional *Vaidya* has adopted Triple wash of wound first by *Neem* Decoction, then *Neem* Soap & then *Neem* Decoction thoroughly. *Indigofera tinctoria* leaf juice 50-60ml with milk one time a day is given orally for 3 days, is found useful to prevent the Rabies after bite of rabid animal, but scientific documentation is not available. *Sushruta* stated that Passionately Induced Purgation by Milky Juice of *Calotropis* mixed with rock salt is beneficial in Rabies. Pure Sulphur will be helpful to heal the wound & prevent the secondary bacterial infection. *Mahavatavidhwansa Rasa* will be helpful to control the vitiated *Vata* & relive also pain. *Dhatu metal* is the chief ingredient of *Unmad-Gaja-Kesari Rasa* & inhibits the secretion along with salivation and mania by controlling the vitiated *Vata-Kapha* can be given in the encephalitic stage only. Traditional *Vaidya* are using the folk medicine like *Achyranthes aspera* (Tamil Nadu), *Abelmochus manihot*

(Maharashtra), *Aristolochia indica* (Karnataka), *Equisetum diffusum* (Sikkim), *Calotropis procera* (Maharashtra & Jharkhand), *Datura innoxia* & *Santalum album* (Tamil Nadu), *Brasica campestris* (Uttarakhand), *Capsicum annum* (Uttarakhand & Uttaranchal), *Achyranthes aspera* (Thar Desert), *Allium cepa* (Uttaranchal), *Commelina benghalensis* (Tamil Nadu), *Leucas aspera* & *Leucas plukentii* (Assam), *Aloe vera*, *Blepharis maderaspatensis*, *Cassia alata*, *Curcuma angustifolia*, *Eclipta alba*, *Gloriosa superba*, *Moringa olifera*, *Murraya koeiniegii*, *Musa paradisiaca*, *Phyllanthus emblica* & *Ricinus communis* (Tamilnadu), *Solanum Nigrum* and *S. Myriacanthus* (Assam) are also playing an important role to prevent the Rabies in India. In Hydrophobia two ounces of fresh juice of *Indigofera tinctoria* with an equal quantity of milk is given in the morning for 3 days, as a prophylactic. It might produce slight headache & nothing beyond it except purging with large dose.^[46] The study of antirabies activity of hydroethanolic extract of roots and leaves of *Phytolacca dodecandra* showed that all doses of roots and 300 and 600 mg/kg doses of leaves of the plant extract didn't significantly ($P>0.05$) increase the survival period of mice compared to negative control group and significant ($P<0.05$) survival period decrement was obtained compared to both positive control groups. However, 1000 mg/kg dose of leaves of the plant extract was significantly ($P<0.05$) increased the survival period of mice as compared to their respective negative control group. The finding indicated the existence of some antirabies activity in extract of leaves of *P. dodecandra* at higher dose, for which further research is needed to elucidate its active ingredients.^[47] The cross-sectional study was conducted at the Out-Patient- Department of the Philippines General Hospital. The respondents completed the questionnaires. Amongst respondents who were able to actual encounter an animal bite victim majority of them answered that they let the wound (caused by the bite) bleed 48.6%. Only 42.4% brought the victim to the doctor for medical help. The same percentage of people at 42.4% washed the wound with soap (65.6%) or water (42.6%). Only 28.5% applied medication on the wound with garlic at 51.2% as the most frequently used.^[48] Application of Red chilli Powder & Turmeric Powder on wound found 5.1% & 2.2% in Survey conducted by Association for Prevention and Control of Rabies in India in between March-May 2003.^[49] Home management of wound, still 39.4% and 37.3% victims applied lime (*chuna*) and red chillies respectively on the wound found in the study conducted in the anti-rabies clinic run by PSM Department of Medical College and Hospital, Ajmer.^[50] The study of the oral administration of crude extracts of *Salix subserrata* and *Silene macroselen* to Pasteur Virus (PV) strain rabies virus infected mice which were assigned into three treatment and one negative control groups. 1 day and 2 days treatment groups of the chloroform extract of *S. macroselen* indicated significant difference on the survival time from the

positive control ($P < 0.05$). The chloroform and aqueous extracts of *S. subserrata* and the methanol 80 % extract of *S. macroselen* in their 1 day and 3 days treatment showed significant difference on survival time from the positive control group ($P < 0.05$).^[51]

PERSONAL SAFETY AGAINST RABIES

Do not touch animal bite wounds with bare hands. Do not touch the fomites viz. chain, food plate, etc. of an animal suspected or proven of rabies. Do not touch stray or sick animal. Take pre-exposure vaccination if you are in constant touch with animals. Avoid contact with saliva, urine, tears, semen and vaginal secretions of a hydrophobia (rabies) patient. Provide pre-exposure prophylaxis to those medical, nursing and ancillary staff who regularly attends to hydrophobia patients and to public health personnel removing rabid and stray animals. Veterinarians shall always be on pre-exposure prophylaxis, wear gloves, glasses, masks and long sleeved overall while examining rabid animals. Besides all instruments used shall be sterilized either by boiling or by placing them in a strong antiseptic solution. The most important thing is to learn how to avoid dog bites. Typical warning signs of unfriendly dogs are snarling or a stiff stance ears laid back and fur/hair on back standing up.^[52]

CONCLUSION

Rabies & *Alark Visa* both have similar symptoms and can be prevented by using basic principle of *Alark Visa* successfully. Squeeze out the blood from the wound and cauterization by warm ghee just after bite, followed by local application of *Agad* will be helpful to prevent the rabies. Internal medication after purgation by milk of *Calotropis Procera* will be helpful to control the rabies. Folk ware medicine are also highly used in all over India to treat the rabies. Thus by using the concept of *Ayurveda*, Rabies (*Alark Visha*) can be easily prevented by means of first aid just after bite. It can be also treated by giving anti rabies herbal drug (*Agadpan*) and purification (*Tikshna Sanshodhan*) which is already mentioned in *Ayurveda*.

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