

Concept of Prativisha with Special Reference to Antidote

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Introduction

Poisoning is the major health problem which is increasing worldwide including India due to utilization of chemical prepared medicines, heavy industrialization, environmental toxicity, aquatic toxicity. Poisoning is a worldwide problem which results in significant morbidity and mortality. In Ayurveda the description of poisoning and its management including antidotes is available in detail. The substance immediately after entering into the body causes the vitiation of the healthy dhatu's or killing of healthy person is defined as Visha¹, the substance which cause sadness to the world is called as Visha². Antidotes is a chemical substance that stops or controls the effect of a poison³. The poisons in any form may be taken in by the breathe or swallowed, absorbed through the thinner and more delicate mucous membrane or absorbed through the skin implanted by stings, bites or other wounds⁴. According to Charak, Prativisha is one among the chaturvimshati upakramas⁵. Detail explanation of Prativisha is available in Ashtanga Sanghrah Uttara stana 48th Adhyaya. When effects of poisons does not subside by curative hymns and drug administration after the lapse of the fifth stage and before the lapse of the seventh stage, Prativisha has to be administered after taking consent⁶. The gunas of Visha according to Acharya charaka are laghu, ruksha, Aashu, Vishada, Vyavayi, Teekshna, Vikashi, Sukshma, Ushna, Anirdishya rasa⁷ and Acharya Sushruta mention

same properties but instead of Anirdishyarasam mentioned Apaki⁸. Vagbhata mentioned same but in case of rasa mention Avyakta rasa⁹. As per sharangadhara vyavayi, vikasi, sukshma, chedi, madavaha, agneya, jivitahara and yogavahi¹⁰. Acharya Charaka opined that a Visha (poison) can become a very good oushadha, if it is administered properly, even oushadha may become poison, if administered improperly.

Definition of antidote

- Antidotes are the substances used to counteract or neutralize the effects of poison. The term derives from the Greek Pharmakon or Antidote, given as a remedy. Sometimes referred to as reversal agents.
- Something that counteracts an unpleasant feeling or situation.
- Laughter is a good antidote for stress¹¹

How does antidote works

- A medication or treatment that counteracts a poison or its effects. An antidote may work by reducing or blocking the absorption of a poison from the stomach. It might counteract its effects directly, as in taking something to neutralize an acid. Or an antidote might work by blocking a poison at its receptor site¹².

Classification of antidotes

1) Mechanical / physical antidote¹³

They neutralize poisons by mechanical action or prevent their absorption.

1) Activated charcoal

2) Demulscents- Are substance which form a protective coating on the gastric mucous membrane and thus do not permit the poisons to cause any damage.

Ex –Milk, starch, egg, white, mineral oil, milk of magnesia, aluminium hydroxide gel etc.

3) Bulky food- Acts as mechanical antidote to glass powder by imprisoning its particles

4) Its meshes, and thus prevent damage being effected by the sharp glass particles.

2) Chemical antidotes¹⁴

They counteract the action of poison by forming harmless or insoluble compounds or by oxidising poison when brought in to contact with them.

Ex- a) common salt decomposes silver nitrate by direct chemical action, forming the insoluble silver chloride

b) potassium permanganate used in opium and its Derivatives ,strychnine, cyanide, hydrocyanic acid.

c) Tannic acid/Tanin used in the form of strong tea Nicotine, strychnine, Cocaine, Aconite and in metals etc.

d) Acids neutralize alkalis by direct chemical action. ex vinegar ,lemon juice, canned fruit juice.

Universal antidote

A mixture formerly recommended as an antidote when the exact poison is not known.

There is, in fact no known universal antidote.

Consisting of activated charcoal, or burnt toast 2 parts, magnesium oxide one part and tannic acid or strong tea one part is not recommended.

3) Physiological or Pharmacological Antidotes¹⁵

They act on the tissues of the body and produce symptoms exactly opposite to those caused by the poison. they are used after some of the poison is absorbed in to the circulation. Their use is somewhat limited and not without danger.

These agents act on the principle of antagonism by interfering with anothers action upon the enzymes,the tissue cells or opposing nerve systems.

Ex-á) Atropine and Physostigmine are two real physiological antidotes.

b)cyanide and amylnitrite.

Chelating agents/Metal complexing agents¹⁶ Are used in the treatment of poisoning by heavy metals. They have greater affinity for the metals as compared to the endogenous enzymes.

The complex of the agent and metal is more water-soluble than the metal itself, resulting in higher renal excretion of the complex.They can form stable ,soluble complexes with calcium and certain heavy metals.

Ex- a) B.A.L (British anti-lewisite; dimercaprol;d imercaptopropanol)- useful in heavy metals like Arsenic, lead, copper, Mercury, gold. antimony, bismuth.

b) E.D.T.A (Ethylene diamine tetra acetic acid;) –effective in lead, copper, cobalt, cadmium, iron, nickel poisoning.

c) pencillamine (cuprimine; Dimethyl cystine);- effective in copper, lead and mercury.

D) D M S A Succimer –used in lead, mercury and arsenic.

Table -1 Poisons and their antidotes¹⁷

		Vit K
Industrial chemicals	<ul style="list-style-type: none"> • Lead • Mercury • Arsenic • Methyl alcohol • Ethylene glycol • Cyanide 	<p>Dimercaprol(BAL) D-Penicillamine Calcium disodium edentate</p> <p>Dimercaprol(BAL) D-Penicillamine Dimecaptosuccinic acid(DMSA)</p> <p>BAL D-Penicillamine</p> <p>Ethanol Folic acid/Folinic acid (Leucovorin)</p> <p>Ethanol Pyridoxine hydrochloride Folic acid Thiamine</p>

	<ul style="list-style-type: none"> • Methemoglobinemia producing agents • nitrites, nitrates dapsone, chlorates, copper 	<p>Amyl nitrite, sodium nitrite, sodium thiosulfate(Cyanide abtodote kit)</p> <p>Hydroxocobalamin</p> <p>Dicobalt edetate</p> <p>Methylene blue</p>
Drugs	<ul style="list-style-type: none"> • Acetaminophen • Iron • Benzodiazepines • Opioids • Isoniazid • Digoxin 	<p>N-Acetylcysteine</p> <p>Deferoxamine</p> <p>Flumazenil</p> <p>Naloxone</p> <p>Pyridoxine</p> <p>Digoxin specific antibodies</p>
Environmental toxins	<ul style="list-style-type: none"> • Datura • Snake bite • Dog bites • Botulism 	<p>Physostigmine</p> <p>Antisnake venom</p> <p>Anti rabies vaccine</p> <p>Botulinum antitoxin(Guanidine)</p>

Chemicals cause poisoning

Chemicals	Antidote
Nerve agents(Neurotoxins) <ul style="list-style-type: none"> Sarin,tabun,cyclosarin,novichok agents 	Atropine sulphate Pralidoxime
Blood agents(Chemical asphyxiants) <ul style="list-style-type: none"> Cyanogen chloride,hydrogen cyanide Hydrogen sulfide 	Amyl nitrite, sodium nitrite, sodium thiosulfate Hydroxocoblammin Sodium nitrite
Methylene chloride, Carbon tetrachloride, carbon monoxide, Hydrogen sulfide	Oxygen Hyperbaric oxygen
Hydrofluoric acid, fluoride salts, Oxalic acid	Calcium chloride Calcium gluconate
Thallium	Prussian blue
Acetonitrile, Acrylonitrile	Dicobalt EDTA Amyl nitrite, sodium nitrite, sodium thiosulfate
Bromates, chlorates	Sodium thiosulfate Methylene blue
Carbon tetrachloride	N Acetylcysteine
Formaldehyde	Folic acid

Coumarins and related redenticides	Vit K1
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Table – 2 List of antidotes¹⁸

Sl No	Poison	Antidote
1	Carbon monoxide poisoning and cyanide poisoning	100% oxygen or hyperbaricoxygen therapy (HBOT)
2	used for many oral toxins	Activated charcoal with sorbitol
3	organophosphate and carbamate insecticides, nerve agents, some poison mushrooms	Atropine
4	Theophylline	Beta blocker
5	calcium channel blockers, black widow spider bites	Calcium chloride
6	hydrofluoric acid	Calcium gluconate
7	Heavy Metal Poisoning	Chelators such as EDTA, dimercaprol (BAL), penicillamine, and 2,3-dimercaptosuccinic

		acid(DMSA, succimer)
8	cyanide poisoning	Cyanide antidote (hydroxocobalamin, amyl nitrite, sodium nitrite, or thiosulfate)
9	serotonin syndrome	Cyproheptadine
10	Iron poisoning	Deferoxamine mesylate
11	digoxin poisoning	Digoxin Immune Fab antibody (Digibind and Digifab)
12	Extrapyramidal reactions associated with antipsychotic	Diphenhydramine hydrochloride and benztropine mesylate
13	Ethylene glycol poisoning and methanol poisoning	Ethanol or fomepizole
14	Benzodiazepine overdose	Flumazenil
15	beta blocker poisoning and calcium channel blocker poisoning	Glucagon

16	Reversal of dabigatran etexilate, an anticoagulant	Idarucizumab
17	beta blocker poisoning and calcium channel blocker poisoning	Insulin with Glucagon
18	methotrexate and trimethoprim	Leucovorin
19	treatment of conditions that cause methemoglobinemia	Methylene blue
20	Paracetamol (acetaminophen) poisoning	N-acetylcysteine
21	Opioid overdose	Naloxone hydrochloride
22	oral hypoglycemic agents	Octreotide
23	anticholinergic poisoning	Physostigmine sulfate
24	warfarin poisoning and indanedione	Phytomenadione (vitamin K) and fresh frozen plasma
25	organophosphate insecticides, followed after	Pralidoxime chloride (2-PAM)

	atropine	
26	Heparin poisoning	Protamine sulfate
27	Thallium poisoning	Prussian blue
28	Isoniazid poisoning, ethylene glycol	Pyridoxine
29	Aspirin, TCAs with a wide QRS	Sodium bicarbonate
30	lead poisoning	Succimer, chemical name Dimercaptosuccinic acid (DMSA)
31	adenosine poisoning	Theophylline

Table – 3 List of antidotes¹⁹

Sl No	Poison	Antidote
1	Acetaminophen	Acetylcysteine
2	Paracetamol	Acetylcysteine

3	Anesthetics, local	Lipid emulsion (Fat Emulsion)
4	Aniline	Methylene blue
5	Anticholinesterases (i.e. organophosphates)	Atropine, Pralidoxime (2-PAM)
6	Antidepressants, Cyclic (TCAs)	Sodium bicarbonate, Lipid emulsion
7	Arsenic	Dimaval
8	Benzodiazepines	Flumazenil
9	Beta-blockers	Atropine, Insulin, Calcium, Glucagon (adjunctive therapy only), Lipid emulsion
10	Black Widow spider	Black Widow spider antivenin (Antivenin Latrodectus Mactans)
11	Calcium channel blockers	Atropine, Insulin, Calcium, Lipid emulsion
12	Cyanide	Hydroxocobalamin (Cyanokit), Sodium thiosulfate

13	Digoxin	Atropine, Digoxin immune Fab
14	Ethylene glycol	Fomepizole, Pyridoxine, Sodium bicarbonate
15	Glycol Ethers	Fomepizole
16	Hydrofluoric acid burns	Calcium gluconate
17	Iron	Deferoxamine (Desferrioxamine)
18	Isoniazid	Pyridoxine
19	Lead	Dimaval
20	Mercury (inorganic or elemental)	Dimaval
21	Methanol	Fomepizole
22	Mushrooms, Hepatotoxic (i.e., Amanita phalloides)	Acetylcysteine
23	Mushrooms, Seizure-inducing (gyromitra or	Pyridoxine

	hydrazine-containing mushrooms)	
24	Nitrates	Methylene blue
25	Nitrites	Methylene blue
26	Opioids	Naloxone
27	Organophosphate insecticides	Atropine Pralidoxime (2-PAM)
28	Salicylates	Sodium bicarbonate
29	Sodium channel blocking drugs* (wide QRS)	Sodium bicarbonate, Lipid emulsion
30	Sulfonylurea(oral hypoglycaemic)	Octreotide

Table – 4 Adjectival antidotes

Indications	Antidotes
Most poisons	Activated charcoal
Dystonia	Benzotropine
Pshycotic states	Chlorpromazine

Acute allergic reaction, laryngeal oedema	Corticosteroids
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Definition of Prativisha²⁰

Prati is its bhasha

Tannamana kayati prakarshyaati it

Pratighato vishyerasminniti

Vishama prati (Mudhadodha vyakarana)

Prativisha means which acts against visha

Prativisha means the medicine which is used for the purpose of pacifying visha utpanna lakshana.

Indications of Prativisha²¹

When the effect of poisons are not subsided by mantra, tantra chikitsa and dravya prayoga.

- 1) When vishapidita has between fifth and seventh visha vega.
- 2) When all treatment procedures have failed
- 3) In Emergency conditions, Prativisha should be administered²².
- 4) In person who is subjected to ghruta, vamana, virechan and hitabhoji, satwika prakruti, sheetakala, vasant rutu, after sunrise, ghishma rutu.

Contraindications of Prativisha²³

- 1) When poison localized in Rakta, Prativisha should not be administered.

- 2) After lapse of kriyakala
- 3) In case of shankha visha²⁴ (doubtful poisons)
- 4) In varsha rutu, durdina (cloud), Krodha(anger), Pittarogi, Klibhya (impotent), Kshuda(hunger), Trushna(thirst), shrama(Fatigue),Atapa sevita(exposure to sun), Adva(walked for longer distance), suffering with other diseases, pregnant woman, child, old person, Ruksha, Marmastita visha²⁵
- 5) Person who consumes ruksha ahara, may suffer from drusti vibram, karnashoola, vatavyadhis
- 6) In Ajeerna²⁶

Dose

In jangma visha– Stavara vish should be administered in the dose²⁷

- Heena matra (Minimal dose) – 4 Yava
- Madhyama matra (Moderate dose) – 6 Yava
- Uttam matra (Maximum dose) – 8 Yava

In Keeta damsha

- Matra – 2 Yava

In Vruschika damsha

- Matra – 1Tila

In Luta damsha²⁸

- External application after pracchana karma

Table- 5 Use of stavara visha in jangama visha chikitsa²⁹

Sl .no	Name of jangama visha	Sthavara visha to be used for treatment
1	Alarka visha(rabies)	Arka ksheera-for virechana
		Dhatura
		Dhatura with punarnava
		Dhatura with Kakodumbara
		Dhatura with Aparajita & Punarnava
		Dhatura + Rice + Sharapunka (stuffed in dhatura patra)
2	Snake bite	Gunja with Nakuli-lepa
		Teekshna visha lepa
		Karaveera,Arka,Langali,with Pippali. Patha-lepa Jayapala beeja –Anjana Langali kanda-Nasya
3	Scorpion bite	Vatsanabha lepa
		Jayapala lepa
		Arkaksheera with Palash beeja-Karpsa lepa Haratala+ Navasadar lepa Somala+Nimbu rasa lepa

4	Rat bite	Danti for virechana
5	Manduka damsha	Snuhi kshira with shirish beeja lepa

Table - 6 Use of sthavara visha in sthavara visha chikitsa³⁰

Sl.No	Name of Poison	Poisons to be used for treatment
1	Jayapala	Ahiphena with Madhu and Keshar
2	Kuchala	Tamraparni(Tobaco)
3	Ahiphena	Karpasa beeja Tamra+ Tankana
4	Dhattura	Eranda moola Karpasa pushpa kwath
5	Karaveera	Arka twak
6	Vatsanabha	Tankana ³¹ Arjuntwak with honey and ghrutha ³²

Table - 7

Sl No	Poisons	Poisons to be used for treatment

1	Dushivisha ³³	Snuhi ksheera (Nagadantyadi ghrita)
2	Gara visha ³⁴	Hemaprashana

Vishagna dravyas

Table - 8 According to Acharya Charak³⁵

Sl.No	Vishagna dravy	Latin name	Properties
1	Haridra	Curcuma longa	Scraping, detoxifier, stimulant.
2	Manjista	Rubia Cordifolia	Blood purifier, circulation provider.
3	Suvha	Operculina turpethum	Laxative, blood purifier, scraping
4	Suhkshma ela	Elettaria cardamomum	Detoxifier, demulsant, diueretic, soothing
5	Palindi	Ichnocarpus frutescens	Liver stimulant, scraping, cholegogue, antipyretic
6	Chanadan	Santalum album	Blood purifier, soothing
7	Kathaka	Strychnos potatorium	Blood purifier, scraping
8	Shirisha	Albizia lebbeck	Detoxifier, immune modulator, blood purifier
9	Sindhuvara	Vitex negundo	Detoxifier, neuro-stimulant, analgesic

10	Shleshmataka	Cordia dichotama	Demulcent, anti spasmodic, anti inflammatory.
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Ghruta as an antidote

Ayurvedic classics have mentioned ghee as the drug of choice for treatment of poisons. Charak mentioned ghee has similar qualities of Oja, hence useful in poisoning³⁶. Acharya Vagbhata says the qualities of ghee, it is destroyer of poisons and clearly mention that in all types of poisonings (Vishapaha), irrespective of state of the patient ghee is best treatment and also mentions that poisons attack the hrudaya cause destruction of life³⁷. So to treat patient of poisoning ghee should be used alone or with other anti poisons drug, in case of alark visha, vruschika visha agnikarma with boiling ghee, followed by oral application of puran ghrutha is also advised as the specific treatment³⁸

Madhu as an antidote-

Acharya Susruta and Vagbhata says the qualities of madhu, it is destroyer of poisons, he clearly mention that in all types of poisonings (Vishapaha), irrespective of state of the patient madhu is best treatment^{39, 40}

Godugdha as an Antidote

Kshira has similar properties to that of Ojus, act as Rasayan, balavardhaka, hrudya, jeevaneeya, ayushya⁴¹.

Swarna bhasma as an antidote

Acharya Bhavaprakash says that swarna is best rasayan, ojaskara, helpful in both visha conditions I,e in jangama visha and stavara visha.⁴²

Discussion

Antidotes may play an important role in the treatment of poisoning. While good supportive care and elimination techniques may, restore a poisoned patient to good health and stabilize body functions, the appropriate use of antidotes greatly enhance elimination and counteract the toxic actions of the poison. Antidotes can be used to prevent the absorption of poisons, to enhance their elimination, and to counteract their effects. With modern resuscitation techniques and intensive care, some patients can recover fully without the use of antidotes. The use of certain antidotes may seem unnecessary and the majority of antidotes considered as adjuncts to supportive care.

Mode of action of visha- The gunas attributed to visha has got some action on dosha,dhatu,mala. Ruksha guna causes aggravation of vata, due to ushna guna aggravation of pitta along with rakta, Laghu guna spreads all over the body, making it difficult to control or cure. Sukshma guna aggravates rakta, enters in to body and damages the organs of the body, Ashukari (quick acting) nature of poison kills instantaneously, due to vyavayi property it is absorbed without pachana, circulate all over the body, quick in deranging body functions. vikashi property damages doshas, dhatus and malas, vishada does not stick anywhere, arresting the functions of organ. Apaki property, difficult to eliminate, as such troubles for long period.⁴³ as per modern medical science the poison enacted on local site, systemic or both. It also enacted as a corrosive, irritant, neurotic, asphyxiants,and miscellaneous.⁴⁴

Mode of action of vishagna dravyas- Acharya Charaka stated that some drugs act by virtue of their own nature (dravya prabhava), some other drugs by virtue of their qualities (guna prabhava), and some drugs by virtue of their nature as well as qualities (Dravya guna prabhava).⁴⁵ Some vishagna dravyas are act on poison by their properties, which will be acted by increasing ojas, strengthens hrudaya, protects the dhatus, allivate vata and pitta, arrest the visha vega (spread the poison in the dhatus), detoxify blood. Some vishagna dravyas are act on poison by their rasa like Madhura rasa causes increases oja , strengthens the hrudaya and alleviates vata and pitta, tikta rasa, which alleviates pitta dosha and kashaya rasa arrest the visha vegas. Some vishagna dravyas are act on poison by Madhura vipaka, alleviates pitta dosha, strengthens dhatus and ojas. Some vishagna dravyas are act by veerya like sheeta causes increase oja and dhatus, alleviate pitta dosha and arrest the spread of poison. Some vishagna dravyas are act on poison by their prabhava like vishahara effect⁴⁶.

Mode of action of Dattura in Alarka visha – Kapha vata shamaka, Swedavarodhaka, best shoolahara, vishapaha, madaka prabhava, akshepaka nivarana (anticonvulsant), first stimulates and subsequently causes depression, relieves anxiety, and have Anti inflammatory effect.

Mode of action of Vatsanabha in scorpion bite - Vatsanabha is vedanastapaka, shothahara, hrudaya uttejaka, shwasa also.

Mode of action of Tamraparnai in Kuchala- Tamraparni is Akshepa nivarana, reduces pain by the increase in acetylcholine and beta endorphin, depresses the passage of nerves impulses and sedative effect, and reduces anxiety by increase in beta endorphin.

Mechanism of action of antidote- physiological antidotes can be act by forming a nontoxic complex, by metabolic conversion by prevention of toxic metabolite formation, by changing the

physio chemical nature of toxicant and repairing defect or enhancing a function that corrects the effect of poison⁴⁷

Conclusion

Medicine used to treat or counteract poison is named as prativisha. Acharya Vagbhata explained in detail about the use of prativisha in almost all types of visha and indicated if the vishavega is in between 5th and 7th vega. Mainly two types of poison mentioned in Ayurveda both poison possessing opposite qualities, when put together they destroy each other, hence patient bitten by jangama visha should administered, Sthavara moola used in the form of internal and external application. Antidotes are the substances used to counteract or neutralize the effects of poison. Poisoning may be caused by plant, animal substances, agricultural poisons, poisonous metals and minerals etc. Prativisha possess vyavayi guna, so that acts vigorously on patient and have affinity for same system on which visha has affected. Prativisha have action opposite to that poison. Common antidotes in Ayurveda are swarna, ghrita, godugdha and madhu. So prativisha and antidote play an important role in the management of poisoning, it helps to save the patient's life. From all above information we can conclude that Prativisha is a substance that should be equally potent to visha (poison).

It is most important to identify the type of poison to treat any poisoning cases very effectively, so that we can use the specific Antidote for proper management of poisoning. For that, knowledge of prativisha and antidote is must for physician.

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