REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

Management Of Organophosphorous Induced Polyneuropathy With Ayurvedic Protocol – A Case Report

Dr.Veena G Rao[1*], Dr. Jurru Niharika [2], Dr. Rakshith HS[3]

*[1]Professor & Head, Department of Panchakarma, JSS Ayurvedic medical college, Mysuru, Karnataka.
email:drveenagrao@yahoo.in. Phone no: +91 9844549152
[2]MD scholar, Department of Panchakarma, JSS Ayurvedic medical college, Mysuru, Karnataka.email:jurruniharika@gmail.com
[3]MD scholar, Department of Panchakarma, JSS Ayurvedic medical college, Mysuru, Karnataka.email:rakshithraj26@gmail.com

ABSTRACT:
Organophosphates encompass a diverse group of chemical compounds and are formed through esterification between phosphoric acid and alcohol. Currently, organophosphates have common application in pesticides and herbicides, as well as nerve agents in chemical warfare. When introduced into the body, organophosphates (OP) inhibit the enzyme acetyl cholinesterase, resulting in an overabundance of the neurotransmitter acetylcholine. This surplus acetylcholine in the body manifests the cholinergic toxidrome, which includes effects on nicotinic and muscarinic receptors, as well as central nervous system. Although developed nations have experienced a decline in poisoning cases due to stricter regulations on the use of these chemicals, developing countries still face a clinical concern, especially when used for self-harm purposes. This case report is intended to throw light to a positive outcome of Ayurvedic treatment protocol in OP poisoning induced polyneuropathy. A male patient aged 34 years diagnosed with OP compound poisoning with intermittent syndrome presiding into Polyneuropathy presented to Panchakarma OPD with complaints of loss of function and loss of strength in both upper &lower limbs was assessed by ASIA scale and FMI scale. Was administered with *Dhanyamladhara, Talam, Abhyanga , Mustadi yapana basti*, *Shastika Shaali Pinda Sweda, Annalepa , Salvana Upanaha*. The ASIA scale before treatment was Grade C has improved to Grade E (normalcy) and was maintained during 2 months follow up after the treatment. This displays the complete remission of the disease alongside with use of internal medications for due course.

KEYWORDS- OP poisoning induced Polyneuropathy, Intermediate syndrome, *Dhanyamladhara, Talam, Abhyanga , Mustadi yapana basti , Annalepa , Salvana Upanaha* .

INTRODUCTION:

Organophosphorous(OP) compounds are widely used as pesticides, especially in developing countries.Case fatality following deliberate ingestion is high 5- 20%. Nerve agents , developed for chemical warfare, are derived from OP insecticides and are much more toxic.They are commonly classified as G (originally synthesised in Germany) or V (‘venomous’) agents.The ‘G’agents ,such as tabun,sarin and soman , are volatile,aborbed by inhalation or via skin, and dissipate rapidly after use.’V’ agents , such as VX,are contact poisons unless aerolised, and contaminate ground for weeks or months.
The toxicology and management of nerve agent and pesticide poisoning are similar[1].

Intermediate syndrome[2]:

About 20% of patients with Op poisoning develop weakness that spreads rapidly from the ocular muscles to those of the head and neck , proximal limbs and the muscles of respiration , resulting in ventilator failure. This ‘intermediate syndrome’ generally develops 1-4days after exposure, often after resolution of the acute cholinergic syndrome and may last 2-3weeks.
Later after Intermediate syndrome , neuro-deficit symptoms continue and settle in a state of Organophosphate – induced delayed polyneuropathy.

Organophosphate-induced delayed polyneuropathy

Oragnophosphate-induced delayed polyneuropathy (OPIDN) is a rare complication that usually occurs 2-3weeks after acute exposure.It is mixed sensory/motor polyneuropathy, affecting long myelinated neurons especially, and appears to result from inhibition of enzymes other than AChE.It is a feature of poisioning with some Ops such as Triorthocresyl phosphate but is less common with nerve agents.Early clinical features are muscle cramps followed by numbness and paraesthesia ,proceeding to flaccid paralysis of the lower and subsequently the upper limbs,with foot and wrist drop and a high-stepping gait ,progressing to paraplegia.Sensory loss may also be present but is variable.Intially ,tendon reflexes are reduced or lost but mild spasticity may develop later.[3]

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

MANAGEMENT:

OP Poisoning causes an acute cholinergic phase, which may occasionally be followed by the intermediate syndrome or organophosphate-induced delayed polyneuropathy(OPIDN).The onset, severity and duration of poisoning depend on the route of exposure and agent involved.[4]

There is no specific therapy for OPIDN. Regular physiotherapy may limit deformity caused by muscle-wasting. Recovery is often incomplete and may be limited to the hands and feet ,although substantial functional recovery after 1-2years may occur, especially in younger patients.[5]

CASE REPORT:

A 34year old male patient presented with complaints of karmakshaya (loss of function) and balakshaya (loss of power) in both *urdhwashaka*(upper limbs) and *adhoshaka* (lower limbs)since 20days.

History of present Illness:

As per the statement of patient , he was apparently healthy before one and half month. Due to intake of poison patient was unresponsive for 2 hours followed by frothing from mouth and was rushed to nearby hospital for emergency care .Diagnosed with OP compound poisoning with intermittent syndrome, emergency incubation was done and was under ventilator support. Was treated for the same with conservative line of management .Gradually, after few weeks he developed *karmakshaya* and *balakshaya* in *urdhwa* and *adhoshaka* for which he consulted allopathic physician and was diagnosed with polyneuropathy. Conservative line of treatment and physiotherapy was adviced and done for the same but complaints persisted. Hence, approached Panchakarma OPD of JSS Ayurveda Hospital, Mysuru for Ayurvedic management of the same .

History of Past Illness:

N/K/C/O HTN, DM

Family History:

Nothing significant

Past treatment History:

- Previous medication : has taken modern emergency care in acute stage.

ONGOING MEDICATION –
1.Levipil 500mg 1-0-1
2.Eption 100mg 0-0-2

Personal History:

- **Ahara** ; SamishayuktaBhojana
- **Vihara :** madhyama
- **Nidra :** Sukha

Duration: 6-7 hrs / Night time

- **Vyasana:** alcohol(weekly60-80ml)
- **Agni**: Samagni
- **Koshtha :** Madhyama
- **Mala pravritti :**Regular ,once/day, grathita mala
- **Mutrapravritti**: 3-4 per day
- **ManasaPariksha:** *affliction to*Bhaya, Chinta

Ashta Sthana Pariksha:

1. Nadi : 72 bpm
2. Mala : once aday
3. Mutra :3-4/1 (d/n) times
4. Jihwa :alipta
5. Shabda:prakrutha
6. Sparsha:anushna sheetha
7. Druk : prakrutha
8. Aakruthi:madhyama

DashavidhaPariksha:

1.Prakruti : Vatapittaja
2. Vikruti : vatakaphaja
3. Sara : Madhyama
4. Samhanana : Madhyama
5. Pramana : Ht :5.5 ft Wt: 66kg
6. Satmya : Sarvarasa

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

7. Satwa : Madhyama
8. Ahara shakti : Abhyavaharana shakti: Madhyama
Jarana shaktiMadhyama
9. Vyayama shakti : avara
10. Vaya : Madhya

Saamaanya Pareeksha:
Built : Moderately Built
Nourishment : Moderately nourished
BP : 130/80 mm hg
Pulse: :72bpm
Temperature : afebrile
Height : 5.5ft
Weight : 66kg
Respiratory rate: 18cpm
Lymph nodes : Non palpable
Conjunctiva : Pink
Nails : Normal

Systemic Examination:
1)Gastro Intestinal System
Abdomen: Soft , non tender
2)Respiratory System
Normal NVBS heard , no added sounds
3)Cardiovascular System
S1 S2 heard, no murmurs
4) Genito Urinary System:
NAD
5) MusculoSkeletal System:
Inspection : Signs of Inflammation : absent
Spine: Normal
Palpation: Joints local temperature: Normal
Tenderness: absent

Examination of Nervous System
Higher mental Functions
Level of Consciousness :Fully Conscious
Attention : Easily obtained
Speech : Slow, slurred
Mood : Normal
Delusion: absent
Orientation: To time Present
Memory : Distant - PresentRecent - Present

Cranial nerve Examination
I. Olfactory nerve :- Normal
II. Optic nerve –Normal
III, IV &VI – Occulomotor,Trochlear&Abducent nerve : normal
V – Trigeminal nerve

A) Sensory part	Rt	Lt
Sensation	+	+
Corneal Reflex (direct& consensual)	+	+

Jaw reflex - normal
Secretions of salivary, buccal, & lacrimal glands- present
B) Motor part
Mastication- normal
Jaw movements- normal
VII VIII :normal

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

IX & X , X1 :normal
XII : Dysarthria- present

MOTOR SYSTEM

1. Gait : steppage
2. Tropical Changes : Bedsore- absent
   Assistance: required, dependent on walker
3. Contracture/Contractions : absent
4. Fasciculation / irritability: absent
5. Muscle bulk : atrophy present, reduced on bilateral lower limbs
6. Muscle tone : Flaccid in bilateral lower limbs and mild flaccidity present in distal part of bilateral upper limb
   Foot Droop : + bilaterally
7. Involuntary movements: absent
8. Ankle clonus: absent

9.Muscle Power:

Muscle power	Right	Left
Upper limb	4/5	4/5
Lower limb	3/5	3/5

10.Reflexes:

Superficial reflexes-
Corneal : Present
Abdominal : Present
Babinski's sign: Absent

Deep reflexes-

Reflex	Right	Left
Biceps	absent	absent
Triceps	absent	absent
Supinator	absent	absent
Knee	Reduced +	Reduced+
Ankle	absent	absent

Visceral reflexes- Present

11.Co-ordination test:

1. Finger-to-nose test- cannot be elicited
2. Heel-shin test – cannot be elicited
3. Dysdiadochokinesia– cannot be elicited
4. Tandem walking – cannot be elicited.

INVESTIGATIONS:

NCS/EP'S/EMG REPORT - This NCS of all 4 limbs suggestive of a Bilateral, Symmetric, Non Length Dependent, Motor Only, Demyelination with Axonal Polyneuropathy Involving all the motor nerves.

SAMPRAPTHI GHATAKA

- Dosha : Vata, Kapha
- Dooshya : Rasa, Raktha, Mamsa,Medha,Sira,Snayu,Kandara.
- Agni : Jataragni, Dhatwagni
- Ama : Jataragnijanya, Dhatwagnijanya
- UdbhavaSthaana : pakwashaya
- SanchaaraSthaana : Sira,Snayu,Dhamani
- VyaktaSthaana : ubhaya adhoshaka and urdwa shakha
- Adhistaana : ubhaya adhoshaka , urdhwa shakha
- Srotas : Rasa,Rakta,Mamsa,Medhovaha
- Sanchara sthana : Rasayani
- SrotoDustiPrakaara: Sanga

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

- RogaMaarga : Madyama

SapekshaNidana: Pakshagatha, Sarvanga roga
RogaNirnaya : Sarvanga roga – as presents with balakshaya & karmakshaya in both urdhwa and adhoshaka i.e Quadreparesis / OPIDN
VyadhiAvastha: ashukari state- emergency care **,** chirakari state-neuro deficits
Sadhyasadhyata: kruchrasadhya

CHIKITSA:

Table showing treatment timeline -

SL.NO	Panchakarma therapy	Medicament	Duration
1.	Koshta shodhana	Eranda Taila 0-0-20ml (before food)	2days
2.	Sarvanga Dhanyamla seka	Dhanyamla	2days
3.	Talam	Kachooradi choorna & ksheerabala tailam	7 days
4.	i.Sarvanga abhyanga followed by Nadi sweda. ii.Annalepa	Mahanarayana tailam &ksheerabalatailam	5days
5.	i.Sarvanaga shastika shaali pinda sweda ii.Ekanga Salvana upanaha[6] (to both lower limbs)	Application of Ksheerabala taila	8days
6.	Kalabasti-	Anuvasana:MahanarayanaTaila-70ml Niruha:Honey-100ml Saindhava lavana -6g Sneha:Ashwagandhaghrita+ ksheerabala taila-140ml(each 70ml) Mustadi kalka -25g Mustadi YapanaKsheera kashaya-350ml Total=621ml	16days
TOTAL NO. OF DAYS OF TREATMENT			22 DAYS

ORAL MEDICATIONS:

ORAL MEDICATION	DURATION
Rasa raja rasa(1-0-0) After food.	1-0-0 after food
Brihat vata chintamani with gold	1-0-0 after food
Shaddharam DS	1-0-1 after food
Mashaatmaguptadi kashaya	50ml-0-50ml after food

RESULTS &IMPROVEMENT:

Table: ASIA impairment grading

ASIA impairment scale		
A	Complete	No motor, no sensory, no scaral sparing
B	Incomplete	No motor, sensory only
C	Incomplete	50% of muscles LESS than grade 3 (can't raise arms or legs off bed)
D	Incomplete	50% of muscles more than Grade 3 (Can raise arms or legs off bed)
E	Normal	Motor and Sensory function are normal

Table showing: ASIA impairment scale score

Variables	Before treatment		After treatment	
Sensory	Upper extremity (UE)	Lower extremity(LE)	UE	LE
Light touch	42	38	104	90
Pin prick	54	48	112	104
Motor	40	30	50	50
ASIA-Grading	GRADE C		GRADE E	

FUNCTIONAL INDEPENDENCE MEASURE (FIM) ASSESSMENT
1 – Total contact assistance with helper

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

2 – Maximal contact assistance with helper
3 – Moderate contact assistance with helper
4 – Minimal contact assistance with helper
5 – Supervision or setup with helper
6 – Modified independence with helper
7 – Complete independence

FIM Assessment	BT (0^{th} day)	MT(10^{th}day)	AT (22^{nd}day)
Motor subscale			
Eating	3	5	6
Grooming	3	5	6
Bathing	2	4	5
Dressing Upper Body	2	5	6
Dressing Lower Body	2	3	5
Toileting	2	3	4
Bladder Management	4	5	6
Bowel Management	4	5	6
Transfer bed/chair	2	3	4
Transfer toilet	2	3	4
Transfer bath/shower	2	3	4
Locomotion	4	6	6
Stairs	3	4	5
Motor Subtotal Score *(max. score 91)*	35	54	67
Cognition subscale			
Comprehension	5	6	7
Expression	7	7	7
Social interaction	7	7	7
Problem solving	7	7	7
Memory	7	7	7
Cognition Subtotal Score *(max. score 35)*	33	34	35

TOTAL SCORES AND GRADES:

TOTAL FIM SCORE *(max. score 126)*	BT (0^{th} day)	MT(10^{th} day)	AT (22^{nd} day)
	75	88	102

ASIA-Grading	BT	AT
	GRADE C	GRADE E

ORAL MEDICATION	DURATION
Rasa raja rasa(1-0-0) After food.	1-0-0 after food
Brihat vata chintamani with gold	1-0-0 after food
Shaddharam DS	1-0-1 after food
Mashaatmaguptadi kashaya	50ml-0-50ml after food
Dhanwantaram ghrita	10ml-0-0 before food
Maxlax DS	0-0-1 before food

DISCHARGE MEDICATIONS:
The above medication was advised for 45days and was advised for follow up.

DISCUSSION:
This case of OP poisoning induced Polyneuropathy can be contemplated as *Vishajanita vatavyadhi* in the presentation of *Sarvanga Roga* (since Polyneuropathy having the presentation of Quadreparesis). Pakshaghata is considered when

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

the presentation of the paresis is limited only to one half of the body i.e can be hemiparesis or Diplegia. Whereas, in this case the presentation is Quadriparesis so, it is considered to be *sarvanga roga*. To commence the protocol, initially *Dhanyamla seka* possessing *ushna, ruksha guna* and *vatakapha hara* property was used to achieve *amapachana* and *kapha haranartha*. Alongside, *Talam* with *kachoradi churna*[7] and *ksheerabala taila*[8] was used to palliate *vata dosha* and also aids in correcting the slurred speech. *kachoradi churnam* contains *kachora , Dhatri, Manjistha,Yashti, Daru, Shilajitu,Vedi, Rohini, Tintrinisira, kumkuma, Indu, Bala, Laja, Ushira, Pushpkaramoola*. This *choorna* is *kapha pradhana Tridoshahara* adjuvenating it with *Ksheerabala Taila* having *snigdha, vatahara* property has an added effect. *Talam* applied over bregma or *seemantha* gets easily absorbed into the skin and reaches the *rasa* and *rakthavahini strotas* which accelerates the recuperation of the patient.[9]

Eventually, once complete *ama nirharana* is acheieved *snighdha chikitsa* was opted . *Sarvanga abhyanga* with *vatahara* ,*brimhana taila* was chosen as it bestows *bala, pushti , su-tvak*- ie proper lustre & sensory functioning can be attained.Which was followed by *Annalepa* ,a thick paste of softly cooked *shastika shaali anna* in the decoctions of *Balamula* and *ksheera,* when applied to the body benefits by providing strength and nutrition to the tissues, especially muscles and other soft tissues. By the virtue of *snighdha , guru , sheeta veerya* does *brumhana* and thus promotes strength , muscle power and muscle tone .Further, *Shastika shaali pinda sweda* and *salvana upanaha* were administered. *Shastika shaali pinda sweda* , a *snigdha sankara sweda* decreases stiffness due to rhythmic strokes , massaging movements with pottali and heat applied over the desired part.Also, nutrients of *shastika shaali* and *ksheera* get absorbed & endure strength to muscles. Sweat pores tend to open and help in proper perspiration , opening blocked channels and help in proper blood flow thereby promoting relaxation process & increasing range of movement on achieving *samyak swinna lakshana*. Both *Shastika shaali pinda sweda* & *Anna lepa* help in improving muscle power ,contour and tonicity.

Acharya Sushruta emphasises on *Basti* and mentions it as best therapy as it collectively works and alleviates all abnormal humors i.e *vata, pitta ,kapha* and *rakta doshas .Mustadi yapana basti*[10] was chosen and was administered in *kala basti* pattern. Drugs used in *Mustadi yapana basti*[10] as *kwatha dravya* are *Ushira, Bala ,Rasna, Bibhitaka ,Katurohini, Punarnava , Manjistha, Gudhuchi ,Madanphala* etc. For *Kalka*, drugs used are : *Shatpushapa, Madhuyasti , Kutaja, Saindhava* etc. *Kwatha* drugs used are *Mustadi khseera kasaya* in this case. Moreover, the *Yapana Basti* are having *Rasayana* effect and can be administered for longer duration without any adverse effects. The ingredient drugs of *Mustadi yapana basti* have predominant *Vatahara* and *Rasayana* properties. Hence it is being a type of *Niruha Basti*, does the *Shodhana* as well as it gives strength to the patient[11]. The *tikta rasa* of the *basti* is *Kaphahara* while the milk and sneha used in the *basti* helps in maintaining Bala of the patients by the virtue of snigdha, balya, rasayana, sheeta *veerya* reduces *vata* and nourishes *mamsadi dhatus* promoting *bala* . *Kala basti* pattern was adopted as *basti* is best modality for palliating *vata dosha* and precisely, this pattern of administration of *basti* nourishes *asthi &majja* dhatu. *Salvana upanaha* [6]mentioned in *vatavyadhi chikitsa* , is a type of *sagni sweda* and is the apt choice as it helps palliate vata & kapha together,thereby doing *Doshaharana*. *Salvana upanaha* is made using fine powders of drugs - *Godhuma, Ashwagandha, Kapikachu, Haridra ,Saindhava, Shatapushpa, Tila ,Atasi, Erandabeeja, Kulattha, Masha, Sarshapa ,Taila, Ghrita, Dhanyamla, Chinca, Guda ,Takra* etc and is made into fine homogeneous paste and cooked so as to have a consistency of smooth lepa. This lukewarm paste is applied over the effected site. It opens up the pores in the skin and transfers the medicated paste and nutrients to the affected site by the *veerya* of drugs. The *ushnata* directly affects the blood vessels, causing vasodilation, particularly in the superficial area where the temperature is highest.Metabolic wastes at the local site are removed through the increased blood circulation and sweating caused. This can be understood as *Sroto-Mukha Vishodhana*; due to the *Guna& veerya* of the *Upanaha Swedana Dravya* used, *the Leena Dosha*s are liquefied and expelled pores of the sweat glands[12].

In due course, internally *Shaddharana vati*[13] containing *Chitraka, Indrayava, Patha,Katuka,Ativisha &Abhaya* ,is chosen as it performs *Kaphavataharana*, does *Deepana pachana, Anulomana*, has *Laghu rooksha teekshna guna, Ushna veerya* and *Katu vipaka*. Therefore, does *Amapchaka* at both *koshta* and *Dhatu level*. *Rasaraja rasa*[14] has ability to pacify vitiated *Vata Dosha*. Majority of the ingredients are *Tikta, Madhura* and *Kashaya rasa* predominant with *Kinchit Katu Rasa, Sheet Virya, Madhura Vipaka, Laghu, Snighdha* and *Vyavayi* in nature with alleviating action on all *Doshas* .Thus, possessing *brumhana, balya* and *rasayana* property. *Brihat vata chintamani rasa*[15,16] with gold helps palliate *vata pradhana tridosha* and also nullifies the effect of *visha* with the presence of *swarna , abhraka &ksheera*, as it contents. The ingredients of this compound formulary were indicated as a stimulant, nervine, nootropic and rejuvenate which improves the acuity of mind as well as directly indicated in the management of stroke in Ayurveda[17].Moreover, studies reveal that there is presence of anti-oxidant promoting and lipid peroxidation decreasing effect and collectively might have shown a neuroprotective effect[18] .*Masha atmaguptadi kashaya*[19](*masha , atmagupta, eranda & balamoola kwatha* with *hingu* & *saindhava* as *prakshepaka dravyas*) was administered to improve the bulk ,tone and power of muscle.Also, *shamana sneha* is known to palliate and control *vata dosha* & moreover,*Ghrita* has been specifically mentioned for *daha,shastra,visha* & *agni*.Therefore, *Dhanwantara ghrita* [20]having *vatahara ,garavishahara* property and also tackles *avarana* and *dhatukshaya* thereby , performing *brumhana* and was elected as *brumhana* and *shamana sneha* as well after *bahir parimarjana chikitsa*.Same set of medications

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No. 1 (2024)
http://www.veterinaria.org
Article Received: 10/01/2024 Article Revised: 19/01/2024 Article Accepted: 30/01/2024
Article Published: 13/05/2024

were continued for a period of 45 days followed by follow up. Patient was observed and was followed by follow up visits for a span of 2 months after treatment.

CONCLUSION:
The result shows that this Ayuvedic Protocol of management including *Mustadi yapana basti* in *Kala basti* pattern along with *Panchkarma* therapies and *shamana chikitisa* were found effective in relieving the signs & symptoms in OP poisoning induced Polyneuropathy/ *Vishajanita vatavyadhi* in the presentation of *Sarvanga roga*.

Patient Perspective-
Patient was satisfied with treatment protocol and desired outcomes.

Source of Support – NONE

Conflict of Intrest – None declared.

REFERENCES:
1. Robb EL, Regina AC, Baker MB. Organophosphate Toxicity. [Updated 2023 Nov 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470430/
2. Staurt H.Ralston, Ian D.Penman, MarkW.J.Strachan ,RichardP.Hobson,Davidson's Principles and Practice of Medicine , Elsevier publications, 23rd Edition ,PP145
3. Staurt H.Ralston, Ian D.Penman, MarkW.J.Strachan ,RichardP.Hobson,Davidson's Principles and Practice of Medicine , Elsevier publications, 23rd Edition ,PP146
4. Staurt H.Ralston, Ian D.Penman, MarkW.J.Strachan ,RichardP.Hobson,Davidson's Principles and Practice of Medicine , Elsevier publications, 23rd Edition ,PP145
5. Staurt H.Ralston, Ian D.Penman, MarkW.J.Strachan ,RichardP.Hobson,Davidson's Principles and Practice of Medicine , Elsevier publications, 23rd Edition ,PP146
6. Acharya YT; et al; Susruta Samhita with Nibandha Sangraha and Nyayachandrika commentary. Varanasi: Chaukambha Sanskrit Sansthan, Edition 2010, Chapter 38, Sutra sthana, shloka, 2010; 35(167): 824.
7. Krishnan vaidyan K.V., Gopalapilla S. Reprint edition. Sahasrayogam, Vidyarambham publishers; 2018. Chikitsa sara sarvaswam. Churna Prakaranam. [Google Scholar].
8. Rao Dr G Prabhakar; Sahasrayogam:2019 ed: New Delhi, Chaukhambha Publications: Taila Prakarana, P-559, Pp838.
9. Shahid M, TK Sujan, Simi Ravindran. An Insight into traditional concept of Thalam. Indian journal of Research 2020; 9(2): 2250-1991.
10. Sushruta. Sushruta Samhita, Chikitsa Sthana, Niruha Krama Chikitsitham, 38/96-101, translated by Srikantha Murthy KR, Shastri KA, Vol. 2, Reprint. ed. Chaukhambha Orientalia, Varanasi; 2012; 379.
11. Shailaja U, Rao PN, Girish KJ, Arun Raj GR. Clinical study on the efficacy of Rajayapana Basti and Baladi Yoga in motor disabilities of cerebral palsy in children. Ayu. 2014;35(3):294-299. doi:10.4103/0974-8520.153748.
12. Harika B, Sudarshan Bhat, A Clinical study on the efficacy of Karpasa Beeja Choorna Pinda Sweda and Patra Pinda Sweda In Sandhigata Vata, International Ayurved Medical Journal, print 2018, p. 557–565.
13. Prof.K. R. Srikantha Murthy Susrutha samhita, vol.II (Chikitsa sthana & kalpa sthana) Chowkhamba publishers, Varanasi, 2012 p.no. 56
14. Shastri Kaviraj Ambikadatta, Bhaisajyaratnavali, Vidhyotini Hindi Commentary, Chaukhamba Sanskrit Sansthan, Varanasi 16th edition 2002, Vatavyadhi Prakaran 26, verse 204-208.
15. Siddhi Nidan Mishra, Bhaishajya Ratnavali of Kaviraj Govind das Sen, Chaukhamba Surbharati Prakasha, 2009;530.
16. Swargeeya Swami Sri Krishnananda Ji Maharaja, Siddhaprayog Sangraha, Krishna Gopal Ayurveda Bhavan, Ajmer, 2000;143.
17. Sri Govindas Sen. Bhaishajya Ratnavali. Shloka No. 141. Sidhinandan Mishra. 1st ed.. Chaukhamba Sanskrit Pratishthan Oriental Publishers & Distributors,New Delhi, India 2013.
18. Goshan V, Mundugaru R, Prakash N, Bhat S, Basavaiah R. Evaluation of neuro-protective activity of Brihatvata Chinthamani Rasa. The Journal of Phytopharmacology 2015;4(4):207-211.
19. Veena G Rao, R. Jayaraj, Ashwini A. Sangolli. An Ayurvedic approach in the management of Watershed Stroke - A Case Report. J Ayurveda Integr Med Sci 2021;6:277-283.
20. Shastri Hari Sadashiva, editor. Astangahrdayam of Vagbhata. New Delhi: Chaukhambha Publications; 2016 Chikitsa Sthana,12.19-24.