WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 7, 735-749. Case Study ISSN 2277–7105

AYURVEDA MANAGEMENT OF GUILLAIN-BARRE SYNDROME-A CASE REPORT

Kiran Kumar P. V.[1]*, Vijayamahantesh Hugar[2], Vanishree[3] and Varsha Kulkarni[4]

[1]Final Year PG Scholar, Department of PG Studies in Panchakarma, Government Ayurveda Medical College, Mysuru, Karnataka, India.

[2]Professor, Department of PG Studies in Panchakarma, Government Ayurveda Medical College, Mysuru, Karnataka, India.

[3]Deputy Medical Superintendent, Government Hi-tech Panchakarma Hospital, Mysuru.

[4]Professor & HOD, Department of PG Studies in Panchakarma, Government Ayurveda Medical College, Mysuru, Karnataka, India.

Article Received on
05 February 2025,

Revised on 26 Feb. 2025,
Accepted on 16 March 2025

DOI: 10.20959/wjpr20257-35697

***Corresponding Author**
Dr. Kiran Kumar P. V.
Final Year PG Scholar, Department of PG Studies in Panchakarma, Government Ayurveda Medical College, Mysuru, Karnataka, India.

ABSTRACT

Introduction: Guillain-Barre syndrome (GB Syndrome) is an acute inflammatory immune-mediated polyneuropathy presenting typically with tingling, progressive weakness, and pain. The incidence rate varies from 1 to 4 instances per 100,000 individuals annually throughout the year. The prognosis and result are significantly influenced by age. **Methods:** The present case study deals with a 40-year old Female patient with Nerve Conduction Study suggestive of, acute motor axonal neuropathy variant of GBS, presenting with Loss of strength in bilateral lower and upper limbs, Tenderness all over the body along with heaviness and Inability to stand / walk. Based upon clinical presentation, ayurvedic diagnosis of Sarvangavata was made and the condition was treated following the principles of vatavyadhichikitsa. **Results:** Remarkable results were observed in the form of improvement in the muscle power from 2 to 4 of all four limbs. After treatment patient was able to stand and walk with support and there was no evidence of tenderness and heaviness of body. **Discussion and Conclusion:** This case study enlightens about the successful Ayurvedic line of management in GB Syndrome.

KEYWORDS: Ayurveda, Panchakarma, Sarvangavata, Guillain-Barre Syndrome, GBS.

INTRODUCTION

Guillain-Barré syndrome is an autoimmune condition in which the immune system attacks healthy nerve cells of the peripheral nervous system.[1]

The cause of this condition is unknown, Usually Guillain-Barré occurs a few days or weeks after the patient had symptoms of a respiratory or gastrointestinal viral infection.[2]

Acute inflammatory demyelinating polyneuropathy (AIDP); acute motor-sensory axonal neuropathy (AMSAN) and acute motor axonal neuropathy (AMAN); and Miller Fisher syndrome (MFS) are the axonal variants of GBS.[3]

Numbness, paresthesia, weakness, discomfort in the limbs, or a combination of these symptoms are the early signs of GBS. Typically, weakness is ascending paralysis which evolves over hours to a few days. All GBS patients require close monitoring and supportive care. Intubation, plasmapheresis, intravenous immunoglobulin and glucocorticoids are lines of treatment adopted by biomedicine practitioners.[4] The Chronic phase with complications undergoes the Respiratory Distress which requires ventilation and emergency care.

As per Ayurvedic classics, this condition can be correlated with Sarvāngagatavātavyādhi (~Vāta disorder affecting all parts of the body).[5] Madhavnidan mentioned that vitiated Vata when affects all body parts, cause weakness all over the body called as Sarvangaghata.[6] The recent onset of Disease and early diagnosis paved the path for success in the treatment by arresting the progress in manifestation of the disease.

Here we present a case of AMAN variant of GBS, the patient was successfully managed with Ayurvedic management and Panchakarma therapies. Ayurvedic diagnosis for the case was considered as Sarvangavata Vyadhi (VitiatedVata affecting all body parts), on the basis of symptoms correlating with GBS.

CASE STUDY

Pradhana vedana

C/O- Loss of strength in bilateral lower and upper limb
Tenderness all over the body along with heaviness } for one month
Inability to stand / walk

Anubandhi vedana

C/O- Increased frequency of urination

Disturbed sleep due to pain

} for 1 month

Vedana vrittanta

A female patient aged 40 years, not a k/c/o DM/ hypertension was apparently healthy one month back.

Later on, she developed diarrhea lasting for 2 days without association of fever and abdominal pain and it was self-limiting. Followed by this she developed complaint of weakness initially in left lower and left upper limb and later on in right lower and right upper limb respectively resulting in difficulty in walking and painful movements of upper and lower limb along with decreased grasping power and severe tenderness and heaviness all over body.

Along with this, patient was having complaint of increased frequency of micturition and disturbed sleep. She was treated for the same in nearby hospital and found no improvement. As the patient preferred Ayurveda line of treatment, she got admitted at Govt. Hitech Panchakarma Hospital.

Poorva vyadhi vrittanta

H/O diarrhoea 2 days prior to the occurrence of other symptoms

N/K/C/O DM or HTN or Thyroid disorders

Negative history

No History of -Fever

-Trauma

Samanya pareeksha

Built- Moderate

Pallor- Present

Icterus-
Clubbing- } Absent
Cyanosis-
Edema

Lymphadenopathy- No palpable lymph-nodes

Vitals: Pulse- 80bpm

Respiratory rate- 17 cycles/minute

Blood pressure- 140/90 mmhg

Temperature- afebrile

Ashta sthana pariksha

Nadi- vata-pittaja nadi

Mala- 1-2times/day, prakruta gandha and varna

Mutra- Increased frequency 10-11 times/day, 5-6 times/night, prakruta gandha and varna

Jihwa- Alipta

Shabda- Prakruta

Sparsha- anushnasheeta

Drik- prakruta

Akriti- Madhyama

Dashavidha pariksha

Prakruti- Vata-pittaja

Vikruti- Vata-kapha pradhana tridosha

Sara- Madhyam

Samhanan- Madhyama

Satvam- Madhyama

Satmya- Madhyama rasa satmya

Ahara Shakti

1. Abhyavarana shakti - Madhyama
2. Jarana shakti - Madhyama

Vyayama shakti- Avara

Vaya- Madhyama

Pramana - madhyama

Samsthanika pareeksha

1. Higher mental functions

Conscious and Oriented to time, Place and Person.

Memory - Intact

Intelligence - Intact

No evidence of illusion, Delusion or hallucination.

2. Cranial nerves examination

Table No. Showing the Detail Cranial Nerve Examination In The Subject.		
Olfactory Nerve		Intact
Optic Nerve	Visual Acuity	Intact
	Color Vision	Intact
	Visual Field	Intact
	Light Reflex	Intact
Oculomotor		Intact
Trochlear		Intact
Abducent		Intact
Trigeminal Nerve	Sensory: Sensation Over Face	Intact
	Motor: Clenching Teeth Lateral Movement of Jaw	Normal
	Reflex Corneal Reflex	Normal
	Jaw Jerk	Normal
Facial nerve	Forehead Furrowing	Intact
	Eyebrow Raising	Intact
	Eye Closure	Intact
	Teeth Showing Intact	Intact
	Blowing The Cheek	Intact
	Nasolabial Fold	Intact
	Taste Sensation of Anterior 1/3rd of the Tongue	Intact
Vestibulocochlear nerve:	Rinne's Test	AC> BC
	Weber's Test	Normal
Glossopharyngeal nerve	Movement of Palate	Intact
Vagus nerve	Position of Uvula Intact	Intact
	Taste Sensation of Posterior 2/3rd of Tongue	Intact
Spinal accessory nerve:	Shrugging The Shoulder	Intact
	Turning The Neck	Intact
Hypoglossal nerve	Protrusion of Tongue	Absent
	Wasting and Deviation	Absent
	Dysarthria	Absent

3. Sensory system examination

Table No. Showing The Detail Sensory System Examination In The Subject.		
Superficial	Touch	Intact
	Temperature	Intact
	Pain	Intact
Deep	Vibration Sense	Intact
	Joint Sense	Intact
	Position Sense	Intact
	Pressure Sense	Intact

4. Motor system examination

1) Built- moderate
2) Nutrition - moderate
3) Muscle Tone - hypotonic
4) Power-

	Right	Left
Upper limb	2/5	2/5
Lower limb	2/5	2/5

5. Deep tendon reflexes

-Supinator
- Biceps
- Triceps
-Knee
- Ankle

} -Absent

6. Gait

Not elicited as patient was not able to walk.

7. Coordination test

Upper limb: Finger to nose test –couldn't be elicited

Finger opposition - Couldn't be elicit

Lower limb: Knee heel / Heel shine test- couldn't be elicited

Rhomberg's sign - couldn't be elicited

Per abdomen examination

▶ Inspection: Umbilicus centrally located,

No prominent veins found.

- Palpation: Soft and Non tender

No palpable organomegaly.

- Percussion: Tympanic note
- Auscultation: Normal peristaltic bowel movement

Respiratory examination

- Inspection - Shape of chest: Bilaterally symmetrical,

No scar marks found

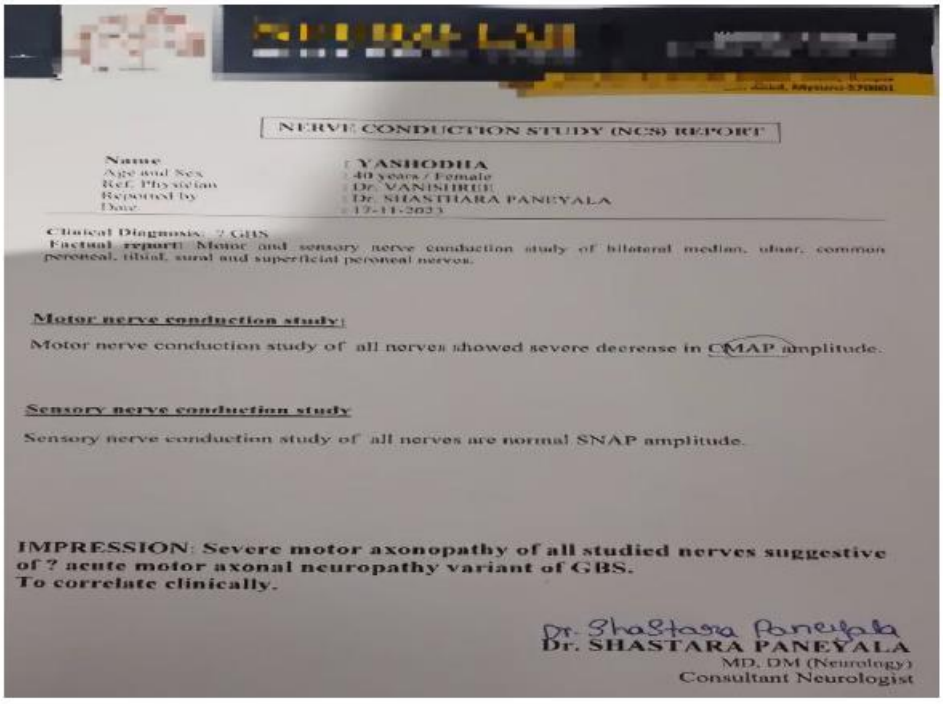
- Palpation - Trachea: Centrally placed,
- Percussion - Resonant note all over lung fields
- Auscultation - Bilateral normal vesicular breath sounds heard no added sounds.

Cvs examination

- Inspection: No visible mass, no bony abnormalities.
- Palpation: Apex beat palpable at 5th intercostal space
- Percussion: Cardiac dullness noted within normal limit.
- Auscultation: S1 and S2 heard, No Murmurs heard.

Investigations

Nerve conduction study date- 17/11/2023



NERVE CONDUCTION STUDY (NCS) REPORT

Name : YASHODHA
Age and Sex : 40 years / Female
Ref. Physician : Dr. VANISHREE
Reported by : Dr. SHASTHARA PANEYALA
Date : 17-11-2023

Clinical Diagnosis: ? GBS
Factual report: Motor and sensory nerve conduction study of bilateral median, ulnar, common peroneal, tibial, sural and superficial peroneal nerves.

Motor nerve conduction study:
Motor nerve conduction study of all nerves showed severe decrease in CMAP amplitude.

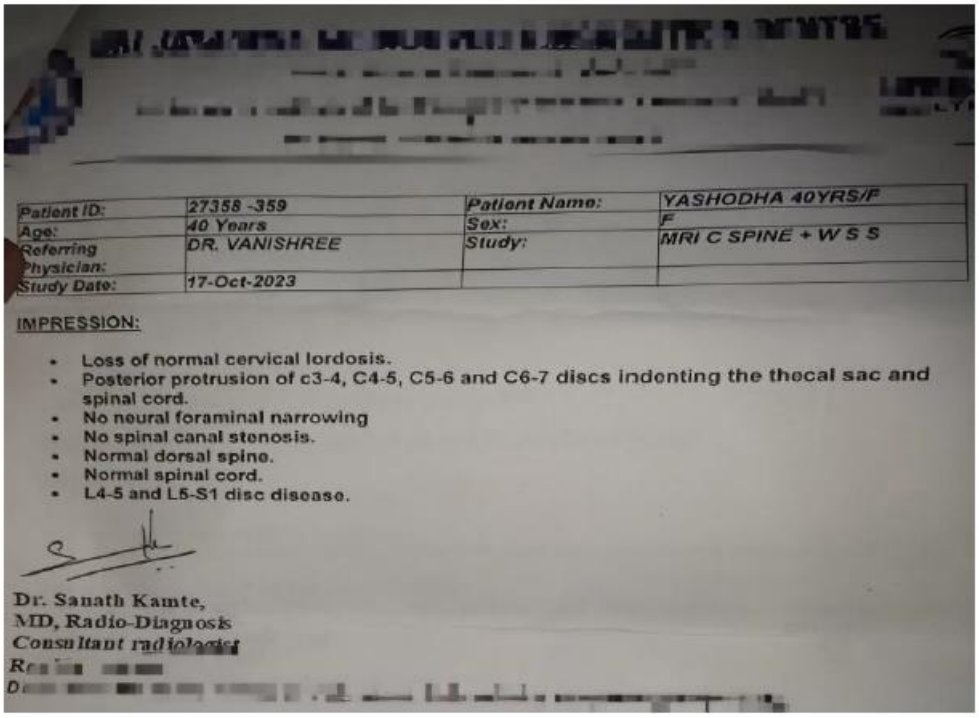
Sensory nerve conduction study
Sensory nerve conduction study of all nerves are normal SNAP amplitude.

IMPRESSION: Severe motor axonopathy of all studied nerves suggestive of ? acute motor axonal neuropathy variant of GBS.
To correlate clinically.

Dr. Shastara Paneyala
Dr. SHASTARA PANEYALA
MD, DM (Neurology)
Consultant Neurologist

Impression: Severe motor axonopathy of all studied nerves suggestive of? acute motor axonal neuropathy variant of GBS.

MRI- Date-17/10/2023



Patient ID:	27358 -359	Patient Name:	YASHODHA 40YRS/F
Age:	40 Years	Sex:	F
Referring Physician:	DR. VANISHREE	Study:	MRI C SPINE + W S S
Study Date:	17-Oct-2023		

IMPRESSION:

- Loss of normal cervical lordosis.
- Posterior protrusion of c3-4, C4-5, C5-6 and C6-7 discs indenting the thecal sac and spinal cord.
- No neural foraminal narrowing
- No spinal canal stenosis.
- Normal dorsal spine.
- Normal spinal cord.
- L4-5 and L5-S1 disc disease.

Dr. Sanath Kamte,
MD, Radio-Diagnosis
Consultant radiologist

Impression

Loss of normal cervical lordosis.

Posterior protrusion of c3-4, C4-5, C5-6 and C6-7 discs indenting the thecal sac and spinal cord.

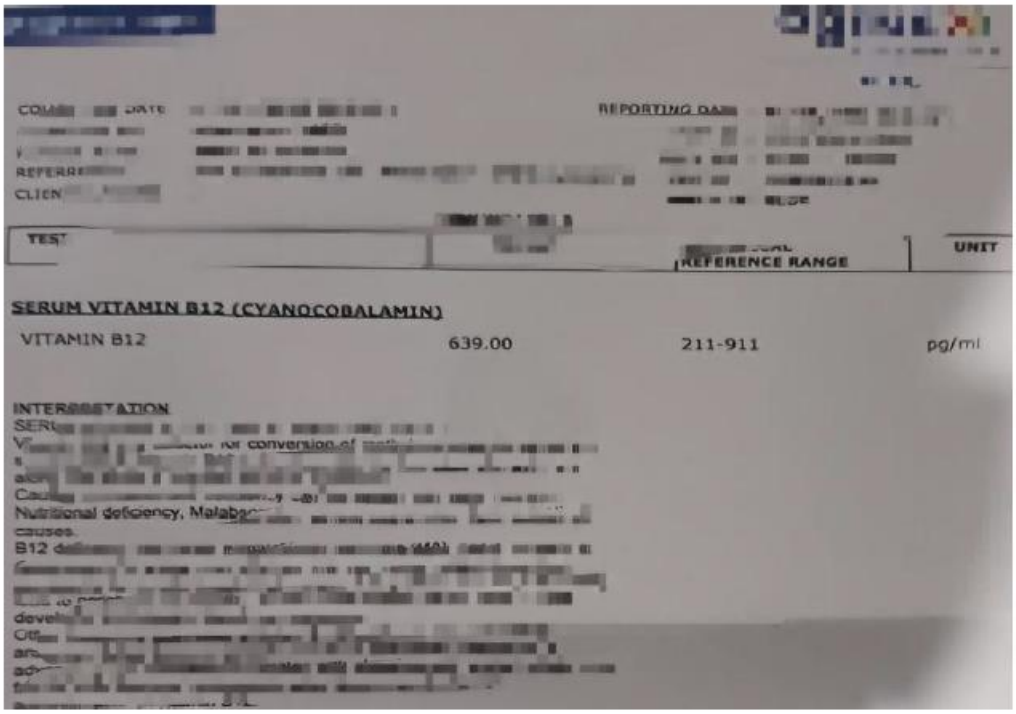
No neural foraminal narrowing

No spinal canal stenosis.

Normal dorsal spine.

L4-5 and L5-S1 disc disease.

Serum vitamin B12 (Cyanocobalamin) Date-17/11/2023



TEST		REFERENCE RANGE	UNIT
SERUM VITAMIN B12 (CYANOCOBALAMIN)			
VITAMIN B12	639.00	211-911	pg/ml

INTERPRETATION

Nutritional deficiency, Malab

causes

Lab investigations- Date – 9-10-23

Hb % - 9.8g/dL

Total count -8000 cells/cumm

Neutrophils – 72%

Lymphocytes – 23%

Eosinophils – 02%

Monocytes- 03%

Basophils – 00

ESR- 15 mm/hr

Platelet Count- 1,90,000 cell/cumm

Date-20-11-23 Phospholipid IGG Antibody -1.24U/ml – **negative**

Anti-phospholipid IGM Antibody -1.6U/ml - **negative**

Date	Treatment given
16-11-23 to 26-11-23 (10 days)	Sarvanga abhyanga with ksheerabala taila f/b shashtika shali pinda sweda
28-11-23 to 5-12-23 (8 days)	Matra basti with ksheerabala taila (25ml) +Ashwagandha ghritam (25ml)
6-12-23 to 13-12-23 (7 days)	Shirodhara with ksheerabala taila Nasya with Neurocare drops 4ml E/N

Ayurvedic intervention

Shamanoushadhis given

- Nidram capsule 0-0-1(bed time)
- Tab. Rasarajeshwari Rasa 1BD AF
- Syp. Ferberry 10ml BD AF
- Syp. Neeri 10ml BD AF
- Tab Vatantaka Gold 1BD AF

Parameters	BT	AT
1. Tenderness	Present +++	Absent
2. Heaviness	Present ++	Absent
3. Weakness in limbs	Present +++	Present+
4. Inability to Stand	Unable to stand	Able to stand with support
5. Inability to Walk	Unable to walk	Able to walk 15-20 steps with support
6. Muscle Power Upper limb- Lower limb-	RT LT 2/5 2/5 2/5 2/5	RT LT 4/5 3/5 4/5 3/5

RESULT AND OBSERVATION

Discussion

Guillian Barré syndrome is an autoimmune disease. In Guillain-Barré syndrome, the immune system starts to destroy the myelin sheath that surrounds the axons of many peripheral nerves, or even the axons themselves. This disease damages parts of nerves which causes tingling, muscle weakness, and paralysis.

Depending on the symptomatology and presentation, in Ayurveda it can be compared with *Sarvangagata Vatavyadhi*. Here the role of Vata is crucial as the entire nervous system is under the control of Vatadosha. Hence correction of Vata is very important so as to bring normalcy to the body. Basti is one of the important therapies amongst all the treatments.

In the present case, predominantly, there was involvement of vata and kapha dosha. The nerve conduction study showed Severe motor axonopathy of all studied nerves suggestive of, acute motor axonal neuropathy variant of GBS. The onset was in November month lies in Hemantha Rtu which has Vata Dosha prakopa due to variations in Sheeta and Ruksha Guna in environment leading to atirukshata in Body. The Kalaprabhava in the present case be highly significant to manifest the pathogenesis.

Considering the dosha and dhātu involvement vatahara, brumhana and rasayana line of treatment was adopted in the present case.

Ayurveda treatment showed to be effective in management of GBS
Oral medications were administered considering *kapha* and *vāta* involvement and presentation of present. Nidram capsule, Rasarajeshwar Rasa, Syp. Ferberry 10ml BD AF, Syp. Neeri, Vatantaka Gold were administered for *shul*a, *karm*a *kshaya*, *balya* and *rasāyan*a effects.

Sarvang Abhyanga Sarvanga Abhyanga was done with *ksheerabala Taila*. Pressure applied during the procedure stimulates superficial mechanoreceptors or deep-tendon receptors which reduce the hyperexcitability of neurons.[7]

Abhyanga strengthens (Puṣṭi) and lessens Vātadoṣa. Abhyanga aids in the remyelination of nerves and opens up blocked nerve conduction, which lets nerve impulses travel across the body.

Abhyanga improves the tone of muscle and compactness of body. *Abhyanga* increases peripheral circulation and vasodilation which is responsible to increase more oxygenated blood to the muscles and helps to produce energy in fatigue muscles as well as removal of waste products from the body.

Considering the vitiated *Vata Dosha* and *Dhatukshaya* (Degeneration of body tissues), *Taila with Vatahara* and *Balya properties* was selected for the *Abhyanga*.

Shastika shalli pinda sweda- *Shashtika Shali Pinda Sweda* is carried out to attain *Brumhana* action. *Shastika shalli pinda sweda* has shown improvement on motor deficits of cerebral palsy patients.[8]

Shastikashalipindasweda is composed of ingredients like milk (Kshira), Shashtikashali (A type of red rice aged for 60 days), and Balamoola. These ingredients possess Santarpana (Nourishing) qualities with Prithwi and Aap Mahabhuta (Earth and Water elements) and are indicated for Balya (Strengthening), Bruhmana (Nourishing), and strengthening Dhatus (Body tissues) with Vata pacification.

Shastikashali Pinda Sweda helped opening the nerve conduction channels and promoted remyelination and helped transmit nerve impulses.[9]

shashthikaśhāli facilitates opening up of blocks in nerve conduction and facilitates remyelination of nerves; thereby helps transmit nerve impulses with minimum amount of stimulus for muscularcontractions.

Matra Basti - Basti (~medicated enema) is an effective treatment for vāta. It also brings about anulomana of vāta. When we use this route of administration we can facilitate rapid absorption action of medicated oils and decoctions for vāta disorders.

Matra Basti was given with *ksheerabala Taila and ashwagandha ghrita* which nourishes all the *Dhatu* in the body and acts as *Balya, Brimhana, Rasayana*, and empowers the nerves.[10] *Ashwagandha* has *Rasayana* (Rejuvenate tonic), and *Balya* properties that helped strengthen and promote muscle tissue mass[11] *Aśhwagandha* has neuroprotective, neuroregenerative,[12] anti-stress, anti-oxidant, immunomodulatory, adaptogenic, and immunostimulant properties[13] Ashwagandha Ghrita is Balya, Bruhan as well as it works on Vatvyadhi,[14] helps in reducing inflammation of nerve sheath Hence helped in remyelination along with Shashtiksali Pindasweda.

Nasya - *Nasya* was done with Neurocare drops. Nasya has nourishing effect on muscles and peripheral nerves. It is effective in fasciculation, peripheral neuropathy.

Abhyaṅga, SSPS, and *Basti* have shown clinical improvement in gross and fine motor function and cognitive functions in patients of cerebral palsy[15] Ayurveda treatments of *Śhirōbasti or śhirōdhārā*, *Abhyaṅga*, and *bhāṣpa swēda* produced improvement in balance of progressive degenerative cerebellar ataxia patients.[16]

In all the above treatment modality, concentration was done to pacify *Vātadoṣa* and to provide *Balya, Brumhana And Rasāyana* effect to the patient. The patient showed gross improvement and complete recovery in motor manifestations and neurological deficit. Ayurveda line of treatment was effective in management of GBS.

CONCLUSION

GBS is a severe acute paralytic neuropathy with rapid progression usually occurring post infections which can be correlated to Vatavyadhi of Ayurveda. In the present study, the

disease entity GBS is correlated with *Sarvangagata Vatavyadhi* and the line of treatment followed was *Vata Vyadhi*. The Ayurveda intervention showed good clinical improvement along with improvement in quality of life of patient. Further studies are to be conducted on this as the present paper is a single case study. Trial in a larger sample is required to generalize the outcome.

EFERENCES

1. Nicki R. colledge, Brian R. Walker, Stauart H. Ralston Disorders of peripheral nerves in Davidson's principles and practice of Medicine, AYUSHDHARA, 2014; 1(1): 50-5454, illustrated by Robert Britton, 2010; 21: 1360-1229.
2. Nicki R. colledge, Brian R. Walker, Stauart H. Ralston -Disorders of peripheral nerves in Davidson's principles and practice of Medicine, illustrated by Robert Britton, 2010; 21: 1360–1229.
3. Akbayram S, Doğan M, Akgün C, Peker E, Sayın R, Aktar F, Bektaş MS, Caksen H. Clinical features and prognosis with Guillain-Barré syndrome. Ann Indian Acad Neurol, 2011; 14(2): 98-102.
4. Longo DL, Fauci AS, Kasper DL, Jameson JL, Hauser SL, Loscalzo J. Harrison's Principle of Internal Medicine. New York, NY: Mc Graw Hill, 2010; 2: 3473.
5. Mahadevan L, Srividya S, Jeyalakshmi B. Dr. L. Mahadevan's Guide to Ayurvedic Clinical Practise Neurology. Kanyakumari, Tamil Nadu, India: Sarada Mahadeva Iyer Ayurvedic Educational and Charitable Trust Derisanamscope, 2011; 2: 300-1.
6. Brian R. Walker, Nicki R. colledge, Stuart H. Raltson, Ian D. Penman Davidson's principle of Medicine, Churchill livingstone Elsevier ndedition,GBS, Page No, 22: 1225.
7. Devendra K, Ojha N. Ayurvedic management of spastic cerebral palsy: A case study Int J Res Ayurveda Pharm, 2018; 9: 50–2.
8. Apexa G. Vyas, Virendra Kumar Kori, S. Rajagopala, Kalpana S. Patel Etiopathological study on cerebral palsy and its management by shashtika shali pinda sweda and samvardhana ghrita Ayu, 2013; 34(1): 56-62. Crossref
9. Wajpeyi SM. Role of Ayurveda in the management of Guillain-Barré syndrome Int J Ayurvedic Med, 2019; 9: 288–92.
10. Shastri Bhishagaratna Shri Bramha Shankar Mishra Bhavaprakasha, Madhyakhanda, Vatavyadhiadhikara. Varanasi Chaukhamba Sanskrita Bhavan, 2018; 274–5: 24, 317-24.
11. Singh N, Bhalla M, de Jager P, Gilca M. An overview on Ashwagandha: A Rasayana (rejuvenator) of Ayurveda Afr J Tradit Complement Altern Med, 2011; 8: 208–13.

12. Konar A, Shah N, Singh R, Saxena N, Kaul SC, Wadhwa R, et al. Protective role of *Ashwagandha* leaf extract and its component withanone on scopolamine-induced changes in the brain and brain-derived cells. PLoS One, 2011; 6: e27265.
13. Tohda C, Joyashiki E. Sominone enhances neurite outgrowth and spatial memory mediated by the neurotrophic factor receptor, RET. Br J Pharmacol, 2009; 157: 1427–40.
14. KavirajAmbikadutta Shastri Ayurvedacharya, bhaishajyaratnavali, Chaukhambaprakashan Varanasi, Balrogchikitsaadhyaya, verse no, 132: 1084.
15. Shailaja U, Rao PN, Debnath P, Adhikari A. Exploratory study on the Ayurvedic therapeutic management of cerebral palsy in children at a tertiary care hospital of Karnataka, India. J Tradit Complement Med, 2014; 4: 49–55.
16. Sriranjini SJ, Pal PK, Devidas KV, Ganpathy S. Improvement of balance in progressive degenerative cerebellar ataxias after Ayurvedic therapy:A preliminary report. Neurol India, 2009; 57: 166–71.
17. Longo DL, Fauci AS, Kasper DL, Jameson JL, Hauser SL, Loscalzo J. Harrison's Principle of Internal Medicine New York, NY; McGraw Hill, 2010; 2: 3473.
18. Brian R. Walker, Nicki R. Colledge, Stuart H. Raltson, Ian D. Penman Davidson's Principle of Medicine, Churchill livingstone Elsevier ndedition, GBS, Page No, 22: 1225.
19. Mahadevan L, Srividya S, Jeyalakshmi B. Dr. L. Mahadevan's Guide to Ayurvedic Clinical Practice Neurology Kanyakumari, Tamilnadu, India: Sarada Mahadevalyer Ayurvedic Educational and Charitable Trust Derisanamscope, 2011; 2: 3001.
20. A clinical study on the effect of Agni Chikitsa in Pakshaghata -Dr.Patanjali, SDMCA&H, Udupi, 2006.
21. Agnivesha, Charaka, Drudabala, Chakrapanidatta. Sutra sthana, In: Acharya YT (Edi.), Charaka Samhita with Ayurveda Deepika Commentary. Reprint Edition: 2014. Varanasi: Chaukhambha Surabharathi Prakashana, 2014.
22. Acharya Vidyadhar Shukla and Prof. Ravidutta Tripathi, Charak samhita of Agnivesha part I, Chaukhamba Surbharati Prakashan, Sutrasthana, Adhyaya, 14: 26-220.
23. Ibidem. Charaka Samhita, Siddhi Sthana, Trimarmeeyam Siddhim Adhyaya, 9/7. 6: 330.
24. Acharya Vidyadhar Shukla and Prof. Ravidutta Tripathi, Charaksamhita of Agnivesha part I (Purvardha), Chaukhamba Surbharati Prakashan, Sutrasthana, Adhyaya, 05: 85-100.
25. Uebaba K, Xu FH, Tagawa M, et al. Using a healing robot for the scientific study of shirodhara. Altered states of consciousness and decreased anxiety through Indian dripping oilb treatments. IEEE Eng Med Biol Mag, 2005; 24(2): 69-78.
26. Bhaishajya Ratnavali, Vatavyadhi chikitsa, 26: 198-202.

27. Rao GP. Sahasra Yogam, chapter, verse. Varanasi: Choukhamba Sanskrit Series, 2016; 3, 192: 91.