Case Study

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RADIAL NERVE PALSY TREATED SUCCESSFULLY BY AYURVEDA: A CASE STUDY

Priyadarshini HP [1]*, Abdul Khader [2], Amritha E. Pady [3]

[1] PG Scholar, Department of Kayachikitsa, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Center, Vijayanagar Bangalore, Karnataka, India

[2] Professor, Department of Kayachikitsa, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Center, Vijayanagar Bangalore, Karnataka, India

[3] Assistant Professor, Department of Kayachikitsa, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Center, Vijayanagar Bangalore, Karnataka, India

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***Corresponding author**
E-mail: drpriyadarshinihp21@gmail.com

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ABSTRACT

Radial nerve palsy is a condition that affects the radial nerve, and injury to the radial nerve can occur at any point along its anatomical route with different aetiology. Damage to the radial nerve leads to wrist drop, weakness in finger extension, thumb abduction, and sensory loss in the dorsal web between the thumb and index finger. In Ayurveda, Facial nerve palsy can be considered Ekanga vata, one among Vataja Nanatmaja Vyadhi. The Aggravated Vata dosha affects the sira and snayu of the Bahu, which leads to cheshta nivrutti. In radial nerve palsy, there will be loss of wrist extension and sensory loss at the dorsum of the hand and forearm. By this, we can understand Ekanga vata. Here, an effort was made to treat a 50-year-old male patient diagnosed with Ekanga Vata (Vama Bahu- Hasta mula and anguli) vis-à-vis Radial nerve palsy and treated by the Ayurvedic line of management. He was treated with Abhyanga, swedana, Sadhyovirechana and Nasya along with Shamanaushadhis. The total duration of the treatment was 14 days. There were marked improvements seen after the completion of therapy and after the complete follow-up. The outcome of this case study shows that Radial nerve palsy may be successfully managed with panchakarma procedures and internal ayurvedic medicines.

Keywords: Radial nerve palsy, Ekangavata, Abhyanga, Navana Nasya Karma, Shamanaushadhi

INTRODUCTION

Radial nerve injury is the most common damage to the peripheral nervous system associated with the fracture of the shaft of the humerus[1]. Wrist drop is the most common presentation of radial nerve injury. Because the radial nerve mainly innervates the extensor muscles of the wrist and digits, and hence radial nerve function has been compromised, which may lead to the following symptoms like wrist drop, finger extension weakness, thumb abduction weakness, sensory loss in the dorsal web between the thumb and index finger. Most cases of radial neuropathy are transient compressive (neuropraxic) injuries that recover spontaneously in 6 – 8 weeks. It may take several months to recover if prolonged compression and severe axonal damage occur. Treatment consists of cock – up wrist and finger splints, avoiding further compression and physical therapy to avoid flexion contactures[2].

Wrist drop is mainly caused by a stab wound at the shoulder area just below the clavicle; it is the area where the radial nerve is the terminal branch of the posterior cord of the brachial plexus. Injury to the radial nerve can also occur at the site of the spiral groove of the humeral shaft due to fracture. Repetitive actions such as prolonged use of crutches or extensive leaning on the elbows may cause persistent injury to the radial nerve, leading to wrist drop. Other than compression, it can also involve enlargement, torsion and fascicular entwinement. Lead poisoning and thiamine deficiency (beriberi) may also result in wrist drops. Wrist drop may also indicate a more systemic neuromuscular disorder such as limb–onset amyotrophic lateral sclerosis[3].

The annual incidence rate of the posterior interosseous nerve compression is estimated to be 0.03%, while the rate for superficial radial nerve compression is 0.003%[4].

In Ayurveda, Radial nerve palsy can be considered Ekanga Vata (Vama Bahu -Hasta and agnuli), which is one among Vataja Nanatmaja Vyadhi. The Aggravated Vata dosha leads to Cheshta Haani of Hasta due to sira and snayu vishoshana at Bahu pradesha[5]. In radial nerve palsy, there will be loss of wrist extension and sensory loss at the dorsum of the hand and forearm. By this, we can understand Ekanga Vata. We discussed a case of Radial nerve palsy – Posterior interosseous nerve syndrome, effectively managed by Ayurvedic treatment modalities.

Case report

A male patient aged about 50 belongs to the middle class and worked as a graphic designer residing in Bengaluru. The patient was healthy three months back; later, in March 2021 patient developed weakness in extending the left wrist, weakness in extending the left index, middle finger and ring finger, reduced grip strength in the left hand, and difficulty in doing professional activities and daily activities of life. According to the patient's statement, before the onset of complaints, the patient had a habit of sleeping in the left lateral posture along with a head over the arm for two months continuously. Since then, he gradually noticed a loss of grip strength while doing work which he neglected. After that, he developed the symptoms mentioned above. The patient also noticed numbness in the tip of the index and middle finger in the resting position and occasional mild pain

in the left arm region. The patient also complained of intermittent pain in the occipital region when there is increased stress and disturbed sleep.

For the above-said chief complaints, the patient consulted a neurosurgeon. The doctor advised him to undergo subsequent investigations like CBC, HbA1C, Vitamin B_{12}, ANA profile, Nerve conduction study and peripheral nerve ultrasound of upper limbs. Then he was referred to Orthopaedic, where the doctor diagnosed him with Posterior interosseous nerve (PIN) syndrome and advised him to undergo nerve decompression surgery. But the patient was not willing to undergo surgery. So, he consulted another orthopaedic for a second opinion. The doctor has advised him to undergo physiotherapy for one week and prescribed oral medications tablet Defzlacort (24 mg) 1 OD for one week and a tablet which contains a combination of Methylcobalamin and Pregabalin (1500 mcg/75 mg) 1OD at night for 15 days. After 15 days, the patient was advised to take Ayurvedic medications, which contain the combination of (Mahavatavidwamsa + Sameerapannaga rasa + Ekangaveera rasa + Sootashekhara rasa) for one month. The patient did not improve his symptoms by accepting these medications and physiotherapy. Hence, he visited SKAMCH and RC, Vijayanagar Bangalore, Karnataka, for further management.

General examination

General physical examination revealed that the patient is moderately built and well nourished; pallor, icterus, clubbing, cyanosis, lymphadenopathy, and oedema are absent.
Pulse: 84 bpm (Right hand)
Respiratory rate: 18 cycles / min
Blood pressure: 130 / 80mmhg

Systemic examination
1. Central nervous system: The patient was conscious and oriented to time and place
2. Respiratory system: NAD
3. Cardiovascular system: NAD
4. Gastrointestinal tract: NAD
5. Musculoskeletal system examination**:** Gait – Normal, Arms – The hand and wrist

Table 1: Musculoskeletal system examination

Inspection	**Right**	**Left**
Discolouration	Absent	Absent
Swelling	Absent	Absent
Deformity	Absent	**Present (semi-flexed)**
Palpation		
Tenderness	Absent	Absent
Range of motion		
Flexion	Possible	**Abnormal flexed**
Extension	Possible	**Not possible**
Abduction	Possible	**Not possible**
Adduction	Possible	**Not possible**
Thumb ROM	**Right**	**Left**
Flexion	Possible	Possible
Extension	Possible	Possible
Abduction	Possible	**Not Possible**
Adduction	Possible	Possible
Opposition	Possible	**Not Possible**

Table 2: Musculoskeletal system examination Elbow Inspection

Elbow: Inspection	**Right**	**Left**
Discolouration	Absent	Absent
Swelling	Absent	Absent
Deformity	Absent	Absent
Palpation	**Right**	**Left**
Tenderness	Absent	Absent
ROM		
Flexion	Possible	Possible
Extension	Possible	Possible
Supination	Possible	**Not Possible**
Pronation	Possible	Possible

Table 3: Shoulder examination Inspection

Shoulder examination Inspection	**Right**	**Left**
Discolouration	Absent	Absent
Swelling	Absent	Absent
Deformity	Absent	Absent
Palpation		
Tenderness	Absent	Absent
ROM		
Flexion	Possible without restriction	Possible without restriction
Extension		
Abduction		
Adduction		
Internal rotation		
External rotation		

Table 4: CNS examination: Motor system examination

	Right	Left
Muscle tone	Normotonic	Normotonic
Muscle power	5/5	5/5
Muscle power at the wrist	5/5	**3/5**
Muscle bulk – Thenarchypothenar	No wasting	No wasting
Deep tendon reflexes		
Biceps	2+	**2+**
Triceps	2+	**1+**
Brachioradialis	2+	**0**

Table 5: Sensory system examination

	Right	Left
Pain	Preserved	Preserved
Touch	Preserved	**Diminished**
Temperature	Preserved	Preserved
Proprioception	Present	**Diminished**
Graphesthesia	Preserved	Preserved
Stereognosis	Preserved	Preserved
One–point discrimination	Preserved	**Diminished (dorsum of hand, thumb, index and middle finger)**
Two–point discrimination	**Preserved**	**Diminished (dorsum of hand, thumb, index and middle finger)**

Spine examination: Cervical spine
Inspection
- Curvature – normal
- Visible scar swelling discolouration – absent

Palpation
- No tenderness
- Doorbell sign – negative

Range of movements
- Flexion, extension, Right and Left lateral flexion, Right and left lateral rotation Possible without pain.

Investigations

Complete blood count was within standard limit; ANA profile was negative. Hba1C was 5.59%, Mean blood glucose level was 111 mg/dl.
- Vitamin B12 was 88 pg/dl (normal value – 187-883pg/ml)
- Peripheral nerve ultrasound of the left upper limbs showed the posterior interosseous nerve in between the two heads of the supinator muscle, and the radial nerve at the spiral groove is enlarged in the left arm.
- A nerve conduction study of the upper limb showed Motor sensory demyelinating neuropathy.

Dashavidha pariksha
Prakruti – Vata-pittaja
Vikruti
- Hetu- Ahara: Katu rasa pradhana ahara ati sevana, Virudha dhanya atisevana, excess use of Potato
  Vihara: Excess desktop work, sleeping in improper posture, Ratri jagarana
  Manasika: Excessive stress
- Dosha – Vata
- Dushya – Rakta, Mamsa, Sira, Snayu, Kandara
- Prakruti – Vata – pittaja
- Desha – Sadharana
- Kala – Adana kala, Vasanta ritu
- Bala – Madhyama

Sara – Madhayama
Samhanana – Madhayama
Pramana – Dhairgya: 170.6 cm, Bhara: 76 kg
Satmya – Vyamishra
Satva – Madhyama
Ahara shakti – Abhayavarana: Madhyama, Jarana: Madhyama
Vyayama shakti – Madhyama
Vaya – Madhayama (Parihani Avasta)
Roga Pariksha – Nidana
Aharaja: Katu rasa pradhana ahara ati sevana, excess use of sprouts, excess use of potato.
Viharaja: Excess desktop work (8 hours/day), Sleeping in improper posture, Ratri jagarana.
Manasika: Ati chinta
Others: Vitamin B_{12} deficiency
Purvarupa
Gradual loss of grip strength in the left hand
Rupa
Weakness in the extension of the left wrist joint, thumb, index and middle finger at the metacarpophalangeal joint.
Loss of grip strength in the left hand

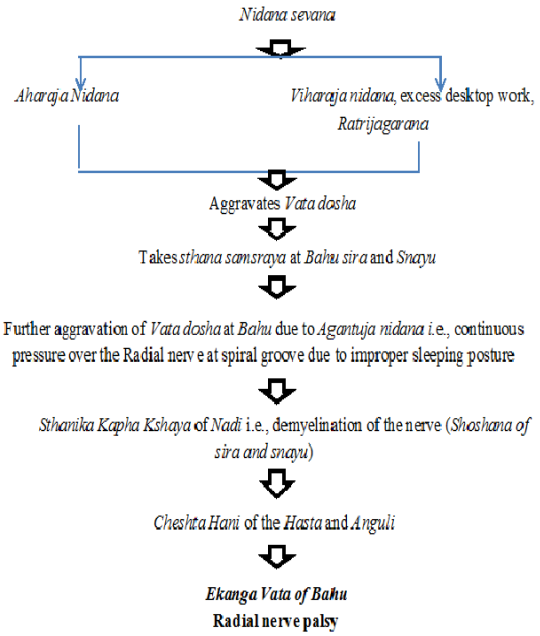

Figure 1: Samprapti

Samprapti Ghataka
Dosha: Vata pradhana
Dushya: Rakta, Mamsa, Sira, Snayu, Kandara of Bahu
Agni: Jataragni, Dhatvagni
Ama: Nirama

Srotas: Raktavaha, Mamsavaha
Srotodushti prakara: Sangha
Udbhava Sthana: Pakwashaya
Sanchara sthana: Bahu (Vama Bhaga)
Vyaktasthana: Kara mula, Anguli
Adhishtana: Bahu (Vama Bhaga)
Rogamarga: Madhyama
Sadhyasadhyata: Krichrasadhya

Vyadhi Nirnaya / Final Diagnosis
Based on History, examination and investigation, the case was diagnosed as Ekanga Vata (Vama Bahu Hasta mula and Anguli), Radial nerve palsy – Posterior interosseous nerve syndrome.

Consent: Written consent was taken from the patient before participation in the study.

Table 7: Treatment given at the time of Admission

Date	Given treatment	Observations
15-08-2021 to 21-08-2021	1. Greeva Basti with Murivenna taila + Kottamchukkadi taila followed by Jambeera pinda sweda 2. Sarvanga Abhyanga with Dhanwantaram taila followed by Bashpa sweda for seven days **Orally** 1. Tab. Panchamrita Loha guggulu 2-0-2 (after food) with warm water 2. **Cap. (Ekangaveera Rasa, Maha VatavidwamsaRasa, Vatakulantaka Rasa, Vata Gajankusha Rasa, Bala, Shilajatu)** 2-0-2 (after food) with warm water 3. Tab. Brihat Vata Chintamani Rasa 1-0-1 (after food) with warm water 4. Syp. Prasarinyadi kashaya 3 tsp BD with 6tsp of lukewarm water (before food) 5. Syp. Balarishta 3 tsp BD with 6 tsp of plain water (after food)	Before treatment Weakness in the extension of the left wrist joint left index, middle and ring finger Difficulty in doing a daily activity of living, professional activities. Numbness at the tip of the left index and middle finger Reduced grip strength in the left hand Pain in the occipital region occasionally Disturbed sleep

Table 8

Date	Treatment given	Observation
0n 7th day, i.e., 21-08-2021	After the treatment mentioned above Koshta shodhana has been adopted with Gandharva hastadi taila 45ml with one glass of warm milk on an empty stomach No of vegas: 4	The patient was able to extend his wrist up to 20 degree Numbness persists Grip strength has improved by 10%
22-08-2021 to 28-08-2021	1. Greeva Basti with murivenna + Kottamchukkadi taila followed by sthanika jambeera pinda sweda 2. Sarvanga Abhyanga with Dhanwantaram taila followed by Bashpa sweda 3. Nasya with Shudha Bala taila Six bindu pramana in each nostril (in the morning on an empty stomach) for seven days **Orally** 1. Tab. Panchamrita Loha guggulu 2-0-2 (after food) with warm water 2. **Cap. (Ekangaveera Rasa, Maha VatavidwamsaRasa, Vatakulantaka Rasa, Vata Gajankusha Rasa, Bala, Shilajatu)** 2-0-2 (after food) with warm water 3. Tab. Brihat Vata Chintamani Rasa 1-0-1 (after food) with warm water 4. Syp.Prasarinyadi kashaya 3tsp BD with 6tsp of lukewarm water (before food) 5. Syp. Balarishta 3tsp BD with 6tsp of plain water (after food)	On the 14th day of treatment The patient can extend his left wrist joint up to 50 degrees. Difficulty in extending the middle and ring fingers at metacarpal-phalangeal joints Grip strength of left hand has improved by 30% Movements like typing, angle of holding glass have improved Sleep was improved Pain in the occipital region has reduced completely.

Figure 2: Before treatment

Figure 3: After treatment

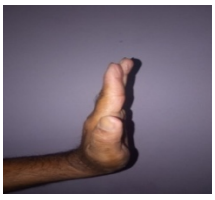

Figure 4: After completing follow up

Mode of action of treatments given

1. Greeva Basti
Grīvā Basti is a type of Snigdha sweda; it is a procedure in which both the properties of Snehana and Svedana are incorporated. It is included under Bahiḥparimārjana Chikitsā.

Skin is susceptible to oleation therapy. Vāyu, located in the skin, dominates in the Sparśendriya, i.e., tactile sensory organ. Through the skin, only Vīryas (active principles) of Abhyaṅga (oleation), Pariśeka (fomentation), Avagāha (bath), Ālepa (locally applied pastes) enter the body after undergoing paka (metabolism) with Bhrājaka Pitta in tvacha (skin)[6].

So, Murivenna taila and Kottamchukkadi taila used in Grīvā Basti reach the different dhātus if applied for sufficient time. Hence it is clear that the drug used in the Grīvā Basti gets absorbed by the skin. When the snehana drug reaches the particular dhātu it subsides or cures the disease of that specific dhatu. As the root of the radial nerve is from C5 – C6, Greeva Basti with Vata Hara Taila, i.e., with Murivenna and Kottamchukkadi Taila, helps to mitigate the Vata Dosha by virtue of its Veerya. Hence, it was beneficial.

Action of Abhyanga and Swedana.
Abhyanga helps to stimulate Brajaka pitta, which is located in Twak. The stimulated Bhrajaka pitta absorbs the veerya and snehamsha of the taila, which is used for Abhyanga. This Snehamsha of taila, along with Veerya of the dravyas, helps nourish Sira and Snayu and helps to reduce the Sira and Snayu Sankocha. Here, in this case, Dhanwantaram taila has been used for Abhyanga, which is mainly indicated in all types of Vata Vikaras[7].

In this condition, the aggravation of Vata dosha leads to Kapha kshaya, i.e., Snigdha Guna of Kapha get depleted. Due to this, there will be demyelination of the nerve takes place. This can be understood as Sira Snayu Vishoshana in the Bahu. Here, myelination is composed of lipids, which we can consider as Snigdha guna of Kapha is responsible for myelination. This demyelination will lead to loss of conduction which is responsible for sensory and motor neuropathy.

Dhanwantaram taila contains bala and ksheera as the main ingredients. Bala possesses brimhaniya, balya and vatahara properties whereas kseera possesses rasayana, brimhaniya effects. Thus, both the drugs help nourish the nerve through the action of Abhyanga. Thus, it helps to increase the strength of the muscles and improves the range of movement of the wrist joint. Other drugs like dashamoola, jeevaniya gana dravyas, yava, kola kullatha, ashwagandha, punarnava, agaru, vacha etc., does the vata hara by virtue of its ushna veerya, guru, snigdha guna. Hence, dhanwantram taila helps to pacify the vata dosha, which is involved in samprapti.

Effect of Swedana: Swedana helps to digest the Snehamsha of the Taila and increases blood circulation. After Sneha Paaka, it spreads locally and generally all over the body, which helps reduce the Sanga / Sakocha by doing proper Rakta sanchara. Swedana procedure helps with Vasodilation which reduces the stiffness. In this condition, Sthanika Jambeera pinda sweda over a left upper limb and Sarvanga Bashpa Sweda have been adopted.

Sadhyovirechana: Sadhyovirechana has been done with Gandharvahastadi taila 45 ml with one glass of warm milk on an empty stomach after abhyanga. This is done for Koshta Shodhana. Eranda Taila is specially indicated for Vata vikaras for Shodhanartha[8]. Hence, it is selected for the treatment.

Effect of Nasya karma: 'Nasa Hi Shiraso Dwaram' [9]. The nose is the gateway of the head, and the drug administrated by this route pervades the head and alleviates the disorders. The medication is administered through the nose as Nasya reaches the brain and eliminates the morbid Doshas responsible for producing the diseases[10]. Nasya is indicated in Urdwajatrugata Vikaras[11]. Diseases of the brachial plexus also come under the Urdwajatrugata Vikaras. As in this presented case, motor and sensory demyelination of the upper limb and the compression of the radial nerve leads to loss of movements of the left wrist and fingers and mild superficial sensory loss in the left dorsum of the hand. Main action of Nasya is 'Ghanonnata Prasanna Twak Skanda Greeva Asya Vakshasaha' [12]. From this, we can understand that nasya with taila, which have brimhana, and balya property, provides strength to the greeva pradesha; by this, it will give strength to the root of the nerves in cervical strength as the radial nerve origin is from the root of the C5 –C6 from a cervical vertebra. In this condition, aggravated vata does the kapha kshaya at sira (nerve), which is responsible for the demyelination of the nerve. In this condition, nasya with shudha bala taila has been selected as shudha bala taila contains bala, ksheera and tila taila, which are responsible for brimhana, balya, rasayana effect and vata hara. In this taila, ksheera is double the quantity of taila; hence, it helps to nourish the sira and snayu through nasya karma and further helps to improve the strength of the bahu. Tila taila, with its ushna veerya and sukshma guna, opens up the channels and passes through the sukshma srotas very quickly and by the potency of ksheera and bala acted on nourishing the dhatu which is involved in samprapti.

Panchamrita Loha guggulu[13] is mainly indicated in the case of Vata Vikara, Snayu Vikaras. In Ekanga Vata, mainly Sira Snayu will be affected due to Vata dosha. Hence it is beneficial in this condition.

Brihatvata chimtamani rasa[14], the main action of this formulation is rasayana and it is beneficial in vata vikaras. The ingredients of the compound formulary were indicated as stimulant, nervine and rejuvinative[15;] hence it is beneficial in neurological conditions. It helps in the recovery face of demyelination by its rasayana effect[16].

The capsule contains a combination of different formulations like Ekangaveera Rasa[17], Maha Vatavidwamsa Rasa[18], Vatakulantaka Rasa[19], and Vata Gajankusha Rasa[20]. These formulations are indicated in vata roga; bala has the property of balya, brimhana and vata hara; hence it helps to improve the hand's grip strength, and shilajatu has the property of rasayana. Hence, this helps in this condition.

Prasarinyadi Kashaya[21], this kashaya mainly indicated in apabahuka and other vatavikaras. This formulation contains prasarini, bala mula, lashuna, rasna, and nagara, which have the property of vataghna, balya, brimhana, and prasarini is a drug of choice for sira – snayu sankocha as pathology by its action of prasarana of rakta. In this condition, due to sira – snayu sankocha, there is a loss of function of the limb. Hence it is beneficial.

Bala Arishta[22] – this formulation has the action of Bala vardhana and helps to mitigate the Vata vikaras.

Dashamoola arishta[23] and **Ashwagandharishta[24]** are useful in Vata vikara and do the Bala Vardhana**.** Hence, it is beneficial in this condition.

DISCUSSION

Radial nerve palsy is a condition caused due to compression of radial nerve at axilla/arm – due to fracture of the humeral shaft at spiral groove. Injury to the radial nerve leads to wrist drop. Because of the radial nerve innervation of the extensor muscles of the wrist and digits, those whose radial nerve function has been compromised cannot actively extend them. As such, the hand hangs flaccidly in a flexion position when the patient attempts to bring the arm in a horizontal position. Causes of wrist drop or Radial nerve palsy can range from penetrative trauma to external compression (Saturday night palsy) to systemic nutritional deficiencies.

Ayurveda diagnosis of this condition can be correlated to Ekanga Vata (Vama Bahu – Hasta mula and anguli), where Cheshta nivrutti is the main clinical feature in this condition which can be understood as weakness in extending the wrist and fingers due to radial nerve compression. In this present case, the patient had weakness in extension of the left wrist and index, middle and ring finger, and loss of grip strength in the left hand. So, he consulted various doctors, who advised him to go for surgery. So, the patient consulted another orthopaedic and advised him on a conservative line of treatment along with physiotherapy. But the patient did not find any improvements. So, he consulted to OPD of the Kayachikitsa department at SKAMCH andRC Bengaluru, where

it was diagnosed as Ekanga Vata of Vama Bahu Vis-à-vis Radial nerve palsy and planned as Vataja line of treatment.

Here, treatment was planned as Greeva Basti, Sarvanga Abhyanga followed by Sthanika Jambeera pinda sweda and Sarvanga Bashpa Sweda for the first seven days, then on the 7th day after the treatment, Sadhyovirechana was planned with Gandharvahastadi taila with warm milk in empty stomach. From the 8th day, Nasya with Shudha Bala taila has been scheduled for the next seven days, along with oral medications.

During the first seven days of treatment, the patient could extend his wrist up to 30 degrees, his grip strength was improved by 10%, and numbness in the tip of the fingers persisted. After the complete duration of treatment, i.e., on the 14th day, the patient was able to extend his wrist up to 50 degrees, grip strength was improved by 30%, the movements like typing, angle of holding glass were improved, sleep was improved, occipital pain region due to stress was reduced entirely and difficulty to extend his middle and ring finger were persists. On the day of discharge, Brihatvata Chintamani rasa, Ayurvedic medications which contain the combination of (Mahavatavidwamsa + Sameerapannaga rasa + Ekangaveera rasa + Sootashekhara rasa), Balarishta, Dashamoolarishta, Ashwagandharishta and Ksheera Bala Taila (for external application) were administered. After the second follow-up, the patient could completely extend his left wrist joint and fingers at the metacarpal phalangeal joint, and his daily routine office work, like typing, was improved. And no adverse effects were found during the complete course of treatment. The patient's quality of life was enhanced, and the patient is not using wrist and finger splints.

CONCLUSION

Radial nerve palsy is a neurological condition which is caused by the injury to the radial nerve by compression or non – compression of the nerve, which presents with the signs and symptoms of loss of extension of wrist joint, index, middle and ring finger at metacarpal phalangeal joints, thumb abduction weakness and sensory loss in the dorsal web between the thumb and index finger. In this case, the radial nerve is compressed at the spiral groove and the Posterior interosseous nerve, the branch of the radial nerve. Here, the patient did not get any improvements by taking modern treatment. So, he approached our hospital for Ayurvedic medicine. We treated this case by the vatahara line of treatment, i.e., abhyanga, swedana and nasya, which mainly helps to nourish the sira and snayus, which are primarily affected in this condition. Hence, the action of the balya, brimhana, and vatahara effect helps to provide strength to the nerves and muscles which are affected in this condition and improve the quality of life of a patient. In this case study, there was no adverse effect seen during treatment. Hence, it has been proved that the Ayurvedic line of management is also effective in treating demyelinating conditions.

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