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MANAGEMENT OF DIFFUSE AXONAL INJURY W.S.R. TO CHARAKOKTA ARDITA THROUGH AYURVEDA INTERVENTIONS: A CASE REPORT

Dr. Megha M. Pujari[1*], Dr. Ananta S. Desai[2], Dr. Chethana S. S.[3]

[1]Final Year Postgraduate Scholar, Department of Kayachikitsa, GAMC Mysuru.
[2]Professor and Head Department of Kayachikitsa, GAMC Mysore.
[3]Deputy Chief Medical Officer, Government Ayurveda Medical College, Mysore, Karnataka, India.

***Corresponding Author: Dr. Megha M. Pujari**

Final Year Postgraduate Scholar, Department of Kayachikitsa, GAMC Mysuru.

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ABSTRACT

Background: Traumatic Brain Injury (TBI), especially Diffuse Axonal Injury (DAI), is a severe neurological condition resulting in long-term cognitive, motor, and behavioral impairments. In Ayurveda, such conditions can be correlated with *Abhigataja Ardita*, predominantly involving vitiation of Vata dosha due to *Shiromarmabhigata*. **Aim & Objective:** To evaluate the efficacy of Ayurveda interventions in the management of Abhigataja Charakokta Ardita (post-traumatic neurological deficit). **Materials and Methods:** A single case study of a 40-year-old male patient presenting with left-sided hemiparesis, facial deviation, speech difficulty, memory impairment, and restricted ocular movements following head injury. The treatment included Panchakarma procedures such as Sarvanga Abhyanga, Swedana, Shiropichu, and Basti along with Shamana Chikitsa. **Results:** Significant improvement was observed in motor strength (from 3/5 to 4/5), speech clarity, and gait. However, partial persistence of facial deviation, eyelid closure defect, and memory impairment was noted. **Conclusion:** Ayurveda management showed promising results in improving functional recovery in post-traumatic neurological deficits, though structural damage-related symptoms may show limited reversal.

KEYWORDS: *Abhigataja Charakokta Ardita*, Traumatic Brain Injury, Diffuse Axonal Injury, *Shiropichu, Basti Karma.*

INTRODUCTION

Traumatic brain injury (TBI) is an injury to the brain that results from an external mechanical force. TBI can generally be classified as closed or penetrating, with the latter distinguished by a violation of the skull and dura mater. Of the two types, closed head injury (CHI) is far more common. The different types of CHI can be broken down to include concussion, contusion, diffuse axonal injury, and intracranial hematoma (epidural hematoma, subdural hematoma, subarachnoid hemorrhage, and intraparenchymal hemorrhage).[1]

Diffuse axonal injury (DAI), the microscopic damage to the axons in the brain neural tracts, corpus callosum, and brainstem. The occurrence of DAI depends on the mechanism of injury; it is more common in higher energy trauma, especially traffic accidents. Diffuse axonal injury is clinically defined by coma lasting 6 h or more after traumatic brain injury (TBI) which may also often results in physical, cognitive, and behavioural impairments that can be temporary or permanent.[2]

In Ayurveda, certain vital areas of the body are regarded as Prana Sthana—the seats of life—and are known as Marma points. Injury to these points can lead to severe outcomes, ranging from functional impairment to even death. Among the three principal Trimarma (vital regions), the Shira (Head) is considered one of the most important.[3] According to Acharya Charaka, trauma to these vital Marma points can result in various disorders, one of which is Ardita.[4] The clinical features of Ardita described by Charaka closely correspond to modern descriptions of facial nerve paralysis; in some cases, it may also present along with hemiplegia (*Pakshaghata*).[5]

This patient, presenting with both facial nerve palsy and left-sided hemiparesis, is diagnosed as Charakokta Ardita according to Charaka, and is managed accordingly.

CASE REPORT

A 40-year-old male patient to with no known history of Diabetes Mellitus, Hypertension, Ischemic Heart Disease, or thyroid dysfunction was apparently normal 8 months prior to illness. On 17/07/2025, he sustained a road traffic accident (self-fall from a bike) resulting in a severe head injury, following which he became unconscious and had nasal bleeding. He received emergency care with intubation and was later admitted in a comatose state with a Glasgow Coma Scale (GCS) of E1VETM1 at a Multispecialty Hospital. CT scan revealed Diffuse Axonal Injury, multiple skull and facial fractures, left clavicle fracture, and fractures of the 2nd and 3rd ribs. He was managed conservatively, and within a day, GCS improved to E1VETM4, though motor activity was present only on the right side. During recovery, he developed incomplete closure of the left eyelid leading to Exposure Keratitis, which improved with treatment. Gradually, his GCS improved to E4VTRM6, and after two months he regained consciousness but developed left-sided weakness, deviation of the mouth to the right, difficulty in closing the left eyelid with restricted eye movements, and memory impairment. After removal of the tracheostomy tube on 12/9/2025, his GCS was E4V3M6 with irrelevant speech. Post-discharge, he experienced irritability, anger, and occasional low mood. Despite undergoing Ayurveda and other treatments, only mild improvement in motor function and speech was noted over time. Currently, he is able to walk with the support of one person, and his speech has become more meaningful, with reduced behavioural symptoms; however, facial deviation, incomplete eyelid closure, restricted ocular movements, left-sided weakness, and memory impairment persist for the past 8 months additionally patient has developed reduced sleep since 6 months . For all these complaints patient got admitted in Government Ayurveda Medical College and Hospital Mysuru for further management.

CLINICAL FINDINGS

General condition-Fair
Built-Moderate
Nourishment-Moderately Nourished
Pallor- Absent
Icterus- Absent
Clubbing-Absent
Cyanosis-Absent
Lymphadenopathy-Absent
Oedema-Absent

Central Nervous system Examination

Higher Mental Function

- Consciousness- Conscious
- Orientation-Oriented to time, place and person
- Memory- Recent and immediate- intact, Remote-Affected (Loss of memory regarding major events in past life like Marriage etc.)
- Intelligence-Intact
- Hallucination and delusion –Absent
- Speech –Dysarthria

Cranial Nerve examination was performed on all nerves enlisted only the abnormal findings below.

Table 1: Showing Oculomotor, Trochlear and Abducent nerve Examination.

	Right eye	**Left eye**
Eyelids	No ptosis, intact	Ptosis present(Moderate-3mm)
Position of eyeballs at rest	intact	Medially Deviated
Extra ocular movements:		
Saccadic	Intact	Affected
Pursuit	Intact	Affected
Pupil	Size,Shape, Light reflex(Direct and Consensual) Accomodtion reflex-Intact Bilaterally Nystagmus-Absent Bilaterally	

Table 2: Showing Trigeminal nerve Examination.

Sensory	**Touch Pain Temperature**	**Intact**
Motor	Jaw deviation	Absent
	Hallowing above Zygoma (Wasting of Temporalis Muscle)	Present (Lf side of the face)
	Hallowing below Zygoma (Wasting of Masseter Muscle)	Absent
	Open mouth against resistance	Possible with difficulty
	Clenching of teeth	Affected at Left side
	Lateral movement of jaw	Affected at Left side
Reflexes	Corneal reflex	Right eye-Normal Left eye-Not Ellicited
	Jaw jerk	Not elicited

Table 3: Showing Facial nerve Examination.

Sensory	Taste sensation of anterior 2/3rd of the tongue	Intact
Motor	Forehead furrowing	reduced in left side
	Eyebrow raising	reduced in left side
	Eye closure	Incomplete Closure of left eyelid
	Teeth showing	reduced in left side
	Blowing the cheek	reduced in left side
	Nasolabial fold	reduced in left side
Lacrimation-Normal ,Huperacusis and Bells Phenomenon-Absent		

9, 10 -Glossopharyngeal nerve, Vagus nerve

- Position of uvula-Deviated to right side
- Gag reflex-Absent

12-Hypoglossal nerve

- Protrusion of tongue- complete protrusion possible.
- Movement of tongue- Difficulty at left side.
- Wasting-Present at left half of the tongue.
- Deviation-Towards right side.

Motor system Examination-

1. Handedness-Right hand
2. Gait-Hemiplegic (Circumduction) gait
3. Muscle bulk –Muscle wasting present at forearm, thenar and hypothenar muscle of left hand.

Table 4: Showing Muscle bulk, Muscle tone, Muscle power, Reflexes and Co-ordination tests

Muscle Bulk	**Right**	**Left**
Mid Arm	28 cm	27.5 cm
Mid Forearm	27 cm	**23.5 cm**
Mid-Thigh	43 cm	43 cm
Mid-Calf	33.5 cm	34cm
Muscle tone	**Right**	**Left**
Upper limb	Normotonic	Clasp knife type of spasticity –grade 3
Lower limb	Normotonic	Clasp knife type of spasticity –Grade 2
Muscle power	**Right**	**Left**
Upper limb	5/5	2/5
Lower limb	5/5	3/5
Reflexes		
Deep tendon reflexes	**Right**	**Left**
Biceps	++	++
Triceps	++	++
Supinator	**+++**	**+++**
Knee	++	**+++**
Ankle	**+**	**+**
Clonus	Absent	Absent
Superficial reflexes	**Right**	**Left**
Plantar reflex	Not elicited, Withdrawal +	Not elicited, Withdrawal +
Corneal Reflex	Normal	Not elicited
Abdominal reflex	Normal	Normal
Co-Ordination Test	**Right**	**Left**
Finger to nose test	Overshooting+	Not elicited due to weakness
Finger to finger test	Overshooting+	
Dysdiadocokinesisa	Absent	
Heel to sheen test	Normal	Not elicited due to weakness
Romberg's test	Positive	

SENSORY SYSTEM EXAMINATION- Normal

RADIOLOGICAL FINDINGS

Table 5- showing Radiological findings.

Investigation	Impression
1. CT scan of the head and cer vical spine (plain) On 18/07/2025	**HEAD** Minimal pneumocephalus along the left temporal lobe. EDH along the left temporal convexity. Sulcal SAH along the right frontal, bilateral parietal and bilateral temporal sulcal spaces. Hemorrhagic non-haemorrhagic contusions in bilateral temporal lobes. Cisternal bleed in the left ambient cistern. Diffuse holocerebral oedema. Fractures at various bones of skull and face Noted IHF is in midline.
18/07/2025: ECHO	Normal findings with EF-63%
27/07/2025: MRI scan of the brain (plain and contrast):	F/u/c/o RTA - TBI, present scan shows, Areas of restricted diffusion in the splenium of corpus callosum, left hemi midbrain and superior cerebellar peduncle as described- likely non hemorrhagic contusions. Few foci of blooming in left temporal lobe and bilateral frontal lobes Micro bleeds. Overall these findings are of concern for diffuse axonal injury. Early sub-acute hemorrhagic contusion in the right temporal lobe. Intraventricular bleed in occipital horn of left lateral ventricle.
10/08/2025: MRI brain angiogram (contrast):	Normal MR Brain Angiogram.

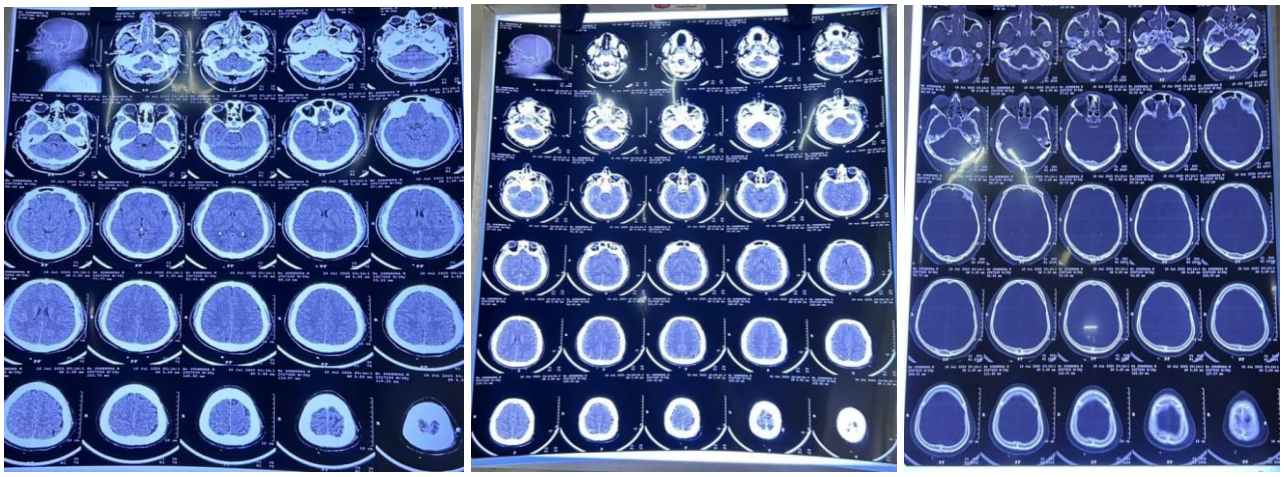

Figure - 1 Computed tomography findings of Head.

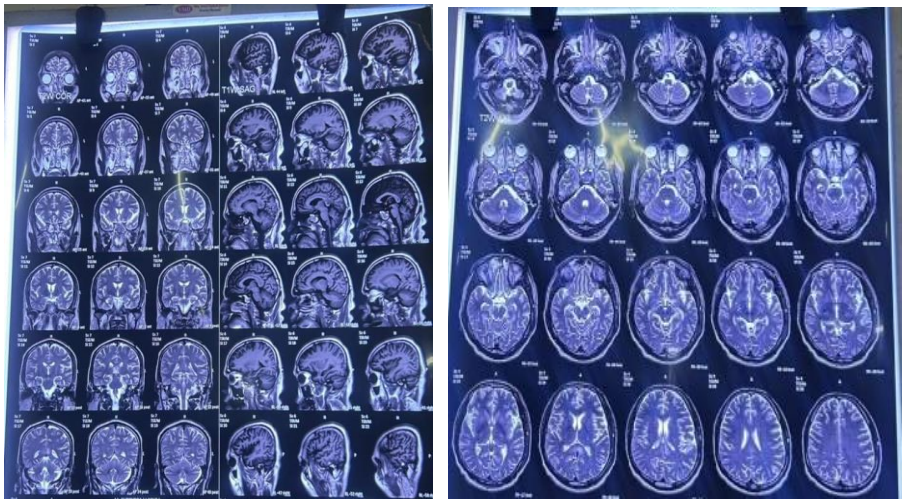

Figure – 2 Magnetic Resonance findings of Head.

MATERIALS AND METHODS

Therapeutic Interventions

1. Sarvanaga Abhyanga with Ksheerabala taila f/b Nadi Sweda x 7 days
2. Shiropichu with Karpasasthyadi taila x 7days
3. Mustadi Raja yapana basti in Yogabasti pattern

Anuvasana Basti with –Ksheerabala taila-70ml
Niruhabasti with-Mustadi Raja Yapana Kwatha+ Mamsarasa as Avapa

Shamanoushadi During Treatment.

- Ashwagandha vati 1-0-1

Advice on discharge

- Cap Dhanvantra 101 1-0-1 A/F x 15 days
- Ashwagandha vati 1-0-1 x 15 days
- Cap. Palsineuron 1-0-1 A/F x 15 days
- Physiotherapy

OBSERVATIONS AND RESULTS

ASSESSMENT OF SYMPTOMS

	Symptoms before treatment	Symptoms After treatment
1.	Weakness in left upper limb and lower limb	Has 25% Subjective improvement
2.	Walking distance without support is 2 to 3 steps	Can walk for more than 100 steps without support
3.	Deviation of angle of mouth to right side persists	No improvement noted
4.	Dysarthria	Mild improvement
5.	Incomplete closure of left eye lid	No improvement noted
6.	Restricted left eye ball movement	Mild improvement

Objective Parameters (Affected limbs)

Parameters	Before treatment		After treatment	
1. Muscle tone	**Upper limb** -Clasp knife type of spasticity –grade 3 **Lower limb**-Clasp knife type of spasticity –Grade 2		**Upper limb** -Clasp knife type of spasticity-grade 1 **Lower limb** -Clasp knife type of spasticity- grade 1	
2. Musle Bulk Mid forearm	Right-27 cm Left-23.5 cm		Right-27 cm Left-24 cm	
3. Msucle Power	Upper limb-2/5 Lower limb-3/5		Upper limb-4/5 Lower limb-+4/5	
4. Reflexes	No deviation seen before and after treatment			
5. Coordination test	**Right**	**Left**	**Right**	**Left**
Finger to nose test	Overshooting+	Not elicited due to weakness	Overshooting+	Able to perform with difficulty due to reduced strength
Finger to finger test	Overshooting+		Overshooting+	
Dysdiadochokinesia	Absent	Absent	Absent	Absent
Heel to sheen test	Normal	Normal	Normal	Normal
Romberg's test	Positive		Positive	

No differences noted in Cranial nerve Examination before and after treatment.

DISCUSSION

Discussion on Samprapti

According to Ayurveda, the present case can be understood as *Dhatukshayajanya Vata Prakopajanita Charakokta Ardita*. The *Nidana* in this case is *Shiromarmabhighata* caused by severe head trauma following a road traffic accident. The injury resulted in significant depletion of *Rakta Dhatu* along with injury to *Mastishka Majja* (Axonal injury). This state of tissue depletion (*Dhatukshaya*) led to the aggravation of *Vata Dosha*, which subsequently localized in the *Shiras* causing *Mastishka Majja Dushti*.

The aggravated *Vata* underwent *Sthanasamshraya* in the *Snayu*, *Sira*, *Kandara*, and *Mamsa* of the *Dakshina Bhaga* of *Mukha*, resulting in *Vakribhava* of the mouth, *Netra Animilana* (incomplete closure of the eyelid), restricted ocular movements, facial weakness, and impaired speech, which are the classical manifestations of *Charakokta Ardita*. Simultaneously, the aggravated *Vata*, on reaching the *Vama Bhaga* of the *Shareera*, caused *Sira* and *Snayu Shosha*, leading to persistent left-sided weakness. These features indicate chronic *Vata* predominance resulting from *Dhatukshaya*. Thus, the *Samprapti* of the present case can be explained as *Shiromarmabhighataja Dhatukshayajanya Vata Prakopa* culminating in *Charakokta Ardita.*

DISCUSSION ON INTERVENTION

***Sarvanga Abhyanga* with *Ksheerabala taila*-** Through the *Virya* of *Abhyanga*, *Abhyanga dravya* enter into the body after undergoing *Paka* by *Bhrajaka pitta* in skin

and produces desired therapeutic action.[7] By *Abhyanga* the nervous system gets stimulated. In this case, *Abhyanga* was performed using *Ksheerabala Taila*, which is renowned for its potent *Rasayana* properties. The formulation mainly comprises *Bala*, *Ksheera*, and *Tila Taila*, which possess predominant Madhura Rasa and Madhura Vipaka. Madhura Rasa helps in pacifying *Vata Dosha*. It imparts strength to the tissues (*Dhatunaam Prabalam*), nourishes the body (*Tarpayati*), promotes vitality (*Jeevayati*), and is beneficial for the sense organs while also providing mental calmness and satisfaction (*Shadindriyaprasadaka*).[8]

***Shiropichu* with *karpasathyadi Taila*-** *Shiropichu* is considered one among the *Murdhni Taila* procedures and can be adopted as a *Mastishkya* therapy. In the present case, *Majja Dhatu Kshaya* may have contributed to the manifestation of symptoms. The procedure involves placing a sterile cotton pad soaked in medicated oil over the *Brahmarandhra* (anterior fontanelle) and securing it with a bandage for a specified duration.[9] This therapy imparts Brimhana, Balya, Vata-shamana, and *Medhya* effects due to the properties of the medicated Taila used, thereby proving beneficial in such conditions.[10] *Karpasastyadi Taila*, being *Sarvaanilapaha* and specifically indicated in *Ardita*, helps in pacifying *Vata*, nourishing *Kapha*, and strengthening the facial muscles.[11]

Mustadi Rajayapana Basti- *Mustadi Rajyapana Basti* exhibits *Vata Shamaka*, *Rasayana*, and *Balya* qualities, which enhance strength.[12] Hence, *Mustadi Rajyapana Basti* is beneficial for neurological conditions and weakened muscles. This formulation also contains *Mamsarasa* as *Avapa*. According to the *Samanya–Vishesha Siddhanta*, *Mamsa* helps in nourishing the *Mamsa Dhatu* and may therefore be beneficial in conditions associated with muscle wasting. *Ksheerabala Taila* used for *Anuvasana Basti* further acts as *Balya* and *Vata-shamaka*, thereby helping in alleviating the symptoms of the patient.

Cap *Dhanvantra* 101- *Dhanwantharam* soft gel provides strength to the muscles primarily through its *Vata-shamaka* and *balya* ingredients. Bala (Sida cordifolia) helps soothe irritated nerves, reduce neurogenic pain, and strengthen neuromuscular pathways. *Ashwagandha* (Withania somnifera), rich in withanolides, promotes nerve tissue repair and enhances neuromuscular resilience. *Dashamoola* improves microcirculation, supporting nourishment to damaged nerves. Eranda-derived ricinoleic acid reduces ama-related stagnation around neural tissues, aiding better conduction, while *Sarasaparilla* supports *Dhatu* nourishment. Together, these ingredients act to calm aggravated *Vata*, improve nerve nourishment, and support functional nerve recovery.[13]

Ashwagandha Vati-*Ashwagandha* being the major ingredient balances Three *Doshas*, especially *Kapha* and *Vata*, It is *Balya*, *Vaajikari*, *Vrushya*, *Rasayani*, *Pushtiprada*, *Anila hara*, *Vranaan hara*, *Shopha hara*, *Kshata* hara.[14]

Palsinuron Capsule -Palsinuron is a remedy for neuro-muscular disorders associated with Central nervous system (CNS) & peripheral nervous system (PNS). It contains *Mahavatvidhwans Rasa*, *Sameerpannaga Rasa*, *Sootshekhara Rasa*, *Ekangveer Rasa*, *Khurasani Owa* (Hyoscyamusniger) anad *Lajari* (Mimosa pudica). *Mahavatvidhwans Rasa* is a generic preparation, which improves metabolism of CNS & PNS, co-ordinates neuro muscular activity. *Sameerpannaga rasa* Improves tissue oxidation, overcomes Anoxia, normalizes neuromuscular metabolism. *Ekangveer rasa* Promotes healing of damaged nerves & blood vessels, reanalyse blood vessels, activate sensory & motor functions. *Sootshekhara rasa* Provides nutritional support for faster healing of damaged organelles. *Lajari* regenerative effect on neuro-lesions and *Khurasani Owa* checks neuro-irritation. It is also prescribed for Hemiplegia, General Paralysis, Facial Palsy, Hand Shoulder syndrome, Convulsions, Whole Body Stiffness, Neurasthenia, Sciatica, Neuralgia, Cramps in calf, Myalgia & other Neuro-Muscular Problems.[15]

Physiotherapy-It was advised for improving the disability of the patient which inturn improves patient's quality of life, this included physiotherapy exercises like Weight bearing exercise on both hands, Sit to stand exercise, eye taping etc.

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