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AYURVEDIC INSIGHTS AND CLINICAL MANAGEMENT OF *PAKSHAGHATA* SECONDARY TO CEREBROVASCULAR ACCIDENT DUE TO ARTERIOVENOUS MALFORMATION (AVM): A CASE STUDY

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ABSTRACT

Introduction: *Pakshaghata* is one among the *vatavyadhi* caused by *prakupita vata*, where *prakruta vata* governs the nervous function and movement in the body. *Pakshaghata* clinically correlates with hemiplegia - a neurological deficit characterized by paralysis on one side of the body. This may arise due to cerebrovascular accident, which may be either due to an ischemic or haemorrhagic event. The crude prevalence of stroke in India ranges from 44.29 to 559 per 100,000 people. This case study presents a paradigm of an *Ayurvedic* management in the treatment of *Pakshaghata*. **Method:** A 30-year-old female patient presented with the chief complains of weakness, heaviness over the left half of the body, difficulty in walking and slurred speech persisting for the past 2 years. She was previously (2years ago) diagnosed with Ruptured right temporal Arteriovenous Malformation (AVM) Spetzler martin grade 1. Patient underwent right Fronto-temporo-parietal (FTP) decompressive craniectomy and evaluation of hematoma with augmentative duroplasty followed by re exploration and excision of AVM. To address her current complaints, patient was treated with *panchakarma* procedure, *shamana ousadhi* and physiotherapy. **Result:** Patient showed significant improvement in terms of motor function especially muscle strength of the body and also showed clarity in speech after the treatment. **Discussion:** In the present case, the initial phase of treatment focused on treatment of *avarana*, followed by treatment measures to address *dhatukshaya* which results in balancing *vata dosha*. Treatment was not only aimed at balancing the vitiated *vata dosha* but also to improve the overall quality of life.

KEYWORDS: *Pakshaghata*, Arteriovenous malformation (AVM), *Agni chikitsa lepa, Matra basti*.

INTRODUCTION

The term *Pakshaghata* literally refers to paralysis of one half of the body, where *paksha* denotes *Sarira ardha* – half/partial/side of the body, and *aaghata* denotes paralysis/affliction/attack. *Pakshaghata* is one among the *Vataja Nanatmaja Vyadhi*,[1] where the *prakupita vata* takes *Ashraya* in the *dhamani's.* The *vata prakopa* can occur as a result of *margavarana* or *dhatu kshaya*. This leads to *ardhakaya akarmanya* (loss of function of half side of the body), *sandhi bandha mokshana, vak sthambha* (slurred speech). According to *Acharya Sushruta*, the prognosis of *Pakshaghata* is *Sadhya* when the *vata anubandha dosha* is involved, *krchrasadhya* when the *kevala vata dosha* is involved and *varjya* when *dhatukshaya* acts as a *nidana* in causing *Pakshaghata*.[2] In present case, the pathology involved initially is *avarana*, which is followed by *dhatu kshaya*. Hence, the *chikitsa* includes *Snehana, Swedana, Mridu Samshodhana, Basti* especially *anuvasana* with *bala taila*, along with *Shirovasti* and *Abhyanga.*

Hemiplegia is the most common manifestation of the stroke. A stroke, or cerebrovascular accident, is defined as an abrupt onset of a neurologic deficit that is

attributable to a focal vascular cause.[3] Arteriovenous Malformation are congenital vascular anomalies involving abnormal shunts between the arterial and venous systems that may present with headache, seizures or intracranial hemorrhage.[4] The blood vessels interposed between arteries and veins are abnormally thin and do not have the structure of normal arteries or veins.[5] Prevalence of arteriovenous malformation (AVM) is unknown, but estimates range from 1 to 2 per 100,000 individuals.[6] AVMs occur in all parts of the cerebral hemispheres, brainstem, and spinal cord, but the largest ones are most frequently located in the posterior half of the hemispheres, commonly forming a wedge-shaped lesion extending from the cortex to the ventricle.[7] The clinical manifestations of stroke are highly variable due to the complex anatomy of the brain and its vasculature.[8] Management of symptomatic AVMs includes surgical decompression and removal of the AVM, if it is accessible.[9] This article explains the *ayurvedic* perspective of *Pakshaghata*, its modern understanding and Ayurvedic treatment approaches to provide a comprehensive overview of this debilitating condition.

CASE REPORT

The present case study deals with a 30-year-old female patient who approached *Kayachikitsa* Outpatient Department of Shri Dharmasthala Manjunatheshwara Institute of *Ayurveda* and Hospital, Bengaluru, with chief complaints of weakness and heaviness over the left half of the body associated with difficulty in walking and slurred speech for the past 2 years. Patient was conscious and well oriented at the time of admission.

HISTORY OF PRESENT ILLNESS

The 28-year-old female patient, who is not a known case of Hypertension or Diabetic mellitus, was apparently normal before 2 years. On 20/03/2022 morning, she had a sudden onset of severe headache, transient seizure with immediate loss of consciousness. She was admitted in a Multispeciality hospital for emergency management and was diagnosed with Ruptured right temporal Arteriovenous Malformation (AVM) (Spetzler Martin Grade I), for which she underwent surgery. Patient remained comatose for 2 months between the two surgical procedures, later she recovered gradually with left sided hemiplegia and difficulty in speech. She felt heaviness and weakness over the left upper limb and lower limb which, was of sudden in onset, gradually progressive and severe in nature.

MEDICAL HISTORY

1. Tab. Levipil 500mg 1-0-1 A/F

FAMILY HISTORY – Not significant

PERSONAL HISTORY

Bowel – Once a day
Bladder – 3-4 times a day
Appetite – Good
Sleep – Sound
Habit – Tea/Coffee (2 times a day)
Diet – Mixed diet.

PAST INTERVENTION AND OUTCOMES

On 20/03/2022, patient underwent right Frontotemporoparietal (FTP) decompressive craniectomy and evacuation of haematoma with augmentative duroplasty, with bone flap in abdomen. On 11/05/2022, she underwent Re exploration and excision of AVM with replacement of bone flap.

ON EXAMINATION

Physical examination: Built, nutritional status, hair, nail of the patient were normal, pallor, clubbing, cyanosis, icterus, lymphadenopathy were absent. Blood pressure was 130/80 mm/hg and pulse rate was 86 beats /minute.

Systemic examination

Respiratory system: On auscultation, normal broncho vesicular breath sounds were heard, no added sounds

Cardiovascular system: On auscultation, S_1 and S_2 was heard, no murmurs.

Per abdomen was soft, non-tender, no organomegaly detected.

Central Nervous System

I. Higher Mental Functions

- Level of conscious: Conscious to place, time and person
- Memory: Immediate, recent and remote were intact
- Hallucinations and delusions: Absent
- Attention: Attentive
- Speech: Slurred speech
- Judgement and reasoning: Normal
- Handedness - Right

II. Cranial Nerve Examination

Table 1: Cranial Nerve Examination.

CN – I Olfactory Perception of Smell	Intact – Anosmia, Parosmia are absent
CN – II Optic Visual acuity Visual field Color vision Fundus examination	Intact

CN – III, IV, VI Oculomotor, Trochlear, Abducent	
Ptosis, Nystagmus	Absent
Diplopia /squint	Absent
Position of eyeball at rest	Intact
Pupil (position, shape, size, symmetry)	Normal
Ocular movements	Possible
CN – V Trigeminal	
Sensory functions	Intact
Motor	
Jaw clenching	Mildly affected
Muscles of mastication	Normal
Open mouth against resistance	Possible
Reflexes	
Jaw jerk	Exaggerated
Corneal	Normal
CN – VII Facial	
Forehead frowning	Possible
Eyebrow raising	Possible
Eye closure	Possible
Clenching of teeth	Mildly affected
Blowing of cheeks	Air leakage in left side
Nasolabial fold	Flattened on left side
Taste perception	Intact
CN – VIII Vestibulocochlear	
Nystagmus	Absent
Rinne's test	AC > BC
Weber's test	No lateralization
CN – IX, X Glossopharyngeal, Facial	
Taste sensation of posterior 1/3rd of tongue	Intact
Gag reflex	Normal
Position of uvula	Centrally placed
Dysphagia	Absent
CN – XI Accessory	
Shrugging against resistance	Not possible in left side
Neck movement against resistance	Not possible in left side
CN – XII Hypoglossal	
Tongue	
Bulk	Normal
Tone	
Power	
Movements	
Deviations/fasciculations	Absent

III. Sensory system examination

- Proprioception: Position and vibration - Normal
- Stereognosis: Able to recognize the objects in right, not in left.
- Graphesthesia: Not able to identify in left. Normal in right
- Two-point discrimination: Not able to identify in left half of the body. Right side- normal

IV. Motor system examination

Gait: Left sided Hemiplegic gait

Table 2: Muscle Bulk Measurement.

Muscle bulk	Right	Left
Mid-arm	28 cm	26 cm
Mid-Fore arm	20 cm	19 cm
Mid-Thigh	46 cm	45 cm
Mid-Calf	35 cm	35 cm

Table 3: Muscle tone Assessment.

Muscle tone	Right	Left
Upper limb	Normal	Hypertonic (Spasticity)
Lower limb	Normal	Hypertonic (Spasticity)

Table 3: Muscle Power Grading.

Muscle power	Right	Left
Upper limb	5/5	2/5
Lower limb	5/5	1/5

Coordination test - Not able to perform
Reflexes
Superficial reflexes
Corneal reflex: Present
Abdominal reflex: Present
Plantar reflex - Right foot: Negative
Left foot: Positive

Table 4: Deep tendon reflexes.

Reflex	Right	Left
Biceps	2+	3+
Triceps	2+	3+
Supinator	2+	3+
Knee	2+	3+
Ankle	2+	3+

LABORATORY INVESTIGATION

❖ CT Brain – 30/04/2022

Right sylvian and temporal haematoma with MLS (Mid Line Shift) to left.

❖ Digital Subtraction Angiography – 30/04/2022

Right temporal arteriovenous malformation, nidus 2.6*1.7*1.5cm. Arterial feeders were inferior division and anterior temporal branches of right middle cerebral artery. Venous drainage of superficial veins into anterior third SSD and right transverse sinus. No flow related aneurysms and no dural recruitment. Spetzler martin grade 1.

DIAGNOSIS

Vama Parswa Pakshaghata in terms of CVA with left sided hemiplegia of AVM origin.

THERAPEUTIC INTERVENTION

Table 5: Therapeutic intervention Timeline.

Date	Procedure	Ousadha	Days
7/6/24 – 12/6/24	*Sarvanga agni chikitsa lepa*		6 days
7/6/24 – 12/6/24	*Sarvanga parisekha*	*Dasamoola kashaya*	
13/6/24 – 18/6/24	*Sarvanga abhyanga*	*Bala Ashwagandha Lakshadi taila*	6 days
13/6/24 – 18/6/24	*Sarvanga patra pinda sweda*	*Bala Ashwagandha Lakshadi taila*	
14/6/24 – 18/6/24	*Matra basti*	*Maha Narayana taila – 60ml*	5 days
7/6/24 – 18/6/24	Physiotherapy		12 days

Table 6: Internal medication.

Date	Medicine	Dosage
7/6/24 – 18/6/24	*Ashtavarga kashaya*	20ml TID with 20ml warm water 30minutes before food.
7/6/24 – 18/6/24	Capsule *Lashuna rasayana*	2 BD with warm water after food.
7/6/24 – 18/6/24	*Brihat Vata Chintamani Rasa*	2 TID with 1 drop honey 10 minutes before food.
15/6/24 – 18/6/24	*Rasa Rajeshwar rasa*	1 tab at early morning 6am before food.
7/6/24 – 18/6/24	*Sandhilin* liniment	For E/A 4-5 times a day.

OUTCOMES AND RESULT

The condition of the patient improved gradually throughout the course of treatment. The muscle strength and power over the both left upper limb and lower limb improved by **grade-3** after the course of treatment. Tone of the muscle was also improved. The patient could walk confidently using a cane without assistance. Along with the signs and symptoms the overall condition of the patient also improved.

DISCUSSION

Samanya chikitsa sutra of *Pakshaghata* includes *Swedana, Snehana, Mrudu Samshodhana, Basti,* especially *anuvasana* with *bala taila,* along with *Shirovasti* and *Anu Taila Abhyanga.*

In *Vatavyadhi chikitsa adhyaya, Acharya Charaka* emphasized on *Parisekha, Abhyanga* and *Basti,* followed by *pathya ahara vihara* and *Brihmana* to be beneficial in *Vataja vikara*. In the present case, *vata prakopa* occurs due to *margavarana,* and later leads to *dhatu kshaya,* due to its chronicity. The treatment modalities mainly aim towards restoring the balance of *vata dosha.* Hence the initial phase of treatment mainly focuses on *avarana* and later aims at treating the *dhatu kshaya*.

Initially *Sarvanga Dashamoola parisekha* and *agni chikitsa lepa* were administered, due to their *Vata Kapha hara* property, *Sroto avarodha hara* and *Sroto vishodana* actions, and its indication in *Vataja rogas.*

Agni chikitsa lepa[10] comprises of *lashuna, lavanga, maricha, sarshapa, haridra, ksudra agnimantha, vana Tulasi, nirgundi, papata* and *bandha*. All the fresh leaves of *Kshudra Agnimantha, Vana Tulasi, Nirgundi, Papata, Bandha* were washed and the thick mid veins present in the leaves were removed and chopped into small pieces and combined with dry drugs, and grinded into a smooth semisolid paste by adding required quantity of boiled and cooled water. Fresh paste of *Agni Chikitsa lepa* was

prepared daily just before application during the course of treatment. *Agni chikitsa lepa* having the properties of *ushna veerya* and *Gandha oushadha* are *vata hara* and *Srotoshodhaka* in nature.

Sarvanga abhyanga and *Sarvanga patra pinda sweda* with *Ashwagandha bala lakshadi taila* was adopted. *Ashwagandha bala lakshadi taila* mainly comprises of *ashwagandha, bala, laksha etc.* are having the *vatahara, Snehana, balya* and *rasayana* properties. *Swedana* helps in relieving the *sthambha, gaurava* and *sheeta.* By the administration of *Snehana* followed by *Swedana* therapy, even the dry wood becomes soft and easy to bend. Similarly, it helps in conditions such as rigidity and heaviness in the body.

Later the phase of treatment aims in treating the *dhatu kshaya. Basti* is the *ardha chikitsa* in *vata vyadhi.* Considering the *rogi bala, Matra basti* was planned with *Maha Narayana taila* 60ml. *Matra basti* acts as *bala prada, sukha prada, srustamala* and *vatanulomana. Maha Narayana taila* acts as *vatahara, balya, rasayana* and *shoola prashamana.*

Physiotherapy plays a crucial role in the management and rehabilitation of hemiplegia. The main goals of physiotherapy in this condition are to restore function, improve mobility and enhance the overall quality of life. The physiotherapy plan should be individualized based on the patient's specific needs, level of impairment and overall health condition. Repetitive practice of functional tasks with the affected arm to stimulate motor pathways and improve limb functions were suggested. Active and passive range of movement exercises were included to strengthen muscles in the arm, leg and trunk to relieve pain and stiffness.

SHAMANA AUSHADI

Ashtavarga kashaya[11] comprising of *Bala, Sahachara, Eranda, Shunti, Rasna, Devadaru, Nirgundi* and *Lasuna* are having vatahara property, helps in normalizing the vitiated vata dosha. It acts as a nervine tonic, supporting the nervous system and enhances mental clarity and cognitive function.

Lashuna Rasayana[12] having *Amla varjya pancharasa, snigdha guna, usna virya* possesses *vatahara, sarva avarana nashana* and *rasayana* property. It is mentioned as one among the *naimitika rasayana.* It is proven that *lashuna* is best neurotonic i.e. it helps in the regeneration of nerves.

Brihat Vata Chintamani Rasa[13] comprises of *Swarna Bhasma, Rajata Bhasma, Abhraka Bhasma, Lauha Bhasma, Pravala Bhasma, Mukta Bhasma* and *Rasa Sindura.* It is indicated in all types of *vata* disorders and also in *pakshaghata* due its *vatahara, balya, rasayana, kshayahara* and *Ojo vardhaka* properties. It has the neuroprotective property. The presence of anti-oxidant effect and lipid peroxidation attenuating effect may contribute to the observed neuroprotection.

Rasa Rajeshwar Rasa[14] comprising of *rasa raja rasa, rasa sindoora, ashwagandha, bala*, etc have *vatahara* property and acts as *balya* and *rasayana*.

CONCLUSION

Pakshaghata is *Vataja Nanatmaja vikara* where *vata dosha* plays a crucial role in the pathogenesis of the disease. In this case, due to chronic *vata vruddhi, dhatu kshaya* occurs. Hence, the treatment modalities were aimed at restoring the balance of *vata dosha.* The initial phase of treatment focuses on treating *avarana* through various *panchakarma* procedures such as *parisekha, agni chikitsa lepa, patra pinda sweda.* Later, the treatment was aimed at treating *dhatukshaya* by certain procedures such as *matra basti*, which acts as both *brihmana* and *vata anulomana. Shamana ousadhi* like *Rasa Rajeshwar Rasa* and *Brihat Vata Chintamani* acts as *rasayana* and *balya*.

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