

Role of Punnagadi Churnapindasweda in Motor Functions of Stroke - A Case Report

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Abstract: Stroke is the most frequent cause of permanent disability in adults worldwide. In 2015, stroke accounted for 6.3 million deaths globally. WHO defines stroke as rapidly developing clinical symptoms and/ or signs of focal (at times global) disturbance of cerebral function, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin. It is caused due to the sudden interruption of blood flow to a region of brain resulting in weakness or paralysis of one side of body associated with slurred speech, numbness, problems with vision etc., depending on the area affected. Recovery of motor function is associated with stroke severity. Pakshaghata which resembles stroke is having bad prognosis especially in chronic conditions. But Ayurveda treatments like swedana (sudation) found to be much effective in improving motor functions. Here is a case of stroke having MCA infarct of 3 years chronicity. He was treated with Snigdha Chunapindasweda using Punnagadi churnain tilataila for 7 days. Assessment was done with Motor assessment scale for stroke before and after the treatment. Hand movements and advanced hand activities are the domains which got much improvement as per the assessment.

Keywords: Stroke, Pakshaghata, Motor functions, Churnapindasweda, Punnagadichurna

1. Introduction

Stroke is the most frequent cause of permanent disability in adults worldwide¹. WHO has defined stroke as rapidly developing clinical symptoms and/ or signs of focal (at times global) disturbance of cerebral function, with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin². In 2015, stroke was the second largest cause of death (after ischaemic heart disease), and accounted for 6.3 million deaths globally³. The prevalence of stroke in India ranges from 40 to 270 per 1,00,000 population⁴. As per WHO data published in 2014, stroke mortality in India reached 9.94 % among the total deaths⁵.

In an ischemic stroke, blood supply to part of the brain is decreased, leading to dysfunction of the brain tissue in that area. Ischemic stroke begins with severe focal hypoperfusion, that leads to excitotoxicity and oxidative damage which in turn cause microvascular injury, blood-brain barrier dysfunction and initiate post-ischemic inflammation. These events all exacerbate the initial injury and can lead to permanent cerebral damage. The major signs and symptoms include weakness or paralysis of one side of body associated with slurred speech, numbness, problems with vision etc., depending on the area of the brain involved. Recovery of motor function is associated with stroke severity but not with age or sex; patients with a mild motor deficit at onset were 10 times more likely to recover their motor function than those with a severe stroke.

Treatment options for stroke in western biomedicine are limited. The only proven treatments for ischemic stroke are intravenous thrombolysis or angiointervention within a limited time window. Mirror therapy and physiotherapy are also used to improve quality of life in post stroke patients^{6,7}.

On the basis of aetiology and symptomatology Pakshaghata is similar to hemiplegia that occurs due to Stroke. The vitiated vata afflicts the dhamani (arteries) of masthishka (brain) which pass downwards or transverse, causes soshana of afflicted sira (veins), snayu (tendons) leading to impairment of functions of vata in any one side of body. The condition is associated with flaccidity of sandhi (joints) and associated structures like muscles, and soshana of sira and snayu. The motor (cheshta) and sensory (chaitanya) functions are lost according to the impaired region. Pakshaghata is a disease having bad prognosis. The result of treatment depends on the severity and chronicity of the disease. Generally, chronicity hampers the improvement. But in this case, even though the disease is 3 years chronic, patient got result.

Punnagadichurna is a formulation exclusively indicated for vatavyadhi in Cikitsamanjari, for doing potalisweda⁸. Even though there is no specific indication for it, Punnagadichurna is most commonly used in stroke and neurodegenerative conditions.

Presenting complaints with history

A 55 year old male patient was admitted in the hospital, complaining of weakness of left side of the body since 3 years. The onset was acute as he developed sudden weakness of left upper and lower limbs during his work. He was conscious at that time. His face was deviated to one side and his speech became slurred. His left side of the body got completely paralysed so that he couldn't even move his limbs. He was admitted in an allopathic hospital and diagnosed as stroke. After medication physiotherapy was advised. On discharge after 14 days, his speech difficulty and facial deviation were reduced to some extent. After 6 months of physiotherapy, he became able to walk without support and face became normal. His speech was improved and became clear gradually. But motor weakness of left

upper limb persisted as impaired. Even after continuing physiotherapy for many more months, it remained the same.

Patient was an ex-smoker (5years) and non-alcoholic. He has been on medication for hypertension and dyslipidemia since 3 years, after the event of stroke. He was a non-vegetarian with good appetite, irregular bowel habit and disturbed sleep.

Clinical examination

On general physical examination, he was moderately nourished person with average built, 170cm height and 66 Kg weight. Pulse rate was 72/minute with regular rhythm and BP was 120/80 mm of Hg. Respiratory rate was 14/minute. No clubbing or cyanosis present.

On neurological examination, he was conscious and oriented. All higher mental functions were intact. While examining the cranial nerves, olfactory, optic, oculomotor and abducens were found to be normal, with proper sense of smell, normal visual acuity and intact movements of eye. Sensation over face, facial expressions, and the activities like whistling showed that both trigeminal and vagus were intact. His auditory nerve was normal with normal hearing. The movements of soft palate, tongue, shoulder were indicative of intact viii to xii cranial nerves.

In motor system examination, bulk was found to be normal with no wasting or hypertrophy. But the tone was hypertonic especially on extensors of left upper limb. Power of all group of muscles of right upper and lower limbs was normal (grade 5) Power on the left side is given in table.

Table 1: Power of group of muscles on left upper and lower limb

Group of Muscles	Power (grade 0-5)
Abductors, adductors, extensors and flexors of left shoulder	4
Extensors and flexors of left elbow	2
Abductors, adductors, extensors and flexors of left wrist	1
Abductors and adductors of phalanges of left hand	1
Abductors, adductors, extensors and flexors of left hip	4
Extensors and flexors of left knee	4
Abductors, adductors, extensors and flexors of left ankle	3

Deep tendon reflexes of right side and jaw showed normal. But biceps, triceps, supinator reflexes of left side was brisk and that of left ankle was normal. Knee reflex on left side was exaggerated. Co-ordination tests like finger nose test, heel shin test, rapid alternative movements were normal. There was no association of involuntary movements. Sensory examination were carried out where all sensations like touch, temperature, pain, position, vibration and tactile

localisation were found to be intact. All the other systemic examination was found to be normal.

Diagnosis and assessment

MRI revealed acute infarct in right Middle Cerebral Artery. Assessment was done using Motor Assessment scale for Stroke.

Table 2: Assessment of motor functions using Motor Assessment scale for Stroke

Motor functions	BT	AT
Supine to side lying onto intact side	6	6
Supine to sitting over side of bed	6	6
Balanced sitting	6	6
Sitting to standing	6	6
Walking	6	6
Upper arm function	4	4
Hand movements	1	5
Advanced hand activities	4	6
Tone	0	0
Total score	39	45

Therapeutic intervention and outcome

Punnāgādicūrṇa is a combination of 20 drugs, the ingredients of which are given in table 3. *Churnapindasweda* was done using this formulation for 7 days, between 8am-12pm for 35 minutes per day, in *tilataila* as per the Standard Operative Procedure developed by the department of Panchakarma. He was allowed to continue his allopathic medications and was given *Gandharvahastadikashaya* 75ml bd during the course of this procedure.

Table 3: Ingredients of *Punnagadichurna*

Drug	Botanical name	Family
<i>Punnaga</i>	<i>Calophylluminophyllum</i>	Guttiferae
<i>Eranda</i>	<i>Ricinuscommunis</i>	Euphorbiaceae
<i>Bakula</i>	<i>Mimusopselenji</i>	Sapotaceae
<i>Dhanadadruk</i>	<i>Caesalpiniaobonduc/ C. crista</i>	Fabaceae
<i>Nalikera</i>	<i>Cocosnucifera</i>	Arecaceae
<i>Kulattha</i>	<i>Dolichosbifloruslinn.</i>	Leguminaceae
<i>Karpasa</i>	<i>Gossypiumherbaceum</i>	Malvaceae
<i>Sigru</i>	<i>Moringaoleifera</i>	Moringaceae
<i>Dolaphala</i>	<i>Sesbaniagrandidiflora</i>	Fabaceae
<i>Munishanaka</i>	<i>Indigoferatinctoria</i>	Fabaceae
<i>Sarshapa</i>	<i>Brassica juncea</i>	Cruciferae
<i>Ankola</i>	<i>Alangiumsalvifolium</i>	Alangiaceae
<i>Rasna</i>	<i>Pluchelanceolata</i>	Compositae
<i>Kusta</i>	<i>Sausserialappa</i>	Compositae
<i>Karanja</i>	<i>Pongamiapinnata</i>	fabaceae
<i>Thila</i>	<i>Sesamumindicumlinn.</i>	Pedaliaceae
<i>Lasuna</i>	<i>Allium sativum</i>	Liliaceae
<i>Vaca</i>	<i>Acoruscalamuslinn.</i>	Araceae
<i>Hingu</i>	<i>Ferula assafoetida</i>	Umbelliferae
<i>Saindhava</i>	Rock salt	

Table 4: Properties of ingredients of *Punnagadichurna*

Drug	Rasa	Guna	Veerya	Vipaka	Doshakarma	Other functions
<i>Punnaga</i>	<i>Madhurakashaya</i>	<i>Laghurooksha</i>	<i>Seetha</i>	<i>Madhura</i>	<i>Kaphapithasamana, vathasamana, rakthapithasamana</i>	<i>Rakthasthambhana, snehana, lekshana, vedanasthapana</i>
<i>Eranda</i>	<i>Madhurakatukashaya</i>	<i>Guru, snigdha, theekshna, sookshma</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Kaphavathasamana, pithavardhana (oil-pithasamana)</i>	<i>Vedanasthapanaamgamardaprasama, soolahara, medhya, deepana, bhedana</i>

<i>Bakula</i>	<i>Katukashaya</i>	<i>Guru</i>	<i>Anushna</i>	<i>Katu</i>	<i>Kaphapithasamana</i>	<i>Danthadardhyakara, grahi, krumighna</i>
<i>Dhanadadruk</i>	<i>Katuthikta</i>	<i>Laghu, ruksha, theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana</i>	<i>Sodhaghna, jwarahara, rakthasthambhaka, vedanasthapana, amavathahara</i>
<i>Nalikera</i>	<i>Madhra</i>	<i>Guru snigdha</i>	<i>Seetha</i>	<i>Madhura</i>	<i>Vathapithasamana</i>	<i>Rakthapithaprasadana, bhedana, brumhana (fresh fruit), karsana (oil)</i>
<i>Kulattha</i>	<i>Kashayamadhura</i>	<i>Laghutheekshnaushna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vathakaphasamana</i>	<i>Mutrala, chakshushya, soolaprasamana, medohara, sara, anulomana, bhedana, samgrahi, vranaropana, swedapanayana</i>
<i>Karpasa</i>	<i>Madhura (seeds), katukashaya (moolatwak)</i>	<i>Laghutheekshnasnigdha</i>	<i>Anushna</i>	<i>Katu</i>	<i>Vathapithasamana (seeds), vathapithasamana (moolatwak)</i>	<i>Vedanasthapana, arthavajanana, vranaropana, nadipoushtika-balya (seeds), sthanyajanana, vishamajwaraghna</i>
<i>Sigru</i>	<i>Madhura</i>	<i>Guru rukshatheekshna</i>	<i>Seetha</i>	<i>Madhura</i>	<i>Vathapithasamana</i>	<i>Medohara, brumhana, sirovirechana, chakshushya</i>
<i>Dolaphala</i>	<i>Thiktha</i>	<i>Ruksha</i>	<i>Ushna</i>		<i>Kaphapithasamana, vathaprakopa</i>	<i>Kanduhara, rathapithajith, vishaghna</i>
<i>Munishanaka</i>	<i>Thiktha</i>	<i>Laghuruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana</i>	<i>Vatharakthahara, amavathahara, kesya</i>
<i>Sarshapa</i>	<i>Katuthiktha</i>	<i>Theekshnaruksha (vegetable), snigdha (seed)</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana, pithavardhana</i>	<i>Leghana, varnya, kushtaghna, vedanasthapana, snehana, vranaropana</i>
<i>Ankola</i>	<i>Thikthakatukashaya</i>	<i>Laghusnigdhatheekshnasara</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana, kaphapithasamana (fruit)</i>	<i>Pithasamsodhana</i>
<i>Rasna</i>	<i>Thiktha</i>	<i>Guru</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana</i>	<i>Vedanasthapana, sodhahara, vedanasamaka, rakthasodhana</i>
<i>Kusta</i>	<i>Thikthakatumadhura</i>	<i>Laghurukshatheekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana</i>	<i>Arthavajanana, sthanyajanana, vedanasthapana, rakthasodhaka</i>
<i>Karanja</i>	<i>Thikthakashaya</i>	<i>Theekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>kaphavathasamana</i>	<i>Sodhahara, kushtaghna, medohara, vranaropana</i>
<i>Thila</i>	<i>Madhurathikthakashayakatu</i>	<i>Guru, snigdha, sukshmayavayi</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Vathasamana, pithavardhana, kaphavardhaka</i>	<i>Medhavardhaka, agnivaradhaka, bhagnaprasadhaka</i>
<i>Lasuna</i>	<i>Pancharasaamlarahlitha / katu, seeds-madhura</i>	<i>Snigdha, theekshna, pichila, guru, sara</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vathaghna</i>	<i>Asthisandhaakara (susu 46) vrushyam, avruthavathahara,</i>
<i>Vaca</i>	<i>Katuthiktha</i>	<i>Laghutheekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vathasamana, kaphasamana</i>	<i>Medhya, vamaka, krumihara, deepana</i>
<i>Hingu</i>	<i>Katu</i>	<i>Laghu, snigdha, theekshna, sara</i>	<i>Ushna</i>	<i>Katu</i>	<i>Kaphavathasamana, pithavardhana</i>	<i>Samjnasthapana, vedanasthapana, akshepahara, arthavajanana, chakshushya, chedana (Kapha)</i>
<i>Saindhava</i>	<i>Lavanam, samadhuram</i>	<i>Aruksha, sookshma, laghu</i>	<i>Seetha</i>	<i>Madhura</i>	<i>Tridoshasamana</i>	<i>Rochanadeepana, vrushyam, chakshushya</i>

Each day assessment was taken for *samyakswinnalakshana*. He developed all *samyakswinnalakshana* during the course of treatment and no complications of *swedana* was noticed. After treatment, on 8th day the motor functions were assessed and the score was found to be increased. Movements of his left upper limb were improved.

2. Discussion

Signs and symptoms of stroke can be compared with that of *pakshagahata*. In *pakshagahata*, *swedana* and *virechana* (purgation therapy) are the main treatment principles⁹. It signifies the importance of *swedana*. The signs and symptoms shows vitiation of both *vata* and *kapha*. So a treatment which reduces both *vata* and *kaphadosha* is suitable. *Swedana* has such a property. When there is association of any *Dosha* to *Vata*, the initial treatment should be planned to remove the association. Here for association of *Kapha*, *rukshasweda* is needed, but it should

not provoke *vata*. So *pindasweda* with *churna* was selected but it was applied as *snigdha* considering *vatadosha*.

The effect of *Pindasweda* depends on action of heat, action of procedure and action of drug used for the procedure. *Swedana* acts by its qualities like *ushna*, *theekshna* etc. *Ushnaguna*/ heat dilates the superficial capillaries (vasodilation), thereby increases circulation and elimination of waste products. Hyperthermia relaxes local musculature. *Swedana* relieves *sthambha* and *gourava* and imparts *seetagnata* and *swedana* to the body¹⁰.

Besides fomentation *snigdha churnapindasweda* accomplishes massaging also. It moves over the body swiftly, softly and sweats relatively deeply. Massage influences the equilibrium in the nervous system¹¹. Vigorous massage has been shown to increase local blood flow and cardiac stroke volume, as well as improve lymph drainage; massage also appears to have an anticoagulant effect.

Drug absorption via the transdermal route primarily occurs by passive diffusion through the stratum corneum. Studies have revealed the fact that lipoidal barrier is very much suitable for penetration of drug molecule through stratum corneum^{12, 13, 14}. On this basis we can assume that in the procedure, *Taila* may serve lipoidal barrier for the penetration of drug molecules of *churna* and exerts immediate effect. The salient property of sesame oil, possessing unctuousness, without provoking kapha makes it an ideal medium (kaphavatasamana). Moreover heat applied during *Swedana* increases the rate of drug absorption. But the intention of the medium or drug is not only to produce absorption in external therapy, but also to reflect their selected properties on the tactile organ.

In *Punnagadichurna* most of the ingredients are oil seeds. The anti-inflammatory, analgesic, antispasmodic, antioxidant etc. properties of the ingredients of *Punnagadichurna* are proven. Phytochemical analyses of leaf extract of *punnaga* shows different bioactive compounds which can be used medicinally. The methanol extracts of *Calophyllum inophyllum* (*Punnaga*) shows significant inhibitory effects against acetylcholinesterase (AChE) which is responsible for inhibiting the neurotransmission by breaking down acetyl choline in stroke¹⁵. Primary phyto chemical analysis of *Ricinus communis* suggests that the plant possess polyphenols, flavonoids etc which are responsible for antimicrobial, immunomodulatory, antidiabetic, central nervous system stimulant, focal pain relieving etc. actions¹⁶. Methanolic extract of *Ricinus communis* possess significant anti-inflammatory and free radical scavenging activity in acute and chronic inflammatory models in rats¹⁷. Similarly other ingredients also shows anti-inflammatory, analgesic, neurostimulant etc. properties. So *Punnagadichurna* can be considered as one of the best formulations used for *swedana* in *vatavyadhi* especially in neurological disorders.

3. Conclusion

Stroke is disease which can cause permanent disability. 60% of stroke survivors have disabilities in upper limb and / or lower limb. Stroke can be correlated to *Pakshaghata* of which the prognosis becomes worse after 1 year. This is a case report demonstrating significant improvement in motor functions of a stroke patient having MCA infarct, even after 3 years. The positive response obtained by the use of *Punnagadi churnapindasweda* is promising and worth detailing. Due to the unique properties of this *churna*, it will be more beneficial in stroke, neurodegenerative conditions etc. This formulation should be brought into common clinical practice and more researches should be carried out.

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