

## A CONCEPTUAL STUDY-UNDERSTANDING SHADKRIYAKALA IN PAKSHAGHATA (CEREBROVASCULAR ACCIDENT DUE TO INFARCT)

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### ABSTRACT

Pakshaghata is one of the Vata-nanatmaja vyadhi<sup>[1]</sup> and Asthamahagada. In modern parlance, Pakshaghata is cerebrovascular accident (CVA), which is a rapid onset of focal neurological deficit. CVA is the leading causes of disability and death resulting in social and economic burden. Shadkriyakala is a unique concept to understand the disease pathogenesis in six stages. For the present study, materials were collected from Ayurvedic Samhitas, text books and data available on internet. There has been an effort to pursue the stagewise pathogenesis of Pakshaghata (CVA) in the light of shadkriyakala. In sanchayavasta, doshas accumulate, initiating plaque buildup in vessels of brain. In Prakopavasta, aggravated dosha causes plaque buildup. In Prasaravasta, the plaques dislodge (vimarga-gamana of dosha). In Stanasamshrayavastha, prodromal clinical features manifests in the

form of transient ischemic attacks. In Vyaktavasta clinical features of Pakshaghata are seen. In Bhedavastha, complication of Pakshaghata manifests and disease become chronic. Further it lead to permanent disability.<sup>[14]</sup> The stagewise pathogenesis is leading pathway to understand diagnosis, prognosis and management.<sup>[2]</sup> The earliest intervention can arrest process and progression. Understanding Shadkriyakala in Pakshaghata is crucial for a successful physician to fetch improved outcomes.

**KEYWORDS:** *Shadkriyakala, Pakshaghata, Pathogenesis, Cerebrovascular accident, Infarct, Stroke, Ayurveda.*

## INTRODUCTION

Pakshaghata is one of the Vata-nanatmaja vyadhi<sup>[1]</sup> included in asthamahagada, manifest either due to dhatukshaya or marga-avarana caused due to factors like Aaharaj (dietary regimen), Viharaj (Lifestyle regimen), Manobhava (mental factors) etc. Here impairment of Karmendriyas, Gnanendriyas and Manas are perceived. In modern parlance it is called Hemiplegia, a sequel of cerebrovascular accidents or stroke. Stroke is a rapid onset of focal neurological deficit resulting due to unhealthy dietary habits, lack of physical activity, stress, tobacco use, high blood pressure, atrial fibrillation, diabetes mellitus, advanced age.<sup>[16,17]</sup> It can be caused by Ischemic stroke (interruption of blood supply to the brain tissue) or Hemorrhagic Stroke (Rupture of blood vessels).<sup>[14]</sup> Stroke is one of the leading causes of disability and death worldwide. According to the World Health Organization, 15 million people suffer stroke worldwide each year, of these, 5 million die and another 5 million are permanently disabled. The prevalence of stroke in India is approximately 200 per 100000 people resulting in huge social and economic consequences.

Shadkriyakala is a unique pathological concept in Ayurveda developed with aim of treating the diseases at various stages of pathogenesis. There are six stages of pathogenesis namely

- 1) Sanchaya-Accumulation
- 2) Prakopa-Aggravation
- 3) Prasara-Overflow
- 4) Sthanasamsraya-Localisation
- 5) Vyakta-Manifestation
- 6) Bheda-Differentiation<sup>[14]</sup>

If disease is treated in early stages, it does not lead to further stages. Hence, it is essential to apply Shadkriyakala in Pakshaghata to understand the complex mechanism of pathogenesis and intervene right mode of treatment modalities at earlier stages itself.

## Objectives

This conceptual study will be helpful in understanding pathogenesis of Pakshaghata in consecutive stages and aids in forecasting appropriate management.

## MATERIALS AND METHODS

Materials were collected from Ayurvedic Samhitas, Various journals, text books, research papers, and data available on internet. All the literary materials were analyzed and reorganized as per present study.

### Conceptual study

Kriyakala defined as “*Chikitsa avasara*” (right time for treatment) explained by Acharya Sushrutha in detail under the context of Vrana, which can be employed in understanding each and every disease.<sup>[9]</sup>

### Six stages of kriyakala explained are

**Table 01: Six stages of Kriyakala and Their management.**<sup>[10]</sup>

Sanchaya There will be Swasthana Vruddi (increase of doshas in its own place) of Doshas takes place	<ol style="list-style-type: none"> <li>1) Vata- Stabdhapooranakosthata (Flatulence, Fullness of the abdomen)</li> <li>2) 2)Pitta-Pitavabhasata (Paleness of the body) Mandoshmata (Lowered temperature)</li> <li>3) 3)Kapha-Angagaurav (Heaviness in different parts of the body), Aalasya (Lassitude), Vidveshashcheti lingani (Repulsion from the causative factors)<sup>[3]</sup></li> </ol>	<ul style="list-style-type: none"> <li>● Nidanaparivarjana</li> <li>● Suitable Shodhana and/or Shamana</li> </ul>
Prakopa Doshas are excited and ready to move from their place	<ol style="list-style-type: none"> <li>1) Vata-Kasthatodasancharana (pins and needles like sensation in the abdomen), sancharna (sound of flatulence in the abdomen)</li> <li>2) Pitta- Amlika (sour eructation), Pipasa (thirst), Paridaha (burning sensation).</li> <li>3) Kapha- Annadwesha (anorexia), hridayotklea (nausea)<sup>[4,10]</sup></li> </ol>	<ol style="list-style-type: none"> <li>1) Vata- Vatanulomana</li> <li>2) Pitta- Pitta samana /Sukhvirechan</li> <li>3) Kapha- Agnideepan, Pachana, Kaphahara</li> <li>4) Suitable Shodhana and/or Shamana</li> </ol>
Prasara Doshas spread all over the body	<ol style="list-style-type: none"> <li>1) Vata-Vayorvimargamana (vata moves to different places other than its own place. i.e. called anti peristalsis.) Atopa (dissention with barborygmi that is called flatulence and gargling)</li> <li>2) Pitta-Osha (generalized burning sensation) Chosha (sucking pain) Paridaha (burning sensation) Dhoomayanani (feeling of hot fumes coming out from stomach)</li> <li>3) Kapha-Arochaka (anorexia) Avipaka</li> </ol>	<ul style="list-style-type: none"> <li>● Shodana employed in this stage after bringing the Prasara Doshas back to Koshta</li> <li>1) Vata- Basti</li> <li>2) Pitta-virechana.</li> <li>3) Kapha-vamana</li> </ul>

	(indigestion) Angasada (Lassitude) Chardi (Vomiting) <sup>[5]</sup>	
Sthana-samshraya– Vikruta Doshas gets lodged at weak spot in Srotas{ Khavaigunya}, leading to Dosha-Dushya sammurchana. This stage is considered as Purvaroopavasta of a Vyadhi	1) Udara (abdomen) Swellings, abscesses, abdominal enlargements, loss of appetite, constipation, gastroenteritis, diarrhoea etc. 2) Bastigata (urinary bladder) Urinary disorders, urolithiasis, retention of urine and other urinary disturbances etc. 3) Medhragata (penis) Phimosis, ulcers on penis, venereal diseases, etc. 4) Gudogata (rectum) Fistula-in-ano, piles etc.(bhagandara, arsha). 5) Vrishanagata (testes) Scrotal swelling (vridhiroga). 6) Twaka, mansasonitgata (skin, muscles and blood) Kshudraroga and various skin disorders (including leprosy). 7) Medogata (adipose tissue) Adenitis, lymphadenitis, tumours, goiter, allergy etc. 8) Asthigata (bone) Abscess (asthividhradhi). 9) Padagata (lower extremities) Elephantiasis, gout, sprain of the ankle joint etc. 10) Sarvangagata (Spread all over the body) Fever (Jwara) <sup>[6]</sup>	<ul style="list-style-type: none"> <li>● Dosha-Dushya Pratyaneeka Chikitsa</li> <li>● Poorva roopa chikitsa</li> </ul>
Vyakta – Disease signs and symptoms are manifested completely.	Shopha (Inflammation), granthi (Tumour), vidradhi (Abscess), visarpa (Cellulitis) <sup>7</sup>	<ul style="list-style-type: none"> <li>● Vyadhi pratyantik chikitsa will be adopted.</li> </ul>
Bheda- This is chronic stage of disease, Upadravas are also noted in this stage	Jwara, atisara and other systemic disorders become chronic <sup>[8]</sup>	<ul style="list-style-type: none"> <li>● Doshpratyantik and vyadhipratyantik chikitsa.</li> <li>● If Upadrava is Prabala in this Avasta, then Upadravas are treated prior, followed by treatment of the disease.</li> </ul>

## DISCUSSION

### Kriyakala vivechana in pakshaghata

The adhithana of pakshaghata occurs in indriyasthana (masthiska). What influences its occurrence can be understood by knowing the six stages.

### Sanchaya

In the initial stage due to Nidana sevana, the doshas begin to accumulate in their own sites. In initial pathogenesis, there may be an initiation of plaque build up in blood vessels of the brain. In this stage, if we can prevent the causative factors, by adopting corrective measures, it will help in arresting plaques progression.<sup>[9,11]</sup>

### Prakopa

The plaque built up at various places causing narrowing and blockage of carotid and cerebral vessels. In this stage, aggravating factors of doshas can be prevented by dosha pratyanka Chikitsa.<sup>[12,13]</sup>

### Prasara

In this stage, the aggravated doshas will traverses through the Urdhvaga, Adhoga and Tiryaka Dhamanis and starts to dry up the Sira and Snayu of that part it traverses. Atherosclerotic changes in blood vessels may result in obstruction. Future consequences cause gradual reduction of blood flow to brain and deprive of glucose and oxygen. There will be depletion of ATP, changes in ionic concentration, increased lactate and release of oxygen free radicals. In this stage, appropriate Shodhana can be employed after bringing the Prasarita Doshas back to Koshta.

### Sthanasamsraya

In this stage, doshas traverses through the Urdhvaga, Adhoga and Tiryaka Dhamanis and reach rasayani and get obstructed in masthiska at the site of khavaigunya based on the dominance of dosha involved. There is avyakta lakshanas produced. Prodromal symptoms usually not well perceived in patients as these mechanisms are understood to be spontaneous and unpredictable. Dosha-dusya pratyaneeka chikista can be employed.

### Vyakti

In this stage Vata (Prana, Udana, Vyana, Apana), Pitta (Ranjaka, Alochaka, Pachaka) and kapha (Avalambaka, Tarpaka, Bodhaka) doshas are involved. Main dushyas like rasa, rakta,

mamsa, meda and majja and upadhatas like sira, snayu, kandara and dhamani are involved. Production of oxygen free radicals cause peroxidation of fatty acids and severely damage the cellular function. The resulting acidosis excites neurotransmitters especially glutamate and leads to sodium and calcium influx into cells followed by chloride ions and water causing oedema. In chronic stage, glial cell form macrophages and gradually ingest the necrotic tissue debris later causing neuronal damage and even cell death.

Ischaemic stroke may be caused by the blood clot that occurred in affected artery (thrombosis), a blood clot that travelled from another part of body (embolism) or blockage due to damage of arterial wall (lacunar infarct). Atherosclerotic changes and variations in collateral network may later result in loss of perfusion or blood supply to the area of brain and can result in sudden manifestation of stroke.

The cardinal symptoms of pakshaghata are Chesta nivritti (impaired motor activity), Ruja (pain), Vak sthambha (slurred speech) and Hasta pada sankocha. In some cases Sandhi Bandha vimoksha (looseness of joints), Vaktra vakrata (mouth deviation), sphoorana of Jihva (fasciculation of the tongue) also be presented. The symptoms can be varying from loss of cerebral functions to deep coma, loss of motor and sensory functions.

Lipid profile, ECG, Carotid doppler study, Magnetic resonance imaging of brain, can be done to understand the basic mechanism of stroke and its progression.

### **Bheda**

There is no separate description of upadravas for pakshaghata mentioned. But while explaining the sadhyaasadyata of Pakshaghata, they mentioned that pakshaghata devoid of upadravas should be treated. Hence before initiation of treatment of any disease, it is important to know curability of that disease. Charakacharya classified Pakshaghata under Kashtasadya or Asadya. Sushrutacharya classified Pakshaghata caused by Shuddha Vata considered as Kashtasadya, one caused by Samsrushta Dosha Pitta or Kapha as Sadya and that caused by Kshaya as Asadya. Vagbhattacharya in his context quote that Pakshaghata caused by Shuddha Vata is Krichha Sadyatama, that caused by Samsrushta Dosha is Krichha Sadya and that caused by Kshayajanya is Asadya.

Stages of Pakshaghata can be studied by assessing the dosha, dushya and sangha type of sroto dusti. Morbidity and mortality can be addressed by following appropriate treatment measures.

## CONCLUSION

Understanding Shadkriyakala in its initial stage can help in effective management. Though Acharya Sushruta has mentioned Kriyakala in Vranaprashniya Adhyaya in respect with Vrana Shopha and Vrana, but it has to be understood as the universal phenomenon. Here an attempt has been made to correlate between the Shadriyakala and pakshaghata for a better understanding of its pathogenesis so as to detect early diagnosis, prognosis and there by adopt prevention and curative management.

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