

**RESEARCH ARTICLE****PANCHAKARMA IN STROKE REHABILITATION: INTEGRATING AYURVEDIC PRINCIPLES WITH CONTEMPORARY NEURO-REHABILITATION****Patil Sushma Balaji¹, Santoshi Biradar¹ and Santosh L Yadahalli²**

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Abstract

Stroke is a major neurological disorder and an important cause of long-term disability, frequently resulting in hemiparesis or hemiplegia, spasticity, impaired coordination, sensory disturbances, speech and language impairment, cognitive dysfunction and limitations in activities of daily living. Recovery following stroke is a multidimensional and long-term process that requires coordinated rehabilitation aimed at restoring functional abilities, promoting independence and improving quality of life. Modern stroke rehabilitation primarily utilizes physiotherapy, occupational therapy, speech and language therapy, cognitive rehabilitation, task-oriented training and other approaches based on the principles of neuroplasticity. Ayurveda describes the clinical presentation of hemiplegia under the concept of Pakshaghata, predominantly considered a Vata Vyadhi. Classical Ayurvedic texts emphasize the importance of Snehana, Swedana, Mridu Shodhana, Basti, Nasya and other appropriate therapeutic measures in the management of Pakshaghata. Panchakarma, when selected according to Dosha involvement, Avarana, Bala, stage of disease and chronicity, may provide a therapeutic framework for addressing functional impairment and supporting the rehabilitation process. The present article discusses the correlation between stroke and Pakshaghata, the role of neuroplasticity in functional recovery and the possible contribution of Panchakarma procedures such as Abhyanga, Swedana, Virechana, Basti, Nasya and Murdhni Taila in stroke rehabilitation. The emphasis is on an integrative model in which Panchakarma complements, rather than replaces, modern neurorehabilitation.

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Introduction:-

Stroke is a neurological emergency characterized by a sudden disturbance of cerebral function resulting from interruption of cerebral blood flow or bleeding within the intracranial vasculature. Depending on the area and extent of cerebral involvement, patients may develop motor, sensory, visual, speech, swallowing and cognitive impairments. Hemiparesis and hemiplegia are among the major disabling manifestations that significantly affect

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mobility, activities of daily living and quality of life. Survival following the acute event does not necessarily indicate complete recovery. Many patients continue to experience residual motor impairment, abnormal muscle tone, contractures, impaired balance, loss of fine motor control, aphasia, dysarthria, dysphagia and cognitive disturbances. Therefore, rehabilitation constitutes an essential component of stroke management. Modern rehabilitation involves a multidisciplinary approach incorporating physiotherapy, occupational therapy, speech and language therapy, cognitive rehabilitation, positioning, orthotic support and task-oriented functional training.

In Ayurveda, the clinical picture of hemiplegia can be understood under the broader concept of Pakshaghata, a Vata-dominant disorder. Classical descriptions emphasize unilateral loss of movement and perception associated with involvement of Vata. Charaka describes the condition as the impairment of one side of the body due to vitiated Vata¹, while Sushruta and Vagbhata describe impairment of the affected half of the body^{4,7}. The management of Pakshaghata described in the classical texts includes Snehana, Swedana^{2,11}, Mridu Shodhana, Basti and other supportive measures⁵. These interventions can be considered in the context of rehabilitation, provided they are individualized according to the patient's strength, stage of disease, Dosha involvement, Avarana and associated manifestations. Thus, this article explores the possibility of Panchakarma as an adjunctive rehabilitation strategy in stroke, with particular emphasis on its potential role in preparing the patient for active rehabilitation, reducing stiffness and providing sensory and functional support.

Objectives:-

- To understand the Ayurvedic concept of Pakshaghata and its clinical correlation with stroke.
- To review the role of modern neurorehabilitation in functional recovery after stroke.
- To understand the relevance of neuroplasticity in stroke rehabilitation.
- To explore the classical rationale for Panchakarma in Pakshaghata.
- To discuss the possible role of Panchakarma procedures in different stages and presentations of stroke rehabilitation.
- To propose an integrative approach combining Panchakarma with physiotherapy, occupational therapy, speech therapy and cognitive rehabilitation.

Pakshaghata – The Ayurvedic Perspective:-

Pakshaghata is described among the Vata disorders and is characterized predominantly by impairment of movement and function of one side of the body¹. The term is derived from Paksha, meaning one side, and Aghata, implying injury or impairment. Charaka describes unilateral impairment caused by aggravated Vata, associated with loss of movement and, in some cases, pain, speech impairment and contraction of the affected limb⁹. Sushruta describes the affected half of the body becoming functionally impaired and insensitive³, while Vagbhata similarly explains the involvement of one side through Vata affecting Sira and Snayu and disturbing normal joint and functional integrity⁶.

Nidana:-

The etiological factors described for Vata aggravation include excessive intake of Ruksha, Sheeta and Laghu Ahara, inadequate food intake, excessive exertion, excessive travel, swimming, excessive sexual activity, irregular lifestyle, suppression of natural urges, day sleep and psychological factors such as Chinta, Shoka, Krodha and Bhaya. Trauma and injury to vital structures are also described as immediate precipitating factors¹⁰.

Samprapti:-

The general pathogenesis involves aggravation of Vata followed by its movement through the channels and localization at a site of Khavaigunya. In Pakshaghata, classical descriptions emphasize the involvement of Sira and Snayu, with disturbance of movement and function of one side of the body. Here, Vata is the predominant Dosha, with possible Kapha or Pitta association, and describes Madhyama Rogamarga involvement⁴.

The major Samprapti Ghataka described include Vata, particularly Prana, Udana and Vyana Vayu, with possible Kapha/Pitta Samsarga; Rasa, Rakta, Mamsa, Medas and Majja as Dhātu; Sira and Snayu as Upadhātu; and involvement of Rasavaha, Raktavaha, Mamsavaha and Medovaha Srotas.

Correlation of Stroke with Pakshaghata:-

Stroke and Pakshaghata are not considered identical entities, but a clinical correlation can be established based on their manifestations. Stroke may produce unilateral motor impairment, sensory deficits, speech disturbances and cognitive dysfunction, while Pakshaghata is characterized by unilateral impairment of movement and function.

The correlation is therefore primarily clinical and functional rather than a direct one-to-one pathological equivalence. Modern stroke diagnosis is based on neurological assessment and neuroimaging, whereas Ayurvedic assessment considers Dosha, Dushya, Srotas, Avarana, Bala, stage and chronicity.

From a rehabilitation perspective, the common ground lies in the functional consequences—loss of movement, altered muscle tone, impaired coordination, sensory dysfunction and difficulty performing activities of daily living.

Stroke and its Rehabilitation:-

Stroke can broadly be categorized into ischemic and hemorrhagic stroke. Ischemic stroke results from interruption of cerebral blood flow due to vascular occlusion, while hemorrhagic stroke results from bleeding within or around the brain. The clinical manifestations vary according to the vascular territory involved. Anterior cerebral artery involvement predominantly affects the lower limb, whereas middle cerebral artery involvement commonly produces contralateral upper-limb weakness and may be associated with aphasia. Posterior cerebral artery involvement can produce visual and higher cortical disturbances, while vertebrobasilar involvement may result in cerebellar, brainstem, cranial nerve and swallowing abnormalities. Diagnosis is established using appropriate investigations such as CT, MRI, MR angiography and carotid Doppler, depending on the clinical situation.

Modern Stroke Rehabilitation:-

Rehabilitation begins as early as clinically appropriate and continues according to the patient's functional status.

Acute stage:-

The acute stage is primarily concerned with stabilization and prevention of secondary complications. Proper positioning, gentle mobilization, passive and active-assisted range-of-motion exercises, bed mobility and prevention of pressure sores, contractures and other complications are emphasized.

Subacute stage:-

During the subacute stage, rehabilitation becomes progressively intensive. Physiotherapy, occupational therapy and speech and language therapy are combined with strengthening, weight-bearing, balance training, coordination exercises and task-specific activities.

Chronic stage:-

The chronic stage focuses on long-term functional recovery, management of residual disability and reintegration into daily and community activities. Gait training, endurance exercises, cognitive rehabilitation and advanced modalities may be incorporated according to individual requirements. Thus, stroke rehabilitation should be viewed as a continuous process rather than a short-term intervention.

Neuroplasticity – The Basis of Functional Recovery:-

Neuroplasticity⁸ refers to the capacity of the nervous system to reorganize its structure and function in response to injury, learning and environmental demands. Following stroke, functional recovery may involve adaptation and reorganization of neural networks. The principles relevant to rehabilitation: increased use of a body part can influence its cortical representation; both ipsilateral and contralateral hemispheres can contribute to motor control; sensory stimulation can enhance plasticity; and reduction of inhibitory factors may facilitate participation in rehabilitation. This provides an important conceptual bridge between Panchakarma-based supportive interventions and active rehabilitation. Panchakarma may be viewed as a preparatory and supportive component, while repetitive, meaningful and task-specific rehabilitation provides the essential functional stimulus for neuroplastic adaptation.

Rehabilitation Through Panchakarma:-

Ayurvedic management of Pakshaghata is individualized rather than based on a single universal procedure. The Samprapti Vighatana and selection of treatment according to Avarana or Dhatu-kshaya, stage of disease, strength and associated manifestations.

The broad therapeutic principles can be summarized as:-

Vata management → Srotoshodhana → Vata Shamana → Brimhana/Balya → support of Indriya and Prana → facilitation of rehabilitation.

Abhyanga:-

Abhyanga occupy an important place in the management of Vata disorders. In the rehabilitation setting, Abhyanga may be considered particularly when stiffness, spasticity, muscular discomfort or restricted mobility are present. The

classical rationale that Abhyanga promotes firmness and strength of the body and pacifies Vata, while also emphasizing the role of tactile stimulation. From a rehabilitation perspective, gentle tactile and proprioceptive input may complement active therapeutic exercises. Abhyanga should therefore be viewed as a supportive intervention that prepares the body for subsequent active rehabilitation, rather than as a substitute for exercise.

Swedana:-

Swedana is described as reducing stiffness, heaviness and coldness. In Pakshaghata, different forms of Swedana may be selected according to the clinical presentation such as Upanaha, Parisheka, Agni lepa and Pinda Sweda among the possible approaches. In patients with stiffness and restricted mobility, appropriately selected Swedana may facilitate relaxation and mobility, potentially making subsequent physiotherapy and stretching easier. However, selection should be individualized, especially in patients with altered sensation, cardiovascular instability or other contraindications.

Udwartana and Ruksha Sweda in Avarana:-

Not every presentation of Pakshaghata is necessarily treated with excessive Snigdha measures. When Kapha or Meda involvement and Avarana are prominent, the PPT discusses Rukshana-oriented interventions such as Udwartana, Dhanyamla Dhara, Agni lepa and Ruksha Pinda Sweda. Udwartana is presented particularly in Kapha-Avarita Vata, while Ruksha Pinda Sweda is mentioned in presentations involving pain and coldness. This highlights the importance of Ayurvedic phenotyping of the patient rather than applying one Panchakarma protocol to every stroke survivor.

Virechana:-

Classical references describe Virechana in the management of Pakshaghata. Charaka advises Swedana along with appropriate oleation and Virechana, while Vagbhata also describes Virechana following Snehana in Pakshaghata. In Avarana-dominant presentations, there is a need for Mridu Shodhana rather than excessively strong purification. It also relates Virechana to the management of Pakshaghata Vata. Therefore, Virechana should not be considered a routine intervention for every stroke patient. Its consideration depends on factors such as Dosha involvement, Avarana, strength, digestive capacity, chronicity and overall clinical stability.

Basti:-

Basti is particularly important in the Ayurvedic management of Vata disorders. It is for Vata management with potential Brimhana, Balya and Dhatu-poshana effects depending on the formulation and type selected. Various Niruha and Anuvasana Basti formulations are described according to clinical presentation.

From a rehabilitation perspective, Basti may be considered particularly in chronic Vata-dominant conditions, wasting, weakness and selected neuromuscular manifestations. The selection of Niruha versus Anuvasana Basti, formulation, dose and timing must be individualized rather than standardized solely on the diagnosis of stroke.

Nasya:-

Nasya is another intervention discussed in relation to Pakshaghata. The classical basis in the association between Pakshaghata and Ardita and the use of Navana Nasya in Ardita. Rechana and Shamana Nasya are mentioned according to the stage and clinical requirement. In the context of rehabilitation, Nasya may be considered when appropriate in patients with associated cranial, sensory, speech or higher-function manifestations. However, its role should be regarded as complementary and should not replace evidence-based speech, swallowing or neurological rehabilitation.

Murdhni Taila:-

Murdhni Taila procedures such as Shirodhara, Shiro Pichu and Shiro Basti are mentioned as supportive interventions. These procedures may have a role in promoting relaxation and providing sensory stimulation, particularly in selected patients with associated cognitive or psychological manifestations. The proposed mechanisms should be regarded as conceptual hypotheses, and stronger clinical evidence is required before attributing specific neurological effects.

Panchakarma According to Functional Manifestations:-

An important strength of an Ayurvedic rehabilitation model is the possibility of selecting interventions according to the patient's dominant functional problem.

Spasticity and contracture - Abhyanga and appropriately selected Swedana may be considered to reduce stiffness and facilitate movement before active physiotherapy.

Cognitive impairment - Thalam, Shirodhara, Talapothichil, Karnapoorana, Ksheeradhooma and Jihwa Lepana as supportive measures. These should be considered adjunctive interventions, while cognitive rehabilitation remains central.

Speech disturbance - Ayurvedic formulations and local applications are described for speech-related disturbances. These should complement, rather than replace, structured speech and language therapy.

Memory disturbance - Several Medhya-oriented formulations are mentioned in relation to memory disturbance.

Integration of Panchakarma with Modern Rehabilitation:-

The most appropriate approach is not to consider Ayurveda and modern rehabilitation as competing systems. Instead, Panchakarma may be incorporated as a supportive and preparatory component within a multidisciplinary rehabilitation programme.

A conceptual sequence may be represented as:-

Stroke → Neurological stabilization → Ayurvedic assessment → Identification of Dosha/Avarana/Bala/Stage → Appropriate Panchakarma or supportive procedure → Improved mobility, relaxation and sensory input → Active physiotherapy/occupational therapy/speech therapy → Repetitive task-specific training → Functional independence. This integrated approach recognizes that Panchakarma alone cannot provide the complete range of rehabilitation required after stroke. Physiotherapy is necessary for motor retraining, occupational therapy for activities of daily living and fine motor function, speech therapy for aphasia, dysarthria and dysphagia, and cognitive rehabilitation for memory, attention and executive dysfunction. Thus, the potential role of Panchakarma is to complement the rehabilitation environment and facilitate participation in active functional training.

Stage-wise Concept of Panchakarma-Based Rehabilitation:-

Acute stage:-

The priority remains medical stabilization, prevention of complications and appropriate early mobilization. Panchakarma should not interfere with emergency stroke management. Any Ayurvedic intervention should be considered only after appropriate medical stabilization and individualized assessment.

Subacute stage:-

Once the patient is medically stable, selected Snehana, Abhyanga, Swedana and other appropriate interventions may be incorporated alongside physiotherapy and occupational therapy. The focus is progressively shifted toward restoration of movement, balance, coordination and functional activities.

Chronic stage:-

In chronic residual disability, individualized Panchakarma and other supportive measures may be considered according to Dosha predominance, stiffness, wasting, pain, weakness, Avarana and other associated manifestations. Basti, Abhyanga, Swedana, Nasya and Rasayana-oriented approaches may be considered where appropriate.

Discussion:-

The central question in stroke rehabilitation is not merely how to reduce symptoms but how to restore meaningful function. Modern rehabilitation achieves this through repeated practice, sensory input, task-specific activities and neuroplastic adaptation. Ayurveda provides a different but potentially complementary framework through assessment of Dosha, Dhatu, Srotas, Avarana, Bala and disease stage. The classical management of Pakshaghata gives importance to Snehana, Swedana, Mridu Shodhana, Basti and other individualized measures. These principles may be interpreted within a rehabilitation framework as interventions that potentially address stiffness, pain, mobility restriction, weakness and general functional readiness. The relationship between Panchakarma and neuroplasticity should, however, be presented cautiously. While sensory stimulation, repeated movement and active task-oriented practice are established principles of neurorehabilitation, direct claims that Panchakarma independently induces neuroplasticity require further scientific validation.

Conclusion:-

Panchakarma provides an individualized supportive approach in stroke rehabilitation, particularly for residual stiffness, weakness, pain and functional limitations. Abhyanga, Swedana, Mridu Shodhana, Basti, Nasya and Murdhni Taila may be selected according to the patient's Dosha, Avarana, Bala and stage of disease. Integration with modern neurorehabilitation may facilitate functional recovery, but Panchakarma should complement rather than replace evidence-based rehabilitation. Further clinical studies are required to establish its efficacy, safety and standardized protocols.

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