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Effect of *Mustadi Rajayapana Vasti* and selected treatment regimen in the management of spinal cord injury- A Case Study

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Abstract:

The damage begins from the moment of injury when displaced bone fragments, disc material or ligaments bruise or tear into spinal cord tissue. This is known as spinal cord injury (SCI). The clinical outcomes of SCI depend on the severity and location of the lesion with partial or complete loss of sensory or motor function below the level of injury. 36.5% of SCIs occur during traffic accidents. Limited pharmacological therapies such as early surgeries, cellular therapies and rehabilitations for enhancement of spinal cord functions are available. This patient who was treated had met with a road traffic accident (RTA). According to MRI report, there was a posterior bulging of C4/C5 and C5/C6 inter vertebral disc. *Marmabhighata* is an etiology of *Vatavyadhi*. Therefore, traumatic SCI can be considered as a type of *Vatavyadhi*. As such, general line of treatments of *Vatavyadhi* was applied when treating this patient. Especially Ayurveda *Panchkarma* treatments have excellent effects on reconstruction of nerves, nourishment of muscle tissues and rejuvenation of the body. So in this study, *Abhyanga, Patrapinda Sweda, Shashtikshali Pinda Sweda, Matra Vasti,* and *Mustadi Rajayapana Vasti* were adopted for a period of 82 days with selected Ayurveda medicines. Remarkable improvement in Spinal Cord Independence Measure Score (SCIM) and Medical Research Council (MRC) grading scale in muscle power was observed during the period of administering *Mustadi Rajayapana Vasti.*

Keywords: *Mustadi Rajayapana Vasti, Panchakarma,* Spinal cord injury.

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Introduction:

Spinal cord injuries (SCIs) usually begin with a sudden, traumatic blow to the spine that fractures or dislocates vertebrae. The damage begins at the moment of injury when displaced bone fragments, disc material or ligaments bruise or tear the spinal cord tissue. This is known as spinal cord injury. The largest portion of SCIs, 36.5% occur during road traffic accidents (RTAs). [1] SCIs are classified as either complete or incomplete. An incomplete SCI means that the ability of the spinal cord to convey messages to or from the brain is partially lost while retaining some motor or sensory function below the injury. A complete SCI is indicated by a total lack of sensory and motor function below the level of injury. People who survive with a SCI will have complications such as chronic pain, bladder and bowel dysfunction, pressure sores and depression. SCI can be determined by radiographic evaluation using an X-Ray, Computerized tomography (CT scan) or Magnetic Resonance Imaging (MRI). Various surgical procedures, neuroplasticity and other medical interventions are employed in modern medicine. Traumatic SCIs can be correlated with *Abhighataja Vatavyadhi* because of *Marmabhigata* (trauma of vital points) is an etiological factor of *Vatavyadhi*. [2] Pain, contractures, diminishing strength of tissues and atrophy of limbs are some of the symptoms of *Vatavyadhi*. [3] The purpose of Ayurveda intervention is to prevent further damage to nerves (neuroprotection) and regeneration of nerves. Special *Panchakarma* therapies implemented here have an excellent ability for protecting surviving nerve cells from further damage and stimulating the regrowth of axons. The drugs and therapeutic procedures which are having property of Srotas Shodhana (cleanses the channels) such as *Nitya Virechana* with *Eranda Thaila*, *Chandra Kalka* with *Mahadalu Anupana*, *Vata Shamana* (pacifies vitiated *Vata Dosha*) such as *Rasna Saptaka Kashaya, Hingvashtaka Churna, Dashamula Kashaya, Vatagajendrasingha Rasa, Thrayodashanga Guggulu*, *Matra Vasti* with *Maha Narayana Thaila*, *Patrapinda Sweda*, *Sarvanga Abhyanaga*) and Tharpana property (nourishes body) such as *Ashvagandha Churna, Asvagandha Rasayanaya, Maha Rasnadi Kashaya*, *Shashtika Shali Pinda Sweda* (SSPS), *Mustadi Rajayapana Vasti* (MRV), *Swarnaghatitha Makaradvajaya*) were selected to treat the patient in this study.

Case Report:

A 53-year-old married female patient presented to Outdoor Patients Department of Chamal Rajapaksha Ayurveda Research Hospital, Hambantota, Sri Lanka with the complaints of loss of functions and decrease in muscle power in both upper and lower limbs, stiffness in neck and limited functions, urinary and fecal incontinence and inability to sit even with support. Patient presented with *Mandagni* (low digestive power), *Aruchi* (impaired appetite), *Gaurawata* (heaviness) in all extremities and *Tandra* (drowsiness). Patient had a history with road traffic accident (RTA) in 2017 resulting in posterior bulging of C4/C5

and C5/C6 inter vertebral disc. It was observed that she was unable to move upper or lower limbs. She was conscious and awake. Her spine and both upper and lower limbs were stiff and unable to turn on the bed or to sit even with support. Her sleep was disturbed. Her higher functions of CNS were within normal limits and had no defects in intelligence, behavior, memory, orientation in time and date. No superficial or deep sensory defects were observed and no involuntary movement such as chorea and tremor were present. Muscle power was in grade 1 of MRC grading scale in both extremities, reflexes of biceps, triceps, knee and ankle were diminished in both sides and no defects in coordination were present.

She had been treated for 60 days with Western modern medicine and physiotherapy for 01 year following injury. She was subjected to *Ayurveda* treatment with *Panchakarma* therapy based on treatment principles of *Vatavyadhi*. Due to *Datukshaya* (depletion of tissues), *Mustadi Rajayapana Vasti* (MRV) and *Shashtikashali Pinda Sweda* (SSPS) were adopted. Internal drugs and *Panchakarma* therapies which were prescribed are mentioned in Table-1.

Table-1: Treatment protocol:

Drug Intervention	**Day 1 to 7**	**Day 8 to 14**	**Day 16 to 22**	**Day 24 to 40**	**Day 42 to 58**	**Day 59 to 65**	**Day 66 to 82**
Rasna Saptaka Kashaya (RSK) (120ml twice a day before meals)	+	-	-	-	-	-	-
Shankha Vati (125mg twice a day with lukewarm water before meals)	+	-	-	-	-	-	-
Hingvashtaka Churna (2.5g twice a day with lukewarm water before meals)	+	-	-	-	-	-	-
Swarnaghatitha Makaradvajaya (64.8mg before meals once a day with bee's honey)	+	+	+	+	-	-	-
Eranda Thaila (15ml of warm oil for a period of 7 days before meals as *Nitya Virechana)*	-	+	-	-	-	-	-
Sarvanga Abhyanaga with 120ml of *Nirgundyadi Thaila*	+	+	-	-	-	-	-
Patrapinda Sweda (using boluses prepared with *Vitex negundo, Pavetta indica, Moringa oliefera, Calotropis gigantean* and *Trigonella foenum-graecum)*	+	+	-	-	-	-	-

Dashamula Kashaya (120ml twice a day before meals)	-	+	+	+	-	-	-
Thrayodashanga Guggulu (500mg twice a day before meals)	-	+	+	-	-	-	-
Ashvagandha Churna (2.5g twice a day with milk after meals)	-	+	+	+	-	-	-
Chandra Kalka (250mg twice a day with *Mahadalu Anupana* before meals)	-	+	+	+	+	+	+
Matra Vasti (*Maha Narayana* Thaila / MNT) 60ml after *Abhyanga* and *Nadi Sweda* just after a light meal).	-	-	+	-	-	-	-
SSPS (MNT was applied on whole body and *Swedana* was performed for 45 minutes using medicated boluses prepared with *Bala* root, cow's milk and rice)	-	-	+	+	-	+	-
Maha Rasnadi Kashaya (MRK) (120ml twice a day before meals)	-	-	-	-	+	+	+
Asvagandha Rasayanaya (5g twice a day with milk after meals)	-	-	-	-	+	+	+
Vatagajendrasingha Rasa (125 mg twice a day after meals)	-	-	-	-	+	+	+
560ml of MRV was administered after conducting *Abhyanga* and *Nadi Sweda* in the morning on empty stomach (for 32 days with a 7 days interval as given in table)	-	-	-	-	+	-	+
g = gram; mg = milligram; ml = milliliter							

Preparation of medicine:

Shankha Vati was prepared according to *Yogaratnakara*. [4] *Hingvashtaka Churna* was prepared according to *Chakkradatta.* [5] *Thrayodashanga Guggulu, Vatagajendrasinha* [6], *Swarnaghatita Makaradwajaya* [7], *Ashwagandha Churna* [8], *Ashvagandha Rasayanaya, Chandra Kalka,* [9] MNT [10] and *Nirgundyadi* Thaila [11] were prepared according to *Ayurveda* pharmacopeia of Sri Lanka. RSK [12], *Dashamula Kashaya* [13] and *Maha Rasnadi Kashaya* (MRK) were prepared according to *Ayurveda* pharmacopeia. *Mahadalu Anupana* [14] was prepared according to *Vatika Prakaranaya* at Pharmacy of CRARH, Hambantota, Sri Lanka. MRV [15] was prepared according to *Charaka Samhita*.

Preparation of MRV:

5g of *Saindawa Lawana* and 50ml of bee's honey were triturated. 40ml each of *Narayana Thaila* and Ghee were added and mixed. Then, 25g of *Shatapushpadi Kalka* was added and triturated. 300ml of milk processed with MRV *Kwatha* and 100ml of goat's femur bone marrow soup were added respectively and mixed till the mixture became homogenous.

Ingredients of *Kashaya* of MRV:

Musta (*Cyperus rotundus*), *Ushira (Vetiveria zizanioidis,) Bala* (*Sida cordifolia), Rasana (Pluchea lanceolata), Aragvadha (Cassia fistula), Gudhuchi (Tinosphora cordiffolia), Manjistha (Rubia cordifolia), Katurohini (Picrorhiza kurroa), Trayamana (Jentiana kuroo), Punarnava (Boerhavia diffusa), Bibhitaka (Terminalia bellirica), Prushnaparni (Uraria picta), Kantakari (Solanum xanthocarpum), Shaliparni (Desmodium Gangenticum), Gokshura (Tribulus terrestris), Bruhati (Solanum indicum)* and *Madanphala (Randia spinosa*). ***Shatapushpadi Kalka*** used in MRV was prepared with *Shatpushapa (Foenicum vulgare), Madhuyasti (Glycyrrhiza glabra linn.), Kutaja (Holarrhena antidysentrica linn), Rasanjana (Berberis ariststa)* and *Priyangu (Prunus mahaleb).* Goat femur bone marrow soup was prepared by boiling 50gm of bone marrow from goat's femur with 150ml of water.

Procedure of *Vasti Karma*:

Snigdha and *Sweda Karma* were performed as *Purva Karma* (Preoperative procedure). In *Pradhana Karma* (Main Procedure), the patient was made to lie down in left lateral position on the bed and *Vasti* was administered. *Paschat Karma* (Postoperative Procedure) were performed as per the classical guidelines. MRV was conducted for a period of 16 days. Then after an interval of 7 days, MRV was performed for a further period of 16 days. Total period of MRV was 32 days. An informed consent was taken from patient for this case study to publish this case for research purpose without discloser of the identity of patient.

Assessment Criteria:

Spinal Cord Independence Measure Score (SCIM) and Reflex grading scale, grading scale for muscle power and writing ability by Medical Research Council (MRC) were used to assess the qualitative improvements of the patient. [16], [17] Improvement was assessed by observing the reduction of clinical features before and after treatments.

Result:

The patient was unable to retain the MRV for even two minutes in first few days. But after the next 07 days, she was able to retain MRV for about 10 minutes. The net SCIM score was 15 before treatment and 65 after treatment. Significant improvement was observed with SCIM score. The patient regained control of micturition and defecation. After completion of 82 days of treatment, the patient made a substantial

recovery. She was able to turn on the bed unaided, able to sit with a little assistance and she could walk a few steps with support. Muscle power increased from grade 1 to grade 4 in all extremities. She was able to eat using her hands with minimal support. Her grip was assessed by writing ability. It improved and she could write a little at the time of discharge. There were no allergies or adverse reactions to the drugs during the treatment period.

Table-2: Overall improvement on SCIM:

Characters	**Before treatment**	**After treatment**					
		After 14 days of treatment		After 40 days of treatment		After completion of treatment	
	Grade	Grade	Percentage of relief	Grade	Percentage of relief	Grade	Percentage of relief
Feeding	0	1	20%	1	20%	4	80%
Bathing	0	1	20%	1	20%	4	80%
Dressing	0	2	40%	2	40%	4	80%
Grooming	0	2	40%	2	40%	4	80%
Respiration	10	10	100%	10	100%	10	100%
Sphincter Management-Bladder	5	15	100%	15	100%	15	100%
Sphincter Management- Bowel	0	5	50%	5	50%	5	50%
Use of toilet	0	0	0%	1	20%	2	40%
Mobility in bed	0	0	0%	1	16%	5	83%
Transfers Bed-wheelchair	0	0	0%	1	50%	1	50%
Transfers wheelchair-toilet-tub	0	0	0%	1	50%	1	50%
Mobility indoors (short distances)	0	0	0%	1	13%	2	26%
Mobility for moderate distances (10-100 meters)	0	0	0%	1	13%	3	39%
Mobility outdoors	0	0	0%	1	13%	2	26%

(more than 100 meters)							
Stair management	0	0	0%	1	25%	2	50%
Transfers: wheelchair-car	0	0	0%	1	50%	1	50%
Sum	15	36	36%	45	45%	65	65%

Table-3: Overall improvement on neurological findings:

Findings	**Before treatment**	**After treatment**					
		After 14 days of treatment		After 40 days of treatment		After completion of treatment	
	Grade	Grade	Percentage of relief	Grade	Percentage of relief	Grade	Percentage of relief
1. **power**							
Right Upper Limb	1	1	0%	2	40%	4	80%
Left Upper Limb	1	1	0%	2	40%	4	80%
Right Lower Limb	1	1	0%	2	40%	4	80%
Left Lower Limb	1	1	0%	2	40%	4	80%
Right Hand Grip	Absent						Present
Left Hand Grip	Absent						Present
2. **Reflexes**							
Biceps jerk Right & Left	1+	1+	0%	1+	0%	2+	100%
Triceps jerk Right & Left	1+	1+	0%	1+	0%	2+	100%
Knee jerk Right & Left	1+	1+	0%	1+	0%	2+	100%
Ankle jerk Right & Left	1+	1+	0%	1+	0%	2+	100%

Discussion:

In *Vatavyadhi*, *Margavarodha* (obstructions in channels), *Marmabhigata* (trauma of vital points) and *Dhatukshaya* (depletion of tissues) are the main underlying pathologies. Therefore, therapies having *Agnideepana* (kindling of digestive power), *Amapachana* (promotes digestion of food), *Vatashamana* (pacifies vitiated *Vata Dosha*), *Vrumhana* (promotes nutrition or bulk of the body) and *Balya* (strengthening) properties were selected for this study.

Mode of action of internal drugs: *Rasna Sapthaka Kashaya*, *Sankha Vati* and *Hingvashtaka Churna* possess *Amapachana* and *Agnideepana* properties. *Trayodashanga Guggulu* is beneficial in *Vata Roga.* [18] *Ashwagandha Churna* has *Vatahara*, *Brumhana*, *Balya* and *Dhathuvar dhaka* properties. C*handra Kalka* with *Mahadalu Anupana* are traditional drugs commonly used in early stages of *Pakshaghata* in Sri Lanka. It pacifies vitiated *Vata Dosha* and acts as an *Amapachaka Aushadha.* [19] *Swarnaghatitha Makaradwajaya* has *Vrishya* (aphrodisiac), Medhya and rejuvenating properties. *Eranda* Taila was administered as *Nithya Virechana* to eliminate vitiated *Dosha. Vatagajendrasingha, Ashvagandha Rasayanaya* and MRK are excellent in mitigating of *Vata* and to promote the nourishment in emaciated body.

Mode of action of *Abhyanga* and *Swedana:* *Abhyanga* and *Swedana* are considered as external therapeutic procedures that mitigates vitiated *Vata Dosha*. Dalhana says that *Abhyanga* should be done for at least 900 *Matra* (5 minutes) in each posture in order to obtain penetration to deeper tissues. [20] *Abhyanga* makes the body soft, bestows nourishment to tissues, control the aggravated *Kapha* and *Vata Dosha* and give strength to the body. *Patrapinda Sweda* pacifies *Vata, Kapha* and opens the obstructed channels through its *Snigdha Ruksha* property. SSPS is a nourishing fomentation prescribed for *Dhatukshaya* conditions. It gives strength and nutrition for *Sapta Dhatu.*

Mode of action of MRV: *Vasti* is the best treatment for vitiated *Vata Dosha*. *Yapana Vasti* has the ability to support life and promote longevity. [21] MRV performs dual actions of *Shodhana* and *Rasayana* simultaneously. *Rasayana* becomes more effective when preceded by a suitable *Panchakarma* therapy. MRV is having "*Sadyo-Balajanana*" (improves strength quickly), *Vatashamaka* and *Rasayana* properties. *Thikta Rasa* may have positive impact on cell implantation and also reduce the degeneration of *Asthi* and *Majja.* [22] Therefore, MRV has a positive effect on neurological disorders and wasted muscles. *Susrhuta* explains when *Vasti* is administered properly, it remains in large intestine, pelvis and below the umbilicus for some time and the potency of the *Vasti* materials spreads in the whole body through the channels and gives its effect quickly. [23] So, the immense number of nerves which are located in Enteric Nervous System can be nourished easily and quickly due to *Sadyaobalajanan*a and *Rasayana* effect of MRV. Therefore, it

can be proposed that muscle strengthening takes place when MRV is given daily.

Conclusion:

It can be concluded that the patients suffering from Spinal Cord Injuries with posterior bulging of C4/C5 and C5/C6 inter vertebral disc can be managed successfully with *Panchakarma* procedures and selected *Ayurvedic* medicines.

Limitation of study:

As this is single case study so there is still need for detailed studies to be carried out in this regard.

Consent of patients:

The written consent has been taken from patient for procedure and publication of data without disclose the identity.

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