



Research Article

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EFFECTIVENESS OF AYURVEDA TREATMENT MODALITIES IN THE MANAGEMENT OF SPASTICITY IN CHILDREN WITH CEREBRAL PALSY AT A TERTIARY CARE TEACHING HOSPITAL OF SOUTHERN INDIA

Arun Raj GR ^{1*}, Shailaja U ², Prasanna N Rao ³, Muralidhar P Pujar ⁴, Srilakshmi ⁵, Kavya Mohan ⁵

¹Assistant Professor, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India

²Professor and Head, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India

³Professor and Principal, Department of Salya Tantra, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India

⁴Professor and Medical Superintendent, Department of Panchakarma, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India

⁵PG scholar, Department of Kaumarabhritya, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan, Karnataka, India

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***Corresponding author**

E-mail: drdrarunraj26@gmail.com

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ABSTRACT

To assess and compare the effectiveness of Salavana Upanaha Sweda with and without Parisheka on spasticity in children with cerebral palsy. 32 diagnosed cases of Spastic Cerebral Palsy were selected for the study based on the diagnostic criteria and inclusion criteria, later divided into two groups (A and B). The subjects in group A was administered both Parisheka and Upanaha while those in group B with Upanaha only. The duration of study was 90 days, in consecutive 3 sittings of 15 days each with gap of another 15 days. Both the groups showed effect in reducing Spasticity at the level of $p < 0.05$. Even though both groups were found to be effective in reducing Spasticity based on objective and subjective parameters, better effect was seen in Upanaha along with Parisheka group when compared to the Upanaha alone group.

Keywords: Cerebral Palsy, Parisheka, Upanaha sweda, Salavana Upanaha Sweda, Spastic Cerebral Palsy, Spasticity

INTRODUCTION

Cerebral Palsy (CP) is a group of permanent disorders of movement and posture causing activity limitations, attributed to non-progressive disturbances in the brain occurring early in development.¹ It is the foremost cause of childhood disability affecting function and development.²⁻³ Population-based studies from around the world report prevalence estimates of CP ranging from 1.5 to more than 4 per 1,000 live births or children of a defined age range.⁴⁻⁸ In a majority of cases of CP, the chief motor abnormality is spasticity.⁹ Spastic CP accounts for major portion of CP with incidence b/w 70% and 80%.¹⁰ All motor activities particularly activities of daily living¹¹ such as brushing, walking, eating etc are hampered in these children due to Spasticity. The various methods to lessen spasticity would be helping these children to overcome their inhibitions.

Even though there is no direct reference for CP in Ayurvedic literature, various conditions like Phakka (a kind of nutritional disorder),¹² Ekangaroga (monoplegia),¹³ Sarvangaroga (quadriplegia),¹⁴ Pangulya (locomotor disorders), Pakṣaghata (hemiparesis) etc. exhibits signs and symptoms of CP.¹⁵ To a larger extent, CP can be understood as Shiro-Marmabhiḡathaja Bala Vata Vyadhi.¹⁴ For Vata Vyadhi, there are many treatments explained, among them Snehana and Swedana have an important role to play.¹³ In Spastic Cerebral Palsy, Spasticity is comparable to Sthamba¹⁶ is Vata – Kapha predominant, Parisheka¹⁷ causes Doshagathi¹⁸ from Shaka to Kosta and removes the

Aavarana caused by Vata as well as removes the Stambana. Hence in present study, Parisheka is planned with Dashamoola Kashaya which possesses Vatahara property. Upanaha along with Bandhana which is kept in contact with affected area for a long period of time, will help to maintain the normal posture of the affected part. A study has been already conducted on Upanaha to assess the reduction on spasticity in spastic cerebral palsy¹⁹ whereas when Upanaha is carried out after Parisheka it may yield better effect as Parisheka relaxes the muscle thereby reducing the spasticity. This study is therefore planned to assess the effect of Salavana Upanaha Sweda and Parisheka on Spasticity in children with Spastic Cerebral Palsy.

MATERIALS AND METHODS

Objectives: To assess and compare the effectiveness of Salavana Upanaha Sweda with and without Parisheka on spasticity in children with cerebral palsy.

Method of collection of data: Patients who are fulfilling the criteria for diagnosis and inclusion were selected for the study.

Research design

The clinical study was single centered, open labeled, double arm, prospective clinical trial, conducted in tertiary care teaching hospital attached to Ayurveda Medical College located in Hassan district, Karnataka state, India.

Source of data: Patients (n=32) were selected successively from the outpatient department of Kaumarabhritya, tertiary care teaching hospital attached to Ayurveda Medical College located in district headquarters. Ethical clearance was obtained from the institutional ethics committee (IEC) of SDM College of Ayurveda and Hospital, Hassan, Karnataka (IEC No. SDM/IEC/103/2016-17). Informed consent was obtained from the parents before registering subjects for the trial.

Diagnostic criteria: Children with spasticity in one or all limbs with failure of co-ordination in spontaneous movements, significant delayed milestones and with exaggerated deep tendon reflexes and increased muscle tone excessive extensor tone.

Inclusion criteria: Children in the age group of 3-8 years of both gender whose parents are willing to sign the informed assent form.

Exclusion criteria: Children with infectious diseases like tuberculosis, meningitis, poor controlled epilepsy, recurrent status epilepticus, intractable seizures, complex seizures, juvenile diabetes mellitus, severe cognitive impairment, severe motor handicap and deformities from long standing spasticity, congenital malformations, other systemic illness like congenital heart disease, nephrotic syndrome and mixed variety of cerebral palsy were excluded from the study.

Administration of drug

Group A (Parisheka and Upanaha): 16 Children of this group were administered Abyanga with Tila Taila for 15 minutes. Dashamoola Kashaya dispensed was taken in Dharapatra (vessel) and poured continuously, neither too fast nor too slow for about 20-minutes, after completing the procedure body of the patient is wiped out and dried. This is followed by a short duration of rest. This is followed by application of Salavana Upanaha.

Group B (Salavana Upanaha): 16 Children of this group were given Abyanga with Tila Taila for 15 minutes followed by lukewarm water bath and application of Salavana Upanaha.

Duration of study: 90 days, in consecutive 3 sittings of 15 days each with gap of another 15days.

Statistical analysis: Friedman test, Wilcoxon Test and Mann-Whitney U Test was used.

Assessment Criteria

Modified Ashworth Scale for Spasticity²⁰

0 - No increase in muscle tone

1 - Slight increase in muscle tone, manifested by a catch and release or by minimal resistance at the end of the range of motion when the affected part(s) is moved in flexion or extension

1+ - Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of the ROM

2 - More marked increase in muscle tone through most of the ROM, but affected part(s) easily moved

3 - Considerable increase in muscle tone, passive movement difficult

4 - Affected part(s) rigid in flexion or extension

OBSERVATIONS AND RESULTS

Of the 32 children, 28 completed the study and 4 were drop out. 18.75% (n=6) were from age group of 3-4years, 15.6% (n=5) were in the age group of 4-5 years, 37.5% (n=12) of 5-6 years age group, 18.75% (n=6) of 6-7 years age group & 0.09% (n=3) of 7-8 years age group. 68.75% (n=22) were male and 45.45% (n=10) were female. 75% (n=24) were Hindus, 0.06% (n=2) from Christians and 18.75% (n=6) were from Muslim community. 62.5% (n=20) were diplegia type, 12.5% (n=4) were quadriplegia type, 18.75% (n=6) were hemiplegic type and 6.25% (n=2) were monoplegic type. 56.25% (n=18) children had severe delay in milestones, 28.12% (n=9) showed moderate delay in milestones and 15.6% (n=5) showed mild delay of milestones. 62.5% (n=20) were not born from a consanguineous marriage while 37.5% (n=12) were born from a consanguineous marriage. Majority children were the 1st born child of the family accounting for 65.6% (n=21), 21.88% (n=7) were 2nd ranking child and 12.5% (n=4) were 3rd child in the family. Majority mother's age of conception was not delayed in 78.12% (n=25) while it was delayed in 21.88% (n=7). 75% (n=24) were with low birth weight while 25% (n=8) were with normal birth weight. Only 43.75% (n=14) children did cry after birth. 75% children were of normal delivery while 25% were LSCS. Majority children started late on breast feeding accounting for 71.88% (n=23) while 28.12% (n=9) started with breast feeding immediately after birth. 59.37% (n=19) developed some form of illness post nately while 40.6% (n=13) didn't developed any post-natal illness. 25% (n=8) were bottle fed while 75% (n=24) were never bottle fed. The effect (Friedman test) of Parisheka - Salavana Upanaha Sweda and Salavana Upanaha Sweda on Ashworth Spasticity Scale is detailed in table 1 and 2 respectively. The effect (Wilcoxon test) of Parisheka - Salavana Upanaha Sweda and Salavana Upanaha Sweda on Ashworth Spasticity Scale is detailed in table 3 and 4 respectively. Comparison on the effect (Mann Whitney U Test) between both the groups is detailed in table 5.

DISCUSSION

The features of Sthambha are comparable with that of Spasticity, as the main feature of Spasticity is velocity dependent loss of stretch reflex resulting in stiffness of limbs.²¹ Here the major Doshas involved are Vata and Kapha where mainly Chala Guna of Vata is affected and Sthira Guna of Kapha is increased. Hence Spasticity can be understood as lakshana Sthambha in which involvement of Vata and Kapha Doshas along with increase of Sheeta Guna is seen.

Swedana drugs by Ushna and Teekshna Guna are capable of penetrating micro circulatory channels (srotas), where they activate sweat glands to produce more sweat.²² After dilatation of Srotas, Laghu and Sara Guna of these drugs enable them to act on Doshas Sangatha in channels, remove the stagnation, making the sticky contents mobile and direct them towards Koshta or excrete them through micro pores of skin in the form of sweat, resulting in Sroto Shodhana. During fomentation, heating the tissues results in rise of temperature, leading to increased metabolism. This in turn increases vasodilatation, increased blood flow, supply of more oxygen and nutrients with simultaneous removal of accumulated metabolic wastes.

Table 1: Effect of Parisheka and Upanaha (Friedman test) on Spasticity

Parameter	N	Mean	Std. Deviation	Mean Rank	X ²	p value	Remarks
Ash 0	37	3.4595	.69100	6.30	175.530	.000	HS
Ash 15	37	2.9189	.98962	5.61			
Ash 30	37	2.5000	1.13039	4.77			
Ash 45	37	2.2703	1.09668	4.04			
Ash 60	37	1.9730	.90482	3.35			
Ash 75	37	1.6081	.66807	2.36			
Ash 90	37	1.2703	.38360	1.57			

Table 2: Effect of Upanaha (Friedman test) on Spasticity

Parameter	N	Mean	Std. Deviation	Mean Rank	X ²	p value	Remarks
Ash 0	25	3.5400	.70593	5.70	75.092	.000	HS
Ash 15	25	3.1600	1.08704	5.08			
Ash 30	25	3.000	1.02062	4.72			
Ash 45	25	2.6800	1.04960	3.84			
Ash 60	25	2.4600	1.07935	3.38			
Ash 75	25	2.2400	1.06184	2.86			
Ash 90	25	2.0600	1.06380	2.42			

Table 3: Effect of Parisheka and Upanaha (Wilcoxon test) on Spasticity

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	p value	Remarks
	N	MR	SR	N	MR	SR					
Ash 15 - Ash 0	13	7.00	91.00	0	.00	.00	24	37	-3.198	.001	S
Ash 30 - Ash 15	14	7.50	105.00	0	.00	.00	23	37	-3.342	.001	S
Ash 45 - Ash 30	10	5.50	55.00	0	.00	.00	27	37	-2.859	.004	S
Ash 60 - Ash 45	9	5.00	45.00	0	.00	.00	28	37	-2.687	.007	S
Ash 75 - Ash 60	15	8.00	120.00	0	.00	.00	22	37	-3.462	.001	S
Ash 90 - Ash 75	15	8.00	120.00	0	.00	.00	22	37	-3.502	.000	HS
Ash 90 - Ash 0	37	19.00	703.00	0	.00	.00	0	37	-5.368	.000	HS

Table 4: Effect of Upanaha (Wilcoxon test) on Spasticity

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	p value	Remarks
	N	MR	SR	N	MR	SR					
Ash 15 - Ash 0	5	3.00	15.00	0	.00	.00	20	25	2.032	.042	S
Ash 30 - Ash 15	4	2.50	10.00	0	.00	.00	21	25	2.000	.046	S
Ash 45 - Ash 30	10	5.50	55.00	0	.00	.00	15	25	2.913	.004	S
Ash 60 - Ash 45	5	3.00	15.00	0	.00	.00	20	25	2.060	.039	S
Ash 75 - Ash 60	5	3.00	15.00	0	.00	.00	20	25	2.121	.034	S
Ash 90 - Ash 75	6	3.50	21.00	0	.00	.00	19	25	2.333	.020	S
Ash 90 - Ash 0	22	11.50	253.00	0	.00	.00	3	25	4.159	.000	HS

Table 5: Comparison between effect of both groups (Mann Whitney U Test) on Spasticity

	df ash 1	df ash 2	df ash 3	df ash 4	df ash 5	df ash 6	df ash 7
Mann-Whitney U	403.000	357.500	423.000	442.000	381.000	389.500	280.500
Wilcoxon W	1106.000	1060.500	748.000	1145.000	1084.000	1092.500	983.500
Z	-1.066	-1.883	-.686	-.402	-1.413	-1.231	-2.730
Asymp. Sig. (2-tailed)	.286	.060	.493	.687	.158	.218	.006

Asymp. Sig. - Asymptotic Significance

When the definition of Spasticity is considered, it is seen to result due to over excitation of stretch reflex, which is velocity dependant.²³ Hence by Bandhana procedure, excessive movement is restricted. Also, by Bandhana procedure, the anatomical position is maintained. The effect of drugs helps in reducing Spasticity, and body gets accustomed to maintaining limb in anatomical position which in turn reduces Spasticity in limbs. This also increases range of movement of limbs without causing limbs to spasm.

Dashamoola is a group of ten drugs i.e. Bilva (*Aegle marmelos* (L.) Corrêa)²⁴⁻²⁵, Patala (*Stereospermum suaveolens* (Roxb.) DC.)²⁶, Agnimantha (*Clerodendrum phlomidis* L.f.)²⁷, Shyonaka

(*Oroxylum indicum* (L.) Benth. ex Kurz)²⁸, Gambhari (*Gmelina arborea* Roxb.)²⁹, Bruhati (*Solanum nigrum* L.)²⁵, Kantakari (*Solanum xanthocarpum* Schrad. & H. Wendl.)³⁰, Prishniparni (*Uraria picta* (Jacq.) DC.)³¹⁻³², Shalaparni (*Desmodium gangeticum* (L.) DC.)³³, Gokshura (*Tribulus terrestris* L.)³⁴, where parts used are roots. Dashamoola possess tridoshahara properties, whereas most of the Dravya of Brihatpanchamoola are of Ushnaveerya, Katuvipaka, Tikta-kashayara and Laghuruksha guna which relieves Stambana. Dashamoola possesses shothahara, tridoshaghna and aamapachana property due to which it is found indicated in conditions like, Vatavyadhi and used mainly in the form of pradeha, parisheka, abhyanga. Salavana

Upanaha containing Rasna (*Alpinia galanga* L. Willd.)³⁵ Churna, Eradamula (*Ricinus communis* L.) Churna,¹⁴ Vacha (*Acorus calamus* L.) Churna,³⁶⁻³⁸ Vidanga (*Embelia ribes* Burm F.) Churna³⁹⁻⁴⁰, Devadaru (*Cedrus deodara* (Roxb.) G. Don) Churna⁴¹, Saindhava (rock salt)⁴² and Godhuma (wheat powder) was utilized in the present study. These ingredients were chosen for the study due to their Kapha Vatahara properties which was found to be effective in reducing the Sthambha. Saindhava was added for Teekshna effect of this Churna and also as it would be Kaphahara in nature. Milk possessing Snigdha, Vatahara and Brumhana was used as medium of cooking as this was used in children who have sensitive skin. Salavana Upanaha Sweda was found to be very effective in reducing Spasticity of limbs within first 15 days of treatment itself. During the first break after 15 days, it was seen that Spasticity increased relatively as there was no treatment done during that period, but it was noticed that in comparison to before intervention, Spasticity had reduced. From second sitting itself it was noticed that Spasticity further reduced and continuous three sittings for 90 days have effectively reduced spasticity lasting for a considerable period of time. While it was further notice that more reduction in spasticity was observed in Upanaha along with Parisheka group highlighting the effectiveness of Parisheka compared to Upanaha only group.

CONCLUSION

Overall it can be concluded that both Parisheka and Salavana Upanaha Sweda when applied for 90 days helps in reducing spasticity. The reduction in Spasticity will allow these children to carry out their activities of daily living which would help them in leading relatively normal lives.

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