

## EXPLORING THE BRAIN-GUT AXIS IN ETIOPATHOGENESIS OF ELDERLY CONSTIPATION AND ITS MANAGEMENT WITH SHANKHAPUSHPI (CONVOLVULUS PLURICAULIS) & VAISHVANARA CHURNA

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### ABSTRACT

Severe stress and strain to the mankind has caused strong impact on the Gastro-intestinal tract (GIT) resulting in increased incidence of diseases of G.I.T. Stress can influence brain and bowel functions causing dysregulation of brain-gut axis in constipation of elderly persons. Total 82 patients aging between 50-80 years were registered to investigate the role of stress in elderly constipation and to evaluate the efficacy of *Shankhapushpi* (*Convolvulus pluricaulis*) as adjuvant to *Vaishvanara churna* in its management. The patients were randomly divided into 2 groups and administered: *Vaishvanara churna*, 6 gms once a day early in the morning (Group A, n=42) and *Vaishvanara churna* as above & *Shankhapushpi churna* 6 gms twice a day (Group-B, n=40) for duration of one month with luke warm water. Psychological counseling was given to the patients in both groups. The result shows that Group B is significantly better than Group A in relieving symptoms like *Mala sanga* (fecal obstruction), *Udara shula* (abdominal colic) and *Hridaya Uparodha* (feeling of obstruction in the chest area). Group B has shown highly significantly better results than Group-A in relieving tension due to anti stress, anxiolytic property of *Shankhapushpi* and contributed in overall wellbeing of elderly patients by improving *Deha bala* (body strength), *Agni bala* (digestive strength) and *Chetasa bala* (mental strength). Thus, *Shankhapushpi* has potentiated the action of principal drug *Vaishvanara churna* in relieving the constipation of elderly persons.

**Keywords:** Constipation, stress, brain-gut axis, *Shankhapushpi*, *Vaishvanara churna*

### INTRODUCTION

Constipation is a problem that affects all ages. However, it is a common problem in geriatric population. Elders may falsely believe that constipation is a “natural” part of aging<sup>1,2,3,4</sup>. Although changes in the gastrointestinal tract associated with aging may predispose one to develop constipation, the disorder usually has a multi-factorial etiology and may be a lifetime disorder. Though bowel transit time and frequency of bowel movements do not change with aging, several co morbid conditions may contribute to the development of constipation<sup>5</sup>. Age-related anatomic changes within the lower gastrointestinal tract may contribute to delayed transit time and decreased stool water content<sup>6</sup>. Patho-physiologic changes in colon occur in old age along with other systems of the body. There is impaired relaxation and segmental contraction due to loss of nitrous oxide containing neuron, decreased calcium influx into neurons and less calcium released in smooth muscle. All these changes are due to morphological atrophy of mucosa, intestinal glands, and muscularis in normal aging process<sup>7</sup>. According to *Ayurveda* “*Vayah krita slathamamsadyavastha visesha*” (*Vachaspatyam*) loosening of muscle and other tissue is the result of ageing<sup>8</sup> *Vibandha* (Constipation) is not described as a separate disease entity in *Ayurveda*; however symptoms of *Udavarta* (retention of feces, flatus, and urine) like-*Anaha* (obstruction), *Adhman* (distension), *Malavastambha* (hardness of feces) due to the *pratiloma gati* (reverse flow) of *Apana Vayu* (one subtype of biological humor of vata dosa) are mentioned. *Vibandha* is the foremost and important symptom of the *Udavarta*<sup>9</sup>

Body and mind are very closely inter-related. Any disturbance or malfunctioning of mental faculties affects majority of the body system<sup>10</sup>. The GI tract is controlled by a complex network, including the autonomic nervous system (ANS), the CNS, and the enteric nervous system (ENS) that interacts to establish a bidirectional communication between the brain and the gut, the so-called “brain-gut axis”. In common, various acute stressors have been shown to delay gastric emptying<sup>11</sup> (Mayer 2000) while increasing distal colonic motility<sup>12</sup> (Welgan et al, 1988), and accelerating intestinal transit<sup>13,14</sup> (Ditto et al, 1998; Martinez et al, 1997) in

both healthy humans and animals. Various stressors, such as anger, fear, labyrinthine stimulation, painful stimuli, preoperative anxiety, or intense exercise result in an inhibition of gastric motor activity and postprandial emptying<sup>15,16,17</sup> (Rao et al, 1998; Tache et al, 1999 and 2001). It is in favor of the concept of *Ayurveda* that mental factors like *Chinta* (worry), *Shoka* (grief), *krodha* (anger), *bhaya* (fear), *dukha* (sadness) working as stressor, also cause *Vibandha* (constipation)<sup>13</sup>. The Laxatives or other modern treatment can easily treat the constipation but may not be able to treat the psychological factors like stress. Furthermore, there is a chance of abuse and addiction of these laxatives in long run.

*Vaishvanara churna*<sup>18</sup> described in *Bhaisajya Ratnavali*, may be effective in treating constipation due to its *Deepana* (Appetizer), *Pachana* (Digestant), *Anulomana* (restores normal movement of Vata), *Vedanasantana* (Anodyne), *malappravartaka* (promoting expulsion of Excreta) and *shothaprasaman* (Anti-inflammatory) properties. The present study was undertaken with the objectives to: 1) evaluate the role of stress in elderly constipation; 2) check the efficacy of *Vaishvanara churna* in the treatment of elderly constipation; 3) assess the role of *Shankhapushpi* when added to the principal treatment - *Vaishvanara churna* in geriatric constipation.

**Materials and Methods:** The study was conducted in *Roga Nidana & Vikriti Vijnana* and *Kayachikitsa* department, IPGT & RA, Jamnagar.

**Selection of Patients:**

The patients attending the O.P.D having complaints described in *Udavarta* and constipation as mentioned in the modern medical literature were registered. Before the treatment, the patient’s consent was taken.

**Inclusion Criteria:**

- Patients between 50 – 80 years of age group
- Patients having symptoms like *adhmana* (gaseous distension), *atopa* (colic pain), *anaha* (acute constipation) and *malvastambha* (hardness of feces) etc. and having symptoms of constipation as per modern literature.

**Exclusion Criteria:**

- Patient suffering from serious ailments like tuberculosis, carcinoma of rectum and colon.

- Patient suffering from *arsha* (piles), *raktarsha* (bleeding piles), *bhagandara* (fistula in ano) etc.
- Patient suffering from endocrine diseases like hypothyroidism etc.
- Patient suffering from prostate enlargement, UTI, gynecological problems like endometriosis, ovarian cyst, uterine tumour etc.
- Patient suffering from major psychiatric illness.

**Plan of Study:** The method adopted in the study is randomized. Patients were surveyed and subjected to evaluation of stress, depression and anxiety by using Hamilton Anxiety Rating Scale and Hamilton Depression Rating Scale. The study had a due clearance from the Institutional Ethics Committee.

### Design of Groups and Its Management

Patients are randomly divided into two groups.

#### Group A:

#### Drug & Dose:

*Vaishvanara churna* (*Haritaki (Terminelia chebula)* – 12 parts, *Shunthi (Zingiber officinale)* – 5 parts, *Ajmoda (Carum roxburghianum)* – 3 parts, *Saindhava lavan (Rock salt)* – 2 part, *Ajwain (Trachyspermum ammi)* – 2 part) - 6 gms empty stomach early in the morning.

*Anupana:* *Koshna jal* (lukewarm water)

Duration: 1 month

#### Group B:

#### Drug & Dose:

*Vaishvanara churna* (as above) + *Shankhapushpi churna* – 6 gms twice a day after Breakfast and at Bed-time.

*Anupana:* *Koshna jal* (lukewarm water)

Duration: 1 month

Psychological Counseling was given in both the groups with advice.

**Criteria of Assessment:** The improvement in the patient was assessed mainly based on relief in the sign and symptoms of the disease. To assess the effect of therapy objectively, all sign and symptoms were given scoring depending upon their severity.

**Observation & Results:** Out of 42 patients registered in Group-A, 37 completed the treatment while 5 dropped out. In Group-B, 40 patients were registered, out of which 36 completed the treatment and 4 of them had discontinued. Out of these 82 patients, 71% were between 50-60 years of age group, 86.58% were Hindu, 46.46% housewives and 95.12% patients were married. The 65% patients had *Vishamasana* (improper diet pattern), 65% *Krura koshta* 46% had *Vata kaphaja Prakriti* and 87% had *Rajasika manas prakriti*.

**Table 1:** Hamilton's Anxiety Rating Scale wise observations in 82 Patients of having Constipation:

Symptoms	No. of patients		Total	Percentage (%)
	Group A	Group B		
Anxious	23	35	58	70.73%
Tension	27	33	60	73%
Fear	3	16	19	23%
Insomnia	23	26	49	59.75%
Intellectual cognitive	7	21	28	34%
Depressed mood	28	30	58	70.73%
Somatic behavior	9	14	23	28%

**Table 2:** Hamilton's Depression Rating Scale wise observations in 82 Patients of Constipation

Symptoms	No. of patients		Total	Percentage (%)
	Group A	Group B		
Depressed mood	28	30	58	70.73%
Guilt Feeling	6	15	21	25%
Suicide feeling	0	6	6	7%
Insomnia	23	26	49	59.75%

Retardation paranoid	4	13	17	20.73%
Agitation	13	16	29	35%

**Table 3:** Effect of therapy on the chief complaints of Constipation:

Symptoms	Vaishvanara Churna (n=37)						Vaishvanara Churna + Shankhapushpi (n=36)					
	Mean d	%	S.D.	S.E.	T	P	Mean d	%	S.D.	S.E.	t	p
<i>Udgarbahulya</i>	1.02	80.43	0.60	0.09	10.41	<0.001	1.11	71.42	0.70	0.15	7.01	<0.001
<i>Adhamana</i>	0.86	72.72	0.57	0.09	9.11	<0.001	1.66	71.66	0.70	0.11	10.09	<0.001
<i>Shirashula</i>	0.32	80	0.46	0.07	4.21	<0.001	0.83	73.17	0.18	0.13	6.16	<0.001
<i>Malasanga</i>	1.37	73	0.63	0.10	13.30	<0.001	1.91	82.14	0.55	0.09	20.75	<0.001
<i>Hridhayauparodha</i>	0.51	63.33	0.49	0.08	6.24	<0.001	0.91	94	0.50	0.08	11	<0.001
<i>Adhovata sanga</i>	0.37	56	0.53	0.08	4.27	<0.001	0.52	54	0.60	0.10	5.20	<0.001
<i>Adhovata atipravritti</i>	0.51	50	0.64	0.10	2.11	<0.001	0.63	49	0.72	0.12	5.30	<0.001
<i>Hrillasa</i>	0.10	50	0.13	0.05	2.11	<0.05	0.10	50	0.5	0.13	1.70	<0.10

**Table 4:** Comparative effect on Chief Complaints

Symptom	Group	<50%	≥50%	$\lambda^2$	p	Significance
<i>Udarashula</i>	Group A	16	16	5.052	0.025	S
	Group B	7	27			
<i>Mala sanga</i>	Group A	16	8	17.57	<0.001	HS
	Group B	4	32			
<i>Hridaya uparodha</i>	Group A	10	20	5.915	0.015	S
	Group B	2	31			

By applying the Chi-square test to compare the significance of both groups on chief complaints, it was observed that Group B was highly significantly better

than Group A in relieving *Mala sanga* whereas significantly better in relieving *Udar shula* and *Hridaya uparodha* (Table 4).

**Table 5:** Effect of Therapy on Hamilton's Anxiety Rating Scale:

Group	Mean	%	S.D.	S.E.	t	p
<i>Vaishvanara churna (n=37)</i>	0.20	41.49	0.37	0.12	7.44	<0.01
<i>Vaishvanara churna + Shankhapuspi churna (n=36)</i>	0.48	52.00	0.54	0.08	5.03	<0.01

**Table 6:** Effect of Therapy on Hamilton's Depression Rating Scale:

Group	Mean	%	S.D.	S.E.	t	p
<i>Vaishvanara churna (n=37)</i>	0.31	47.01	0.42	0.06	5.38	<0.01
<i>Vaishvanara churna &amp; Shankhapuspi churna (n=36)</i>	0.38	55.44	0.58	0.09	4.41	<0.01

**Table 7:** Effect of therapy on Stress induced Anxiety and Depression

Group	Effect on Hamilton Anxiety Rating Scale (% improvement)	Effect on Hamilton Depression Rating Scale (% improvement)	Average relief
<i>Vaishvanara churna (n=37)</i>	41.49%	43%	42.24%
<i>Vaishvanara churna + Shankhapuspi (n=36)</i>	52%	54.44%	53.22%

**Table 8:** Comparative effect on Hamilton Anxiety Rating Scale

Symptom	Group	<50%	≥50%	λ <sup>2</sup>	t	Significance
Tension	Group A	18	9	9.75	0.002	HS
	Group B	8	26			

By applying the Chi-square test to compare the significance of both groups on Hamilton Anxiety Rating scale, it was observed that Group B was highly significantly better than Group A in relieving tension (p=0.002) (Table 8). By applying the Chi-square test to

compare the significance of both groups on Hamilton Rating Scale for Depression, it was observed both the groups are equally effective in improving the Hamilton Rating Scale for Depression.

**Table 9:** Overall effect of therapy

Patient	Improvement of Rogabala	Improvement of Dehabala	Improvement of Agnibala	Improvement of Chetasabala	Total Average % relief
Vaishvanara Churna (n=37)	62.65%	45.44%	55.14%	41%	51.05%
Vaishvanara Churna + Shankhapushpi (n=36)	64.71%	67.00%	70.22%	57.02%	64.73%

**Table 10:** Overall Effect of Therapy

Effect of Therapy	Vaishvanara Churna (n=37)		Vaishvanara Churna + Shankhapushpi (n=36)	
	No. of patients	Percentage	No. of Patients	Percentage
Complete Remission (100%)	0	0%	0	0%
Marked Improvement (>75% - < 100%)	0	0%	5	14%
Moderate Improvement (>50% - 75%)	17	45.94%	20	55.55%
Mild Improvement (25% - 50%)	14	37.83%	9	25%
Unchanged (<25%)	6	16.21%	2	05%

## DISCUSSION

**Probable mode of action of Vaishvanara Churna & Shankhapushpi:** Most of the constituents of *Vaishvanara churna* have *Ushna Veerya, Madhura, Katu Vipaka and Vata Kapha Shamaka* properties. It has *deepana, pachana, anulomana* properties and improves the status of *Agni* to prevent *Ama* formation and vitiation of dosha, helping the food digested and expelled. *Vedanasthapana* (analgesic) property of *Ajwain & Shunthi* helps in relieving pain and *anulomana* property of *Haritaki, Ajmoda* and *Ajwain* helps in releasing accumulated gas and relieving the symptoms produced due to constipation. *Haritaki* (*Terminalia chebula*) is a main ingredient of *Vaishvanara churna*, indicated as *anulomaka* drug in the classics, possessing *deepana, pachana, vedanasthapana* and *malapravartaka karma*. It increases the digestive fire and clears undigested residues (*ama*). It descends *apana vayu*. As a decoction it is more astringent as the tannins are water soluble and as a tincture or powder it is more laxative<sup>19</sup>. Its

sennosides treat constipation. It is salutary in digestive upset. It works as a natural cleanser for digestive system and its effects further extend to the further regions of the system like liver, spleen, colons because it is extensively consumed as a digestive tonic<sup>20</sup>. In the control of habitual constipation, it "not only acts as a laxative but restores natural tone to the colon. One of numerous studies of *Haritaki* demonstrated its 'anti-vata' or anti-spasmodic properties by the reduction of abnormal blood pressure as well as intestinal spasms. It is absorbed from the small intestine, but they are hydrolyzed by bacteria to the active aglycones, which are partly absorbed in the colon and are excreted predominantly in the feces<sup>21</sup>. It inhibits growth of harmful intestinal bacteria without suppressing the growth of the beneficial lactic acid producing bacteria<sup>22</sup>. Neurodegenerative changes in the enteric nervous system (ENS) may be key to functional changes observed with advanced age which might be delayed or protected using *Terminalia chebula* as it is the most powerful antioxidant

compound<sup>23</sup>. Antioxidants are essential for protecting the vital organs in the body from oxidative stress. Obstruction caused by feces can cause greater pressure in the anus area, making constipated people pass more gas. In addition, the presence of feces and bacteria makes the gas smell worse. Essentially, constipation can cause an individual to pass more gas. Conversely, gas can increase the likelihood of getting constipated. As gasses build up in the body, an individual experience more pain. *Ajamoda* ensures good digestion and timely bowel movements there by reducing and finally relieving pain, occurring because of irregular and rare bowel movements which results in the pain of anal region. It is carminative, stimulant and anti-spasmodic and useful in colic, relief of flatulence and dyspepsia<sup>24</sup>. Fluid balance is necessary to correct bowel function. *Saindhava lavana is deepana, pachana, ruchivardhaka, kapha vilayana*. Further, due to *chhedana* property it may remove the obstruction created by hard stool and due to osmosis, water from blood and body fluids enter the intestines to decrease its concentration, thus creating a semi liquid content in the intestine which has to go out quickly, creating pressure and softens the stool by preventing the decreased stool water content which is mostly found in the elderly constipation. *Shankhapushpi* is one of the best *medhya rasayan* which has good action on *manovaha srotas* and effective in weakness of the brain and its related disorders like *Unmada, Apasmara, Anidra, and Bhrama*. Because of its *picchila, anulomaka and madhura vipaka*, it is effective in *Vibandha*. It has an established anti-stress, anti-depressant, and anxiolytic properties. Since the stress is one of the causative factors in the pathology of constipation in geriatric people, the therapy is more effective when *Shankhapushpi* was added as an adjuvant with *Vaishvanara churna*.

## CONCLUSION

Stress can influence brain and bowel functions causing dysregulation of brain-gut axis in elderly constipation. *Shankhapushpi* as adjuvant to principal drug *Vaishvanara churna* showed significantly better effect in relieving the symptoms like *Mala sanga, Udara shula* and *Hridaya uparodha*. This combination was highly

significantly better in relieving tension due to anti stress, anti-depressant and anxiolytic property of the *Shankhapushpi*. The combination not only significantly relieved the chief complains of constipation, stress and tension in elderly persons but also improved the overall wellbeing of the patients by improving *Dehabala, Agnibala, chetasabala* in elderly patients suffering with constipation. Thus, the study revealed that *Vaishvanara Churna* can be used effectively in the treatment of elderly constipation and *Shankhapushpi* has an edge when added to the principle drug *Vaishvanara churna* in the management of elderly constipation.

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