



## International Journal of Ayurveda and Traditional Medicine

### Role of *Sansarjana Krama* and various *Yavagu* in Malnutrition due to Chemotherapy induced Nausea and Vomiting.

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#### ABSTRACT

**Introduction:** Chemotherapy agents are the chemical agents. Their systemic administration may cause malnutrition due to gastrointestinal toxicities. Symptoms like nausea and vomiting, anorexia, diarrhea are more common, which leads to malnutrition. In *Sansarjana Krama*, administration of carbohydrates and proteins in a specific manner enhances the digestive and absorptive capacities.

**Method:** Ayurveda texts, Medical journals, Articles etc. have been scrutinized to gather the information.

**Result:** The incidence of nausea and vomiting depends on the emetogenic potential of the specific drugs, dose, combinations and treatment schedules. In SK, food is administered in sequence of carbohydrates, proteins and fat. Introduction of food in this sequence gradually increases the capacity of digestion and absorption. Also, according to different symptoms, *Yavagu* and *Peya* can be prescribed.

**Conclusion:** SK is necessary to level up the digestive power to its normal state. Prescribing SK may help in tackling the malnutrition due to chemotherapy induced nausea and vomiting.

**Keywords:** Chemotherapy; *Peya*, *Sansarjana Krama*; *Yavagu*.

#### INTRODUCTION

Chemotherapy agents are the chemical agents. Their systemic administration may cause malnutrition due to gastrointestinal toxicities. Symptoms like nausea and vomiting, anorexia, diarrhea are more common,<sup>1</sup> which leads to malnutrition resulting in higher complication rate and reduced tolerance for treatment.<sup>2</sup> Hospital stays are prolonged,<sup>3</sup> which directly affects the effect of treatment,<sup>4</sup> increase mortality,<sup>5</sup> as well as burden on health care resources.<sup>6</sup> According to Ayurveda, *Agnimandya* (weak digestive power) occurs due to chronic nature of the disease which further increases due to the use of these chemical agents. Hence it is necessary to improve the

*Agnibala* (Digestive power) so that appetite is improved and healing can occur. Here comes the role of *Sansarjana karma* (SK).<sup>7</sup> It is the sequential dietary regimen which is necessary to increase the digestive powers up to its normal state, as well as to provide the needful energy at that time.

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It is used after the purification therapy, namely in case of *Vamana* (Medicated induced emesis) and *Virechana* (Medicated induced purgation) where the *Agnibala* (Digestive power) decreases, and the person is not able to digest normal routine diet.

In our texts, the SK is decided based on *Shuddhi* (level of purification), which is estimated on the number of *Vega* (bouts) and the *Matra* (quantity of product expelled).<sup>8</sup> (Table 1) Use of *Yavagu* and *Peya* according to various conditions is also mentioned in our texts.

Hence an attempt has been made in this review to assess the usage of SK in chemotherapy induced malnutrition

Table 1. Number of <i>Vega</i> (bouts) and the <i>Matra</i> (quantity of product expelled)						
Purification	Vega (bouts)		Matra (Quantity)		Annakala (Diet schedule)/ Days	
	Vamana	Virechana	Vamana	Virechana		
Jaghnya (Low level)	4	10	1 Prastha	2 Prastha	4	3 days
Madhyam (Medium level)	6	20	1½ Prastha	3 Prastha	8	5 days
Pravara (Higher level)	8	30	2 Prastha	4 Prastha	12	7 days

Note: 1 prastha is equal to 640gm.

## METHODS

Ayurveda texts, Medical journals, Articles etc. have been scrutinized to gather the information. Keywords: *Sansarjana Krama* and *Yavagu* were observed through the literature review.

## RESULTS

### Method of Preparation and Administration:

Days of administration of SK depends on the type of *Shuddhi*<sup>9,10</sup> (Table 2.)

For a person taking a diet weighing 200 grams of food material per meal in a day, the amount of rice taken during SK will be ¼<sup>th</sup> i.e. 50 grams. The methods of preparation are done accordingly:

***Peya* (thin rice gruel)**<sup>11</sup> -1- part *Shastika* (*Oryza sativa* Linn) rice is mixed with 14 parts of water and heated up. If a large amount of water remains while the rice is cooked well, it is called *Peya*.

Example-50 gms of rice+ 700ml water

***Vilepi* (thick rice gruel)**<sup>12</sup> -1- part of *Shastika* rice (*Oryza sativa* Linn) is mixed with 4 parts of water and heated up. If less water remains while the rice is cooked well, it is called a *Vilepi*.

Example-50 gms of rice+ 200ml water

***Yusha* (black gram pulse soup)**<sup>13</sup> -1- part *Moonga Daal* (*Vigna radiate*) and 16- part water is heated until half of the water remains.

50 gms of pulses+800ml water

***Mansarasa* (meat soup) *Nirmanavidhi***<sup>14</sup> There are 3 types of *Mansarasa* (Meat soup) given according to their viscosity-

1. For thick viscosity-8 *Pala Mansa* is cooked with 1 *Prastha* water (320 gms meat+640ml water)
2. For medium viscosity -6 *Pala Mansa* is cooked with 1 *Prastha* water (240 gms meat+640ml water)
3. For thin viscosity -4 *Pala Mansa* is cooked with 1 *Prastha* water (160 gms meat+640 ml water)

### Nutritional Analysis:

The products contain their nutritional values.<sup>15</sup> Carbohydrates- *Peya* contains 92.3%, *Vilepi* contains 88.05%, *Akrityush* contains 60.89% , *Krityush* contains 77.2% , while carbohydrate content is negligible in case of *Mansarasa*.

Proteins- *Peya* contains 2.70%, *Vilepi* contains 8.12%, *Akrityush* contains 21.24%, *Krityush* contains 18.22%, *Akritmansarasa* contains 41.43% and *Kritmansarasa* contains 44.82% proteins.

On roasting, rice starch changes to resistant starch which escapes from the small intestine of healthy individual and get fermented by colonic bacteria.<sup>16</sup> The study done to assess nutritional composition and digestibility of puffed grains shows that total sugar content increases along with raise in gelatinization degree which helps in easy hydrolysis. Digestibility of starch and protein in grains is also improved after puffing.<sup>17</sup> Hence, studies shows that processed rice is preferable in the nutritional aspect.<sup>1</sup>

Day	Pravara Shudhi		Madhyam Shudhi		Avara Shudhi	
1	Evening	<i>Peya</i> (thin rice gruel)	Evening	<i>Peya</i> (thin rice gruel)	Evening	<i>Peya</i> (thin rice gruel)
2	Morning	<i>Peya</i> (thin rice gruel)	Morning	<i>Peya</i> (thin rice gruel)	Morning	<i>Vilepi</i> (thick rice gruel)
	Evening	<i>Peya</i> (thin rice gruel)	Evening	<i>Vilepi</i> (thick rice gruel)	Evening	<i>Krita yusha</i> (Black gram pulse Soup with salt and <i>ghee</i> )
3	Morning	<i>Vilepi</i> (thick rice gruel)	Morning	<i>Vilepi</i> (thick rice gruel)	Morning	<i>Krita mansa rasa</i> (meat Soup with salt and <i>ghee</i> )
	Evening	<i>Vilepi</i> (thick rice gruel)	Evening	<i>Akrita yusha</i> (Black gram pulse Soup without salt and <i>ghee</i> )	Evening	Normal Diet
4	Morning	<i>Vilepi</i> (thick rice gruel)	Morning	<i>Krita yusha</i> (Black gram pulse Soup with salt and <i>ghee</i> )		
	Evening	<i>Akrita yusha</i> ( Black gram pulse Soup without salt and <i>ghee</i> )	Evening	<i>Akrita mansa rasa</i> (meat Soup without salt and <i>ghee</i> )		
5	Morning	<i>Krita yusha</i> (Black gram pulse Soup with salt and <i>ghee</i> )	Morning	<i>Krita mansa rasa</i> (meat Soup with salt and <i>ghee</i> )		
	Evening	<i>Krita yusha</i> (Black gram pulse Soup with salt and <i>ghee</i> )	Evening	Normal Diet		
6	Morning	<i>Akrita mansa rasa</i> (meat Soup without salt and <i>ghee</i> )				
	Evening	<i>Krita mansa rasa</i> (meat Soup with salt and <i>ghee</i> )				
7	Morning	<i>Krita mansa rasa</i> (meat Soup with salt and <i>ghee</i> )				
	Evening	Normal Diet				

## DISCUSSION

The incidence of nausea and vomiting depends on emetogenic potential of the specific drugs, dose, combinations and treatment schedules which ranges up to 90%.<sup>19,20,21</sup> In some cases, delayed symptoms may appear.<sup>22,23</sup> It is believed that entero-endocrine cells in the GI mucosa are stimulated by the chemotherapeutic agent which leads to release mediators (prostaglandins, 5-hydroxytryptamine (5-HT), cholecystokinin and substance P) which stimulate vagal afferents resulting in nausea and emetic reflex.<sup>24</sup> Digestion and absorption decreases, appetite reduces.

In SK, food is administered in sequence of carbohydrates, proteins and fat.<sup>25,26,27</sup> *Peya* contains more liquid along with carbohydrates which are absorbed easily by the intestinal lumen in this form. *Manda* and *Vilepi* contain less liquid with higher amounts of carbohydrates. In the case of *Yusha*, it is prepared from cereals and pulses. Cereals and pulses are the simplest form of protein derived from plants. Finally, complex proteins are given in the form of meat soup. In this way all forms of food are introduced which gradually increases the capacity of digestion and absorption.

In the context of different conditions *Deepniya Yavagu*<sup>28</sup> may help in enhancing the intake capacity while *Pachani peya*,<sup>29</sup> may increase the digestive capacity. *Pipasahara yavagu*<sup>30</sup> might help in curing the excessive thirst. *Sangrahi yavagu*<sup>31</sup> may be used in case of diarrhea. *Vata anulomani yavagu*<sup>32</sup> may help in proper regulation of peristaltic movements. Once the digestion improves, we can use *Snehani yavagu*<sup>33</sup> and *Brimhani yavagu*<sup>34</sup> to improve the nutritional status of the patient.

## CONCLUSIONS

*Sansarjana karma* is necessary to level up the digestive power to its normal state after *Sanshodhana* (Purification) is done. So, it can help in improving malnutrition due to chemotherapy. With the enhancement in the technology, various new techniques are to be used for planning as the ultimate goal of every treatment plan is providing best care and treatment to the patients.

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Source of Support: Nil  
Conflict Of Interest: None Declared

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