

## UNDERSTANDING THE ROLE OF VIRECHANA KARMA IN METABOLIC ENDOTOXEMIA

**Divya Darshini M.<sup>1\*</sup>, Shreyas D. M.<sup>2</sup> and Kiran M. Goud<sup>3</sup>**

<sup>1</sup>PG Scholar, Department of PG Studies in Panchakarma, Sri Kalabyraveswarswamy Ayurvedic Medical College Hospital and P.G. Research Centre, Bengaluru, Karnataka, India.

<sup>2</sup>Associate Professor, Department of PG Studies in Panchakarma, Sri Kalabyraveswarswamy Ayurvedic Medical College Hospital and P.G. Research Centre, Bengaluru, Karnataka, India.

<sup>3</sup>Professor and Principal, Department of PG Studies in Panchakarma, Sri Kalabyraveswarswamy Ayurvedic Medical College Hospital and P.G. Research Centre, Bengaluru, Karnataka, India.



**\*Corresponding Author: Divya Darshini M.**

PG Scholar, Department of PG Studies in Panchakarma, Sri Kalabyraveswarswamy Ayurvedic Medical College Hospital and P.G. Research Centre, Bengaluru, Karnataka, India.

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### ABSTRACT

The act of expelling vitiated *Doshas* through *Adhobhaga* is known as *Virechana*. It is one of the five *Shodhana* that helps to eliminate vitiated *Doshas*, whilst, exerts an extensive range of action in the body, suggesting that it has both systemic and local effects. Lifestyle diseases are major health concern in India and the number of cases is increasing, especially in urban areas. Unhealthy high caloric diet, lack of physical activity, low caloric metabolism, gut dysbiosis, exposure to pollutants are some of the causes of lifestyle diseases leading to metabolic endotoxemia and *Virechana* plays a pivotal role in managing these.

**KEYWORDS:** Virechana, Lipid allergies, Metabolic-endotoxemia, Mode of action.

### INTRODUCTION

Treatment of diseases are broadly categorized into two, *Shodhana* and *Shamana*, while, *Shamana* focus on palliating vitiated *Doshas*, *Shodhana* therapy aims to eliminate excessively vitiated *Doshas* from the body thereby providing complete cure. *Acharya Charaka*, emphasizes the importance of *Shodhana* therapy, stating the *Doshas* subdued by *Shamana* may get provoked but in case of *Shodhana*, there is seldom possibility of such recurrence.<sup>[1]</sup> This emphasis on *Shodhana* therapy sets the stage for exploring one of its key components, *Virechana*. Metabolic endotoxemia refers to a condition where elevated levels of bacterial lipopolysaccharide (LPS), a component of the outer membrane of certain bacteria, are present in the bloodstream, leading to a state of low-grade systemic inflammation Obesity, diabetes, and non-alcoholic fatty liver disease (NAFLD) can also cause an increase in gut permeability and potential pharmacological and dietary interventions could be used to reduce the chronic low-grade inflammation associated with endotoxemia.<sup>[2]</sup>

### Objectives

To understand the role of *Virechana* in reducing Metabolic endotoxemia and its associated inflammatory responses.

### Virechana Karma

Etymology- *Virechana* (*Vachaspathyam* 4847)<sup>[3]</sup>

*Vi* – *upasarga* (prefix)

*Richir* – *Rich dhatu* (root)

*Lut* – *Pratyaya* (suffix) – *Maladir nissarane*.

### Definition

*Tatradoshaharanam Adhobhagam Virechana Sanyakam.*<sup>[4]</sup>

The act of expelling dosha from *Adhobhaga* (*Guda Marga*) is called as *Virechana*.

*Virechana* is employed in *Pitta Pradhana*, *Pitta Pradhana Kapha Samsrushta* and *Pitta sthanagata Kapha conditions*.<sup>[5]</sup>

### Importance of Poorvakarma

A pre requisite to perform *Panchakarma* is that, *Doshas* has to be brought back to *Koshta* from *Shaka* and must get rid of *Leenavastha* and attain *Pradhana Avastha*.<sup>[6]</sup> This is primarily done by *Poorvakarma* which enables to prepare the body for *Shodhana*.

### Pachana - Deepana

*Pachana* and *Deepana Dravyas* plays an important role in bringing *Sama* to *Nirama* state. *Acharya Vagbhata* emphasizes the importance of *Pachana Deepana* by

mentioning that *Mrudu Bhesaja*<sup>[7]</sup> has to be administered before starting *Snehapana* to enhance the *Agni* and bring lightness in the *Koshta*. Thus, *Pachana* and *Deepana* are highly efficient as *Poorva karma* in *Samsodhana karma*.

### Snehana

Before adopting *Shodhana*, it is necessary to do *Snehana* and *Swedana* properly. *Snehapana* is a major preparatory procedure because of its multifaceted action. *Shodhananga Abhyantara Snehapana* is advised before *Virechana*. Three essential factors to be taken into account before starting *Shodhananga snehapana* are

1. *Snehasatmya*<sup>[8]</sup>
2. *Kleshasaha*
3. *Kale na ati ushnasheetale*

1. *Snehasatmya* – Before administering *Snehapana*, it is crucial to ensure that the patient is accustomed to consuming *Sneha* to minimize the risk of adverse reactions. Recent studies have identified, oleosins,<sup>[9]</sup> structural proteins that surround the oil bodies in plant-based oils, such as sesame (*Tila Tila*), peanut etc. can cause allergic reactions in susceptible individuals.

2. *Kleshasaha* – refers to '*shaktalakshana balayukta*'<sup>[8]</sup> since *Shodhananga Snehapana* is given in *Bahumatra* and the person must be able to withstand *shiroruk*, *bhrama*, *murcha*, *angamarda* and *klama*, which can be encountered during the digestion of *Bahumatra sneha*.

3. *Kale na ati Ushnasheetale* – *Virechana* should not be administered during extreme *Ushna* or *Sheeta kala*. People tend to be less active and eat more fatty and processed foods in the winter in addition to that less sunlight in the environment can increase cholesterol levels. LDL cholesterol levels tend to be higher in the winter than in the summer. Higher temperatures increase membrane fluidity because the lipids gain thermal energy and move around more, this could also be one of the reason for *Atiyoga* during *Ati Ushna kala*.

*Snehana* does '*Sneho anilam hanti mrudu karoti deham malanam vinihanti sangam*'<sup>[10]</sup>

*Sneha* pacifies *Vata*, softens the body and breaks down the morbid materials in the body. Ghee/oil contains linoleic acid, which can help lower LDL levels. It can also increase the excretion of cholesterol in faeces and inhibit cholesterol biosynthesis.

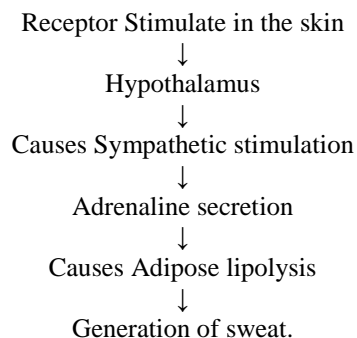
### Swedana

*Swedana* employed as *Poorvakarma* helps to bring *Doshas* from *Shaka* to *Koshta*.

The ability of cell to change shape and move in response to external forces is cell fluidity, and temperature rise corresponds to enhanced fluidity.

Enhanced heat in superficial tissues stimulates metabolic activity, increasing oxygen and nutrient demand. This, in

turn, boosts waste product generation, facilitating their removal. *Swedana karma* hastens this process by increasing the permeability of capillary and bringing the morbidities into an extracellular fluid by dilating and clearing the channels of the body. Finally, *Swedana karma* facilitates the transport of metabolites into the blood and lastly into *Koshta* for easy elimination



### Understanding Dosh Gati from Shaka to Koshta

1. *Vruddhi* – For *Vruddhi* of the *Doshas*, *Sneha* is consumed in empty stomach in the morning in *Bahumatra*. The symptoms of *Rasa Vridhi* like *Hrillasa*, *Praseka* signifies the increase of *Kledata/Apyamsha* in the body which is the action of *Snehana* i.e., *Vridhi* for bringing the *Doshas* from *Shaka* into the *Koshta* from where they can be easily expelled out.

2. *Vishyandanat* – "*vileenascha dravatvaadeva koshte nimnam yaati*."<sup>[11]</sup> *Snehana* does *Vishyandana*, during *Snehapana* there is an acceleration of fat utilization for energy in the absence of carbohydrates. This absence of carbohydrate replenishment promotes mobilization of fatty acids from the adipose tissue.

3. *Pakat* – "*pakvo dosho abaddhatvena eva nimnam koshtam yaati*."<sup>[11]</sup> Production of *Sweda* physiologically occurs by *Paka* of *Sukshameda*. *Swedana* drugs by *Ushna* and *Tikshna guna* are capable of penetrating the *Sukshma Srotas* where they activate the sweat glands to produce more sweat. The heat in the form of *Swedana* influences even the biphospholipid layer of cells and the lateral distance between the tails of the phospholipids that form the bilayer increase progressively when the films are heated, which increases permeability of cells.

4. *Srotomukha vishodhanat* – "*avarodha apagamat*"<sup>[11]</sup> While describing the benefits of the *Swedana Karma*, *Acharya Sushruta* says that *Swedana* creates *Nirmalatva* in the *Srotas*.

5. *Vayoscha Nighrahat* – "*Prakrutam sthanam koshtam yaati*"<sup>[11]</sup> The first line of management of *Vata Dosh* according to *Acharya Vagbhata* is *Snehana* and *Swedana*. So *Vata Dosh* can be controlled very well by the *Snehana* and *Swedana*.

### **Virechana Karma – Mode of Action according to Ayurveda**

*Amashaya* is the specific seat of *Pitta Dosha*, even though *Virechana* is the specific therapy for morbid *Pitta Dosha*, it also can be used for elimination of *Kapha Dosha*. *Pitta Dosha* clears not only from the *Amashaya* but from all over the body i.e., from cellular level. It is worth mentioning that *Virechana Karma*, unlike the modern purgatives, is not merely an act to clean the bowel, but it is a complete therapeutic measure which has systemic as well as local effects.

*Virechana* drugs are having *Ushna*, *Teekshna*, *Sukshma*, *Vyavayi*, *Vikashi* properties and *Adhobhagahara Prabhava*. *Virechana dravya* gets absorbed by its *Veerya*, it reaches to *Hridaya*, then the *Dhamani* and thereafter it reaches to macro and micro-channels of the body i.e. *Sukshma srotas*. *Ushna Guna* has *Agneya* property and hence the *Dosha Sanghata* is liquified (*Vishyandana*). Hence it facilitates movement of morbid *Doshas* towards *Kostha*. Due to *Teekshna Guna*, *Mala* and *Doshas* breaks up in micro form that helps in quick excretion. Due to *Pranava bhava* of *Sukshma Guna*, it opens micro channels and makes the *Doshas* to move towards *Kostha*. Due to *Vyavayi Guna* these drugs spreads quickly throughout the body and starts their action before its digestion. *Vikashi Guna* of drugs causes loosening of the bond between *Dosha* and *Dhatu* causing *Dhatu Shaithilya*.

*Acharya Charaka* while explaining about *Dhamani*, mentions '*sakaladehagata dhamani anusrutya*'<sup>[12]</sup> and the *Virechana dravya* due to its *Veerya* enters into *Dhamanis*, which gives us evidence that *Virechana* is not solely to clear the bowel but has its effect in overall body.

### **Laxatives and Purgatives**

**Bulk forming laxatives:** Increases the weight and consistency of stool, which stimulates the bowel and enables easier evacuation.

**Osmotic laxatives:** Osmotic laxatives are poorly or non-absorbed substances that create an osmotic gradient in the colon. This gradient causes water and electrolytes to be secreted into the colon. The water retention in the colon increases the water content of the stool, making it softer and easier to pass.

**Stool softeners:** Reduces the surface tension of stool which allows more water and fat to be absorbed, thereby softening the stool and making it easier to pass.

**Irritant purgatives:** They irritate the intestinal cells causing the intestine to contract, which is responsible for the purgative action. They also promote water influx to the intestine, which in turn promotes bowel movement propels the bowel down by peristalsis.

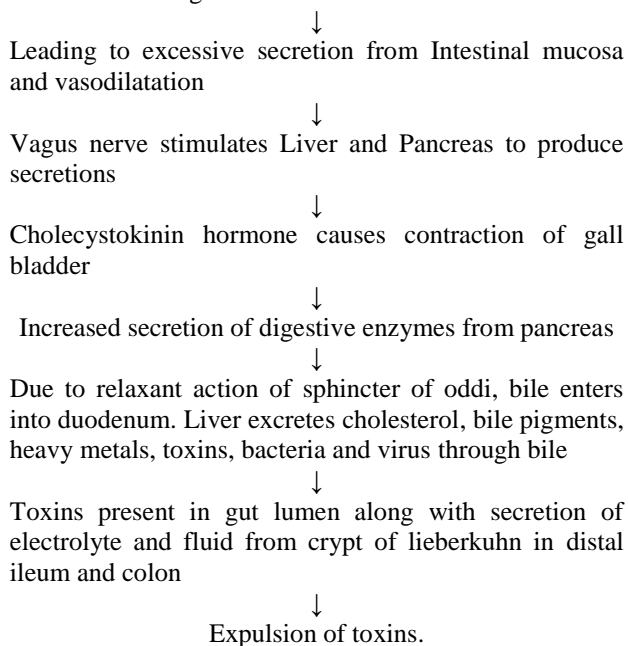
### **Mode of action according to modern**

*Virechana dravya* are mild irritant to the stomach and the intestinal mucosa. Local hyperaemia occurs due to arteriolar dilatation and capillary dilatation. Exudation of protein rich fluid through the vessel wall in the intestinal tissue helps in dilution of toxins.

*Virechana* drugs causes irritation in intestinal mucosa, thereby leading to excessive secretions from intestinal mucosa like hepatocrinin, secretin and cholecystokinin. This leads to irritation and stimulation of vagus nerve. The vagus nerve stimulates pancreas & liver to produce secretions. Bile is secreted due to contraction of Gall Bladder due to irritation & stimulation of vagus nerve. Bruner's gland are stimulated which secretes mucus. Whenever a segment of large intestine irritates, then mucosa secretes large quantities of water and electrolytes in addition to alkaline mucus. This leads to dilution of irritating factors and cause rapid movements of the faeces towards anus.

The metabolites with a molecular weight of > 300g/mol and with both polar and lipophilic groups are more likely to be excreted in bile.<sup>[13]</sup>

*Virechana* drug Cause Irritation in Intestinal mucosa



### **Virechana in preventing inflammation and cell injury**

Inflammatory cells like neutrophils and macrophages release toxic substances like proteases and reactive oxygen species that can directly damage cell membranes and intracellular components, causing cell necrosis. Pro-inflammatory cytokines like activates signalling pathways within cells, leading to changes in gene expression that can disrupt cellular homeostasis and promote cell death. The breakdown of cell causes an increase in the number of small molecules within the cytoplasm with increased intracellular fluid. This may accelerate vacuolar degeneration. In *Virechana*, the

water loss from gut may shift the intracellular fluid to colon and thus restrict cell degeneration/death.

## DISCUSSION

The faulty lifestyle, consumption of junk food, stress, inadequate sleep and avoidance of *Sadvritta* are the major reasons of vitiation of *Doshas* which leads to disturbance in the functioning of *Agni*. Once *Agni* becomes *Dushti* it does not do *Pachana* of *Anna* and causes *Shukrtatva* of *Anna* which is *Bahuvikarakari* and manifest as wide spectrum of diseases according to the site of impact.

Factors contributing to metabolic endotoxemia are high fat diet, gut dysbiosis, obesity etc. A change in pH can cause a shift in the composition of the gut microbiome. Diet-induced metabolic endotoxemia has been proposed as a major root cause of inflammation and these pathways emerge as detrimental factors of healthy ageing.

Endotoxins (Lipopolysaccharides, LPS), a major component of the outer membrane of Gram-negative bacteria, are contributors to the inflammation. Although LPS may originate from skin and mucous membranes or local sites of bacterial infection for instance, the gut microbiota is considered the main natural reservoir of pro-inflammatory endotoxins in the body. Endotoxins are released when bacteria die, and then dissociated endotoxins are able to cross the gastro-intestinal barrier to end up in the bloodstream. Endotoxin or lipopolysaccharide (LPS) is a major glycolipid component of the cell wall of gram-negative bacteria and, if absorbed into the circulation, activates the release of host-derived inflammatory mediators to induce a systemic inflammatory response. Endotoxemia occurs in obesity, is accompanied by several metabolic disorders, and is associated with low-grade systemic inflammation. Endotoxemia is derived from the gut and must reflect enhanced intestinal permeability or major changes in gut bacterial species. Stress also increases intestinal permeability and causes low grade inflammation and endotoxemia.<sup>[14]</sup>

Thus, *Virechana* is targeted to create a biochemical alteration as it modulates the fluid compartments of the body. It changes the *E. coli* colonization and further induces the stability of gut flora. Studies have shown the changes in metabolites across many pathways such as phospholipid biosynthesis, choline metabolism, and lipoprotein metabolism by regulating pro-inflammatory cytokines, immunoglobulins and functional properties of T-cells.<sup>[15]</sup>

## CONCLUSION

*Virechana* by its *Ushna*, *Teekshna*, *Sukshma*, *Vyavayi*, *Vikasi gunas* clears the accumulated toxic materials resulted due to metabolic activity through secretions of liver, bile, intestinal mucosa along with the unabsorbed residues of gastrointestinal tract. It regulates chemo-

enzymatic secretion and intestinal mucosa. Thus *Virechana* helps to get rid of the toxins present in the body, thereby cleansing and rejuvenating each and every cell of the body. *Acharya Sushruta* highlights the importance of *Virechana* by stating, it brings in *Prasadata* of *Buddhi*, strengthens the *Indriya*, firmness of the organs and of the *Dhatus* of the body, increase *Bala*, improved digestive capacity and slows down the ageing/degeneration. The deranged *Pitta* of the system, having been fully removed by *Virechana*, precludes the possibility of the existence of any *Pitta*-originated *Rogas*.

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