

## REVIEW ARTICLE

# ROLE OF *LEKHANA BASTI* IN THE MANAGEMENT OF METABOLIC SYNDROME – A REVIEW

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### ABSTRACT

Metabolic Syndrome is a complex metabolic disorder and an emerging clinical challenge in society as 11% - 41% Indians and around 1 out of 4 adults worldwide are suffering from this syndrome. It is associated with the development of CVD, Type 2 DM and other life threatening problems. It arises due to fatty rich diet, sedentary lifestyle, stress, excessive alcohol, overweight, age etc. It is clinically recognized when at least 3 out of 5 biochemical and physiological abnormalities like visceral obesity, dyslipidemia, hypertension, raised blood sugar, insulin resistance etc are found in the body. *Acharya Charaka* has mentioned a group of diseases namely *santarpana nimittaj vikara* (diseases due to over nutrition) which can be symptomatically co-related with Metabolic Syndrome. Treatment offered by modern science does not deal with the removal of harmful metabolites created in the body during the development of diseases. *Ayurvedic* treatment like *lekhana basti* (medicated enema) emphasize mainly in the removal of vitiated *doshas* (three humours-*vata, pitta, kapha*) and cleansing congested *srotas* (channels) helping in removing harmful metabolites from the body which not only prevents but also uproots the cause which may further manifest into more complicated conditions.

**Key words:** Metabolic Syndrome, *santarpana nimittaj vikara*, *lekhana basti*

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## INTRODUCTION

In recent years Metabolic Syndrome is gaining too much importance because of its complex etio-pathogenesis, clinical presentation, management and major complications. It consists of various components which are result of defective metabolism and increases the risk of Coronary Artery diseases and Diabetes Mellitus<sup>[1]</sup>. It is a major health hazard in the developed countries and gradually accruing its place in developing countries too, which leads to other hazardous complications such as Chronic Artery Disease, Chronic Kidney Disease, Non Alcoholic Fatty Liver Disease and Poly Cystic Ovarian Disease etc<sup>[2]</sup>. Initially Metabolic Syndrome was known as Syndrome X or Insulin Resistance syndrome<sup>[3]</sup>. Syndrome X was the name proposed by Reaven (1988) in a lecture of the American Diabetes Association<sup>[4]</sup>. The sedentary life style and unhealthy food habits contributes a lot in rising rates of obesity, which is a major contributor to develop Metabolic Syndrome<sup>[5]</sup>.

### **Disease review (modern):**

Metabolic Syndrome is clinically recognized when at least 3 out of 5 biochemical and physiological abnormalities like visceral obesity, elevated triglycerides, dyslipidemia, hypertension, raised blood sugar, insulin resistance etc are found in the body and collectively share some common signs and symptoms like belly fat, fatigue,

breathlessness, polyuria, high appetite etc. In Metabolic Syndrome different diseased conditions arise due to disturbed metabolism of lipids esp. FFA (free fatty acids) which further affects functioning of liver, pancreas, kidneys, heart and worsening the biochemistry of blood by increasing the level of VLDL, LDL, TGL, glucose insulin, endocrine secretions of triglycerides like TNF, interleukins etc. Many definitions of Metabolic Syndrome have been proposed from time to time. But the most widely accepted definition worldwide is of the NCEP ATP III. According to this definition, a subject has Metabolic Syndrome if he or she has three or more of the following criteria<sup>[6]</sup>.

1. Abdominal obesity: WC  $\geq$ 102 cm in men and  $\geq$ 88 cm in women
2. Hypertriglyceridemia:  $\geq$ 150 mg/dl (1.695 mmol/l)
3. Low HDL-C:  $<$ 40 mg/dl in men and  $<$ 50 mg/dl in women
4. High blood pressure (BP) :  $>$ 130/85 mmHg
5. High fasting glucose:  $>$ 110 mg/dl

Subsequently, the NCEP ATP III has also suggested that the fasting plasma glucose concentration for diagnosing Metabolic Syndrome be lowered to 100 mg/dl<sup>[7]</sup>. Researchers worldwide preferred using the NCEP ATP III definition because it was relatively simple and clinically applicable.

**Ayurvedic review:**

The classical Ayurvedic texts have vividly described *santarpana nimittaj vikara* comprising diseases due to over nutrition and

defective tissue metabolism seem to have similarity with Metabolic Syndrome. Following table shows aetiopathogenic factors of Metabolic Syndrome.

**Table 1: The *samprapti ghataka* (aetiopathogenic factors) of Metabolic Syndrome [8].**

<i>dosha</i>	predomonantly <i>kapha</i> (mainly <i>kledaka</i> ) <i>pitta</i> (mainly <i>pachaka</i> ) <i>vata</i> (mainly <i>samana</i> and <i>vyana</i> )
<i>dushya</i>	<i>rasa, rakta, mamsa, meda, majja, shukra</i> and <i>oja</i> (mainly <i>meda</i> )
<i>Agni</i>	<i>medodhatu agnimandya</i>
<i>srotas</i>	<i>rasavaha, raktavaha, mamsavaha, medovaha, majjavaha</i> and <i>shukravaha</i> (mainly <i>medovaha</i> )
<i>strotodushti</i>	<i>sanga, vimarga gamana, Atipravritti</i>
<i>adhishthana</i>	<i>sarva shaira</i>
<i>udbhavasthana</i>	<i>Amashaya</i>
<i>prasara</i>	<i>rasayani</i>
<i>Ama</i>	<i>dhatvagni mandata janya</i>

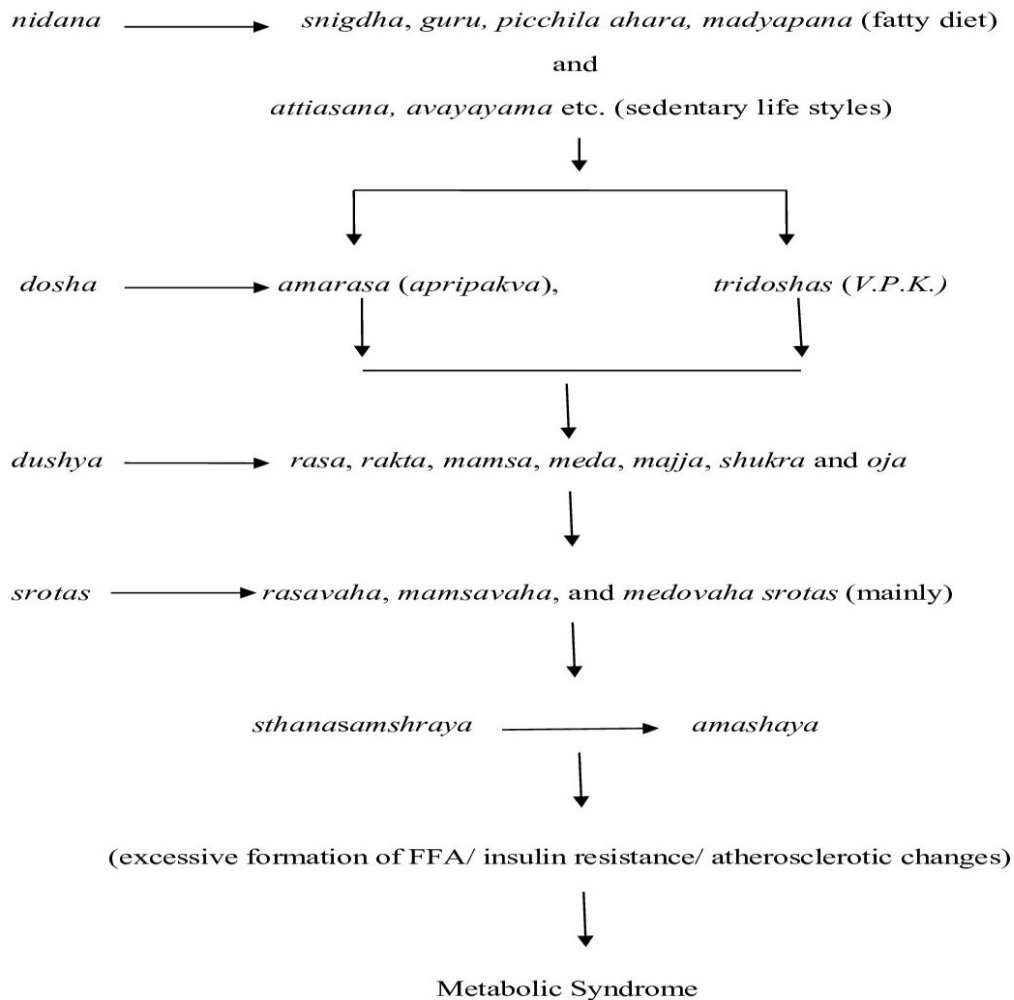
In the pathogenesis of Metabolic Syndrome, *agni* (biochemical transformers) plays a very important role since beginning to the end. In the cases of Metabolic Syndrome, *agni mandata* (slow digestion) especially at the level of *medo dhatu* (adipose tissue). *Agni* is the root cause of Metabolic Syndrome. *Dhatvagni* are seven in numbers. Each one is located in its specific dhatu to permit its moieties from the circulating substances derived after *bhutaagni paka* (digestion) to form its own tissue. In the process of *dhatvagni paka* (metabolic transformation)) *asthayi dhatu* (mobile or non-static, meant to nourish) or *sthayi dhatu* (fixed, already formed and existing) are formed.

Metabolic Syndrome is caused by the excessive intake of *madhura ahara* (food with sweet taste) *snigdha ahara* (fat rich diet), *adhyashana* (eating before digestion of previous food) and sedentary life style etc. Due to these *nidana* (causes), as *ahara* (diet) taken is not properly digested. This may lead to formation of *ama* (un-metabolized food) i.e. a reactive species. This form of *ama* is distributed all over the body with *ahara rasa* and mainly increases the *sama meda dhatu* (visceral adiposity) because of its excessive unctuous and sweet nature. This *ama* formation suggests that there is *dhatvagni mandata* (slow tissue metabolism) at the level of *meda dhatu*. It is pointed out by *Dalhana* and

Chakrapani in their commentaries on *Sushruta Samhita* that formation of *ama* need not necessarily be due to the *jatharagni mandata* (weak gastrointestinal metabolism) only and it

may also occur due to impairment of *dhatvagni vyapara* (tissue metabolism) [10].

Following flowchart shows pathogenesis of Metabolic Syndrome-



**Figure 1: samprapti (pathogenesis) of Metabolic Syndrome [9].**

**Management:**

In Modern medical science-moderate calorie restriction, fiber rich diet, increase in physical activity and quitting addiction (smoking & alcohol) is followed as primary intervention in treating metabolic syndrome. Further symptomatic drug therapies are used to pacify different diseased conditions like

antihypertensive drugs for hypertension, cholesterol reducing drugs, anti-diabetic drugs, Liposuction for removing subcutaneous fats etc. Treatment offered by modern medical science does not deal with the removal of harmful metabolites that are created in the body during the development of diseases.

Acharya Charaka and Shushruta described the treatment for *santarpana nimittaj roga* by *samshodhana* (purification and cleansing) procedures like *lekhana basti*, medicines, dietary changes and exercise <sup>[11], [12]</sup>.

Ayurvedic treatment includes *nidana parivarjana* (removal of cause) and use of drugs for the treatment of *santarpana nimittaj roga* like modern medicines but the main difference is in the concept of removal of *doshas* and cleansing congested *srotas* which in turn helps in removing harmful chemical metabolites from the body. *Lekhana basti* is an important *samshodhana karma* in the treatment of Metabolic Syndrome.

*Lekhana Basti:*

The word *lekhana* (scrapping) itself indicates its action means - "*lekhanam patlikaranam*".

"*lekhanam karshanam*" <sup>[13]</sup>. Thus *lekhana* is nothing but a process of emaciation while *Sarangadhara* considered *lekhana* in a wide sense i.e. *Lekhana* is a process of drying up or desiccation of all excess *dosha*, *dhatu* and *mala* i.e. "*deha vishosanam*" <sup>[14]</sup>.

"*Dhatun - malan va dehsya vishoshya lekhavechha yat lekhanam*" <sup>[15]</sup>. That means the drug which rarifies the protoplasmic contents of tissue cells and thus gradually clears the system of its deranged constituents is known as *lekhana*. This *basti* is prepared by following the method of *asthapana basti*. Ingredients of *lekhana basti* are taken from *Sharangdhar*

*Samhita* which comprise of *triphala kwatha*, *gomutra*, *honey*, *yavakshara* and *ooshakadi gana* <sup>[16]</sup>.

#### DISCUSSION:

Many works have been done on *lekhana basti* in obesity, hyperlipidaemia etc but not much work has been done on the role of *panchakarma* (the five cleansing procedures) therapies in Metabolic Syndrome.

Chaturvedi A, Rao PN, Kumar MA, Ravishankar B, Rao N, Ravi M. et al conducted a study on Wistar strain albino rats entitled "Effect and mechanism of *virechana karma* (therapeutic purgation) over fructose-induced Metabolic Syndrome: An experimental study. They found *virechana karma* to be effective in the management of Metabolic Syndrome <sup>[17]</sup>. Chaudhary Nidhi conducted a clinical trial on 30 patients with two sittings of *virechana* entitled "Clinical evaluation of *virechana* in management of Metabolic Syndrome" and she concluded that *virechana* had significant effect in the management of Metabolic Syndrome <sup>[18]</sup>.

As far as *lekhana basti* is concerned, Auti S. Swapnil, Thakar B. Anup, Ravishankar B. et al conducted a clinical trial on 22 patients of hyperlipidemia entitled "Assessment of *lekhana basti* in the management of hyperlipidemia "which were divided randomly into two groups (*lekhana basti* group and standard control group). The trial was conducted for 21 days and it was concluded

that *lekhana basti* had significant effect in reducing the symptoms of *medo dushti* and in reduction of objective parameters like weight, body mass index(BMI),body circumferences etc<sup>[19]</sup>.

Another clinical trial entitled “*Lekhana basti: an alternative for Bariatric Surgery*” was conducted by Gupta Arun, Sharma Pushpa, Kajaria Divya et al. They selected 10 patients of obesity and administered them with *udvartana* and *lekhana basti* (*kala basti* -6 *nirooha basti* and 10 *anuvasana basti* schedule) in 2 sittings with one month gap in between. It was concluded that *lekhana basti* produced significant result in both subjective and objective parameters of obesity<sup>[20]</sup>.

Sreelakshmi Chaganti, Kumari Shylaja R., Sanpeti V. Rajashekhar, Dasari Srilakshmi et al conducted a single blinded randomized controlled study entitled “Evaluation of efficacy of *ooshakadi lekhana basti* in hyperlipidemia-A single blinded randomized controlled study” on 45 hyperlipidemic patients divided into three groups,(a)*kalabasti*- in patients associated with obesity,(b)*kalabasti* in those not associated

with obesity,(c)those with or without obesity administered with antihyperlipidaemic drug atorvastin. It was found that, *ooshakadi lekhana basti* is effective in hyperlipidemia and more efficacious in the group of non-obese hyperlipidemic patients<sup>[21]</sup>.

Nisargi Ramachandra, Pathak Pankaj, C R Mythrey et al conducted a clinical trial on 22 patients entitled “The effect of *lekhana basti* in the management of *sthoulya*”It was a randomized controlled single blinded study with two groups, (a) *lekhana basti* (*kala basti* schedule), (b) standard control group. It was concluded that *lekhana basti* has a significant role in reducing BMI, VLDL cholesterol and triglyceride level<sup>[22]</sup>.

All the above mentioned studies prove *lekhana basti* to be highly efficacious in obesity and hyperlipidemia. As these are the key components of Metabolic Syndrome, *lekhana basti* would be highly effective in Metabolic Syndrome too.

In this article, the role of *lekhana basti* on Metabolic Syndrome is being described.

**Table 2: Drugs used in *lekhana basti***

Name	Rasa	Guna	Virya	Vipaka	Karma
Haritiki (Terminalia chebula)	kashya, tikta, madhura, katu, amla	laghu, ruksha	ushna	madhur	tridoshshamak Esp.vata
Bibhitak (Terminalia bellerica)	kashya	laghu, ruksha	ushna	madhur	tridosh shamak Esp, kaph
Amalaki (Emblica officinalis)	amla, madhur, tikta, kashya, katu	guru ruksha sheeta	sheeta	madhur	tridoshshamak Esp.pitta
Goumutra	katu, tikta, kashya, lavana, madhur	tikshana ushana, laahu	ushna	Katu	vata kapha shamak pitta prakopak
Madhu (Honey)	madhurkashya	guru ruksha, sukshmalekhna	sheeta	madhur	Tridoshhara
Yavakshar	katu	laghu, snigdha	ushna	Katu	kaph vatta shamak
Kasis Ferrous sulphate	amlatikta	Laghu	ushna	Katu	kaph vatta shamak
Hingu ferula narthex	katu	Laghu snigdha, tikshna	ushna	Katu	kaph vatta shamak
Saindhav lavana Rock salt	lavana	Laghu rooksha	sheeta	madhur	tridoshhara
Shilajatu	tikta	guru	sheeta	Katu	kaph shamak

### Mode of action of *lekhana basti*:

The drugs used for the preparation of *lekhana basti* possess *gunas* (qualities) like *katu* (pungent), *tikta* (bitter), *kashya* (astringent) *rasa*, *laghu* (light), *ruksha* (dry) and *tikshna* (sharp/pungent) *guna*, *ushna* (hot) *virya* (potent energy), *katu vipaka* (post digestive effect), *lekhana* (scrapping), *kapha vata hara*, *deepana* (appetizer), *pachana* (carminative) and *stroto shodhaka* (channel clearing) properties<sup>[23]</sup>. *Lekhana basti* works on whole body after entering into *pakvashaya* (large intestine) or *guda* (rectum and anus). *Guda* is said as *sharira mula* (base of the body) having *shiras* (blood vessels) and *dhamanis* (arteries), which spreads all over the body. *Basti dravya* normalize *apana vata* (*vata*

governing downward movements especially excretion) making it to function normal. It also enhances the function of *purisha* (stool). One of the functions of *purisha* is 'anila anala dharana', thus *basti* leads to correction of *agni dushti* (improper functioning of biochemical transformers). As metabolic syndrome is mainly due to *agni dushti*, *lekhana basti* helps in pacifying its symptoms by correction of *agni dushti*. As per modern appraise, the intestines are highly innervated. The *basti* drugs stimulate the specific receptors present in the intestines which activate the autonomic nervous system and send signals to the brain. This helps in removal of morbid *doshas* and excessive fat.

The multidimensional actions exerted by the *basti* are due to the usage of various

combinations of drugs [24]. The specific formulation called "*ooshakadigana dravya*" mainly possesses *katu, tikta, kashaya rasa, ushna, tikshna, laghu, rooksha gunas* are the inherent qualities with *ushna virya* and *katu vipaka*. These properties are *tejo guna pradhana* (mainly fire element) and are understood to act at the level of *jatharagni* enhancing the *dhatvagni* (metabolism). Thus the formation of *ama rasa* is avoided and sequential formation of *rasa, rakta* is achieved resulting in decreased production of *medodhatu*. Further it will not cause the *avarana* (occlusion) of *vata* which will not cause increased appetite which is usually set-in due to *jatharagni deepati*. Hence avoiding the patient in indulging in the causative factors. The *kshara guna* (alkaline property) effect of *gomutra, yavakshara* is increased by the synergistic effect of *ooshakadi gana* drugs as they also possess similar properties. The complete and final product of *lekhana basti* is a hyper tonic solution. After entering in the large intestine it creates the osmotic pressure gradient, favoring the body fluids transfer from hypotonic to hyper tonic solutions along with toxic materials like LDL cholesterol. This phenomenon preferably helps to drag the toxins (unwanted metabolites) from inter intra cellular levels to large intestine and are eliminated out of body. This LDL cholesterol has the affinity for toxins and thus becomes

harmful in the body. Rectum being rich in vasculature and the unique preparations of *lekhana basti yoga*, the drugs are absorbed and cross the rectal mucosa through selective permeability. The major active principles present in the above formulation are of alkaline nature. This normalizes physiological PH of rectal mucosa facilitating for growth of bacterial flora which results in the stimulation of enzymes for the proper metabolism of cholesterol. Most of the ingredients used in the formulation have been screened for antihyperlipidaemic activities. As mentioned above it is proposed that the drugs absorbed either reaches portal circulation through superior haemorohoidal veins from upper rectal mucosa or directly enters into the systemic circulation through middle and inferior rectal veins from lower rectal mucosa. These active principles that reaches liver, stimulates production of bile salts resulting in regularization of emulsification of fats thus avoiding fatty accumulation in liver and in blood cells. The active principles directly entering in to circulation reduces the *sandrata* (density) of blood by scraping the lipids in blood vessels with their alkaline property. Thus avoids the narrowing of arteries (atherosclerosis) which is major risk factor of CHD. Large intestine contains maximum number of nerve plexuses and lumbo sacral plexus that spread all over the body. *Vata*



*dosha* is considered to be the entity of functions performed by the above plexuses in the present context. Here by the virtue of *basti* treatment *vata* is channelized, causing stimulation of particular endocrine glands to release their enzymes like pancreatic lipase, acetyl-a coenzyme which are responsible for metabolism of lipids. *Basti dravyas* are absorbed into *sira* or *rasayani* (channels) that generally carries *rasa* (*plasma*) along with *rakta* (blood). The increased *meda dhatu* also goes to *deha sanchari* (travel all over the body) through these *sira* and *rasayani*. It is perceived as increased lipids circulating through *rasa* and *rakta*. Hence the drugs administered in the form of *basti* have effect even on *rakta dhatu* which is having the increased circulating lipids [25].

#### CONCLUSION:

From the above discussion we can conclude that *lekhana basti* is an important *samshodhana* procedure which plays a key role in removing harmful disease causing metabolites from the body, hence pacifying the symptoms of Metabolic Syndrome by cleansing the *strotas* of the body.

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