IJAPC

Volume 11 Issue 2,
2019

www.ijapc.com

2350-0204

GREENTREE GROUP PUBLISHERS

Int J Ayu Pharm Chem

REVIEW ARTICLE

www.ijapc.com

e-ISSN 2350-0204

Role of *Virechana Karma* in Metabolic Syndrome -A Review

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ABSTRACT

A diseased condition that arises in the body due to the development of at least 3 out of 5 or more biochemical and physiological abnormalities, like visceral adiposity, Hypertension, Dyslipidemia, Diabetes and Insulin resistance is often termed as Metabolic Syndrome. A person suffering from Metabolic Syndrome may develop Cardio Vascular Disease and Type 2 Diabetes Mellitus in future. Studies show that about 11% - 41% Indians and around 1 out of 4 adults worldwide have Metabolic Syndrome. Metabolic Syndrome increases a 3 fold risk of developing Myocardial Infarction or stroke and a 5 fold risk of developing type 2 Diabetes Mellitus. As far as morbidity and mortality is concerned Metabolic syndrome and Diabetes Mellitus are far ahead of HIV/AIDS. It has many synonyms, the most common being- Syndrome X and Insulin Resistance Syndrome. It may be caused due to fat rich diet, inactive life style, genetics, excessive alcohol, disrupted sleep, mood disorders, stress, overweight, increasing age etc. In *Ayurveda*, it can be symptomatically correlated with *Santarpana Nimittaj Vikara* (diseases due to over nutrition) described by *Acharya Charaka*. Modern medicine emphasizes on treating individual components of Metabolic Syndrome. On the other hand, *Ayurveda* believes in removal of the root cause by removing vitiated *Doshas* and cleansing congested *Strotas* (microchannel). *Virechana Karma* is an effective measure which helps in cleansing congested *Strotas* and removing vitiated doshas hence pacifying the symptoms of Metabolic Syndrome.

KEYWORDS

Metabolic Syndrome, Santarpana Nimittaj Vikara, Virechana Karma, Strotas, Doshas

Greentree Group Publishers

Received 10/08/19 Accepted 04/09/19 Published 10/09/19

INTRODUCTION

Metabolic syndrome is a group of certain factors like hypertension, dyslipidemia, insulin resistance, obesity and glucose intolerance that are risk factors for cardiovascular disease (CVD) and type 2 diabetes[1,2]. It is commonly known as Insulin Resistance syndrome or Syndrome X. The National Cholesterol Education Program Adult Treatment Panel III (ATP III) has defined a diagnostic criteria for Metabolic Syndrome which can be used to classify patients[3]. This syndrome affects about 20-30% of the middle-aged population[4].It affects about 8 to 24% males[5,6] and 7 to 46% females[7].Approximately, 20–25 percent of the world's adult population is suffering from Metabolic Syndrome[8].

DISEASE REVIEW (MODERN)

Metabolic Syndrome is a set of diseases that appear to be risk factors for cardiovascular disease and type 2 diabetes. Over the past 20 years, many definitions have been given for Metabolic Syndrome, but the most widely used is the NCEP ATP III definition as it is clinically most applicable. According to this definition, a subject has Metabolic Syndrome if he or she has three or more of the following criteria[9]:

1.Abdominal obesity: Waist Circumference ≥102 cm in men and ≥88 cm in women

2.Hypertriglyceridemia: ≥150 mg/dl (1.695 mmol/l)

3.HDL-C: <40 mg/dl in men and <50 mg/dl in women

4.Blood pressure (BP) : >130/85 mmHg

5.Fasting glucose: >110 mg/dl

Later on, the NCEP ATP III proposed that the fasting plasma glucose concentration for diagnosing Metabolic Syndrome be dropped to 100 mg/dl[10].

The most important risk factors are diet (particularly sugar-sweetened beverage)[11], genetics[12], aging, sedentary behaviour[13] or low physical activity[14], disrupted chronobiology/sleep[15], mood disorders/psychotropic medication use[16] and excessive alcohol use[17].

AYURVEDIC REVIEW

Obesity and lipid disorders have been highly considered in *Ayurveda* in context of *Medo Roga* and *Prameha*. *Santarpana Janya Vikara* have been described in *Ayurvedic* Parlance, as diseases due to over sustenance and diseases due to lack of sustenance. They seem to have similarity with Metabolic Syndrome. **Table 1**.shows the aetiopathogenic factors of Metabolic Syndrome[18].

Table 1 *Samprapti Ghatak (aetiopathogenic factors) of Metabolic Syndrome*

Dosha	predomonantly *Kapha* (mainly *Kledaka*) *Pitta* (mainly *Pachaka*) *Vata* (mainly *Samana* and *Vyana*)
Dushya	*Rasa*, *Rakta*, *Mamsa*, *Meda*, *Majja*, *Shukra* and *Oja* (mainly *Meda*)
Agni	*MedodhatuAgnimandya*
Srotas	*Rasavaha*, *Raktavaha*, *Mamsavaha*, *Medovaha*, *Majjavaha* and *Shukravaha* (mainly *Medovaha*)
Strotodushti	*Sanga*, *VimargaGamana*, *Atipravritti*
Adhishthana	*SarvaShaira*
Udbhavasthana	*Amashaya*
Prasara	*Rasayani*
Ama	*DhatvagniMandata Janya*

***Pathogenesis of Metabolic Syndrome with respect to Shatkriyakala[18]*:**

1. *Sanchaya*- Excessive indulgence in fattydiet and inactive life styles, aggravates Kapha Pradhan *Tridosha* (especially *Kapha Dosha*). This form of *Kapha* has physical similarity with *Ama* and *Medodhatu*, which get accumulated over immovable parts in vicious manner and finally the whole nutritional pool is shifted towards strengthening of *Medodhatu.*

2. *Prokopa*-The increase of *Kapha* in quantity and quality leads to disturbance in the functions of *Agni* at different level in the body especially at the level of *Bhutaagni* and *Medodhatvagni*. The deranged functions of *Agnis* may lead to formation of *Àma* at that level. Because *Kapha* and *Meda* are of same nature that's why *Ama* formed at *Medodhatvagni* level gets mixed with circulating *Annarasa / Ahararasa* and causes blockage of micro channels (*Srotosanga*). This blockage of micro channels can be compared with the downstream signaling of the Insulin receptors due to excess formation of Free Fatty Acids i.e. FFA (*Ama*).

3. *Prasara*- If a person is still consuming fatty and high calorie diet and following sedentary life style, this preformed and newly formed FFAs (mainly from the visceral adipose tissue) move continuously all over the body in the form of *Ama rasa*.

4. *Sthanasamshraya*- The circulating *Ama rasa* (FFAs from the visceral adipose tissue) gets localized at different places in the body. FFAs which are directed to the liver stimulate, release of different pro inflammatory mediators. In due course of time these inflammatory mediators play an important role in the pathogenesis of atherosclerosis. Most of the FFAs occupy the insulin receptors by molecular mimicry, may lead to Insulin resistance. Beside this, Insulin resistance creates a disproportion between production of NO and secretion of endothelin-I, leading to decrease blood flow and activation of sympathetic system which may lead to develop Hypertension.

5. *Vyakta*- If the whole process is continuously going on, it causes downstream signaling of the insulin receptors due to occupancy by the

circulating FFAs, which causes Insulin resistance and the condition known as Hyperinsulinemia. Initially this stage represents as postprandial hyperglycemia, then fasting hyperglycemia and finally as the Hyperglycemia or Type 2 DM. FFAs which are directed to the liver are associated with increased production of apo-B containing triglyceride rich VLDLs. Increased triglyceride level decreases HDL(good cholesterol) due to reduced cholesteryl ester of the lipoprotein core in combination with cholesteryl ester transfer protein mediated alteration in triglyceride, making the particle small and dense i.e increase in LDL concentration. Small dense LDLs are more atherogenic. They may be toxic to the endothelium, and they are able to transmit through the endothelial basement membrane and adhere to glycosaminoglycans and results in atherosclerosis and Hypertension.

6. *Bheda*- The manifestation of the *Upadrava* or the complication of Metabolic Syndrome such as Atherosclerosis, Cardio vascular diseases (CVDs) and Poly cystic ovarian disease (PCODs) etc. can be considered as the *Bheda* stage of Metabolic Syndrome.

Prevention strategies include increased physical activity (such as walking 30 minutes every day)[20] and a healthy, reduced calorie diet[21].

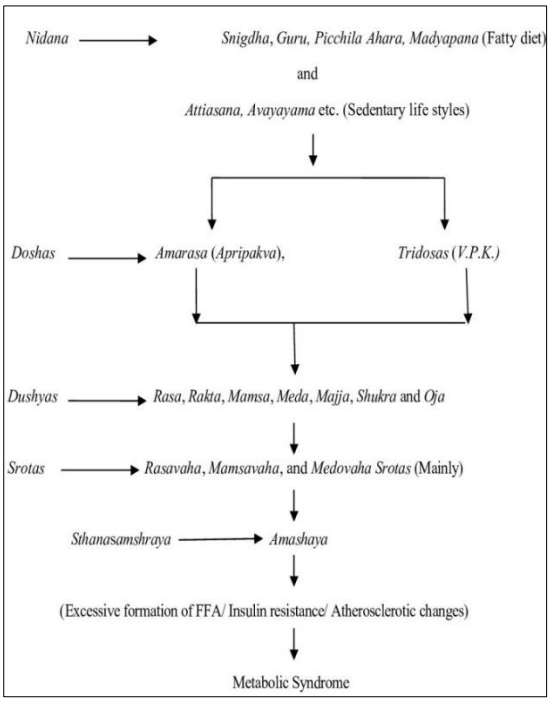

Figure 1 Pathogenesis of Metabolic Syndrome[19]

Management

Normally, various components of Metabolic Syndrome are treated separately[22].One can reduce weight simply by controlling carbohydrate intake in diet which would also reduce the blood glucose levels[23].

Ayurvedic management includes both *Samshamana* and *Samshodhana* procedures. *Samshamana* includes *Nidana Parivarjana*, yoga, exercises, *Agni* promoting drugs like *Guduchi, Shilajatu* etc, compound formulations like *Puskarabrahmi Guggulu, Medohara Guggulu and Punarnavadi Guggulu* etc. *Samshodhana* includes *Panchakarma* procedures like *Virechana, Lekhana Basti, and Raktamokshana*[24, 25].*Samshodhana* procedures help in removing *Doshas* and

cleansing congested *Strotas*. *Virechana Karma* is an important *Samshodhana* procedure in Metabolic Syndrome.

DISCUSSION

As such not much work has been conducted on the effect of *Panchakarma* procedures 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 efficacious in Metabolic Syndrome[26]. 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 Metabolic Syndrome[27].

In this article role of *Virechana Karma* in Metabolic Syndrome is being described.

HOW VIRECHANA WORKS? –A HYPOTHESIS

1. As per *Ayurveda*, the *Virechana* drug acts in *Pachyamana Awastha* i.e. the digestion of drug is in progress. So, *Virechana* drugs start action in stomach and as an outcome of the motor response through the ganglionic plexus stimulation the peristaltic movements reach to a maximum level known as "Rush Peristalsis". Due to this rush peristalsis pyloric part and the sphincter opens allowing the material to enter to the duodenum where local reflex reactions along with the motor response through vagus stimulate duodenum to secrete more and more hormones such as cholecystokinin, hepatokinine etc. which encourages liver and pancreas to secrete much more digestive enzymes. During this digestive period, mucus secretion continues along with increased peristaltic movements. This second stage of digestion helps in the complete evacuation of *Mala*, which contain mucus, fats, bacterial debris nitrogen compounds, acids, salts elements such as calcium, iron, etc.

2. In the small intestine, the *"*Crypts of Luberkahn*"* are stimulated and secret more and more water. The bulk material driven out from the stomach combines with this enormous secretion of water. As a result, the pressure level inside the small intestine is increased to a higher level. A pressure gradient established attracts much more water from the other areas of G.I.T. which are having a lower osmotic pressure and the water content is increased once again and this reaches its maximum level which is sufficient enough to push the material bulk downwards to the large intestine[28].

PHYSIOLOGY OF *VIRECHANA KARMA*

The process of *Virechana* is regulated & controlled by a special Centre situated near Medulla Oblongata in the brain. This Centre is close to Respiratory & Vomiting Centre. When the *Virechana* drugs stimulate the purgation Centre, indirectly Vomiting Centre is relaxed. The sacral plexus also helps in controlling & regulating the act of purgation, & it is also controlled & regulated by local reflex actions. Hence, during defecation, the respiration is arrested shortly; diaphragm is activated & presses transverse colon. Simultaneously, the accessory muscles of the abdomen are also activated & help in propelling the fecal matter towards anus along with the diaphragm. The increased hydrostatic pressure of the matter reached to the large intestine along with the mass peristaltic movements induces a slight mechanical pressure in the sacral plexus. (2^{nd}, 3^{rd}& 4^{th} sacral nerves) and lumber nerves situated at the lower levels of spinal cord. Because of these irritations motor reaction occurs which relaxes the ilio sacral valve muscles and anal sphincter muscles. There is cessation of breathing for a moment and diaphragm is activated through motor response and it exerts more pressure and presses the transverse colon downwards. As a combination of the mechanical pressure and associated n relaxation of anal sphincter muscles, the material as a whole is expelled from the body downwards through anus[29].

From the modern point of view we can say that the *Ayurvedic Shodhana Karma* are "physician induced mild inflammation" mainly *Vamana* and *Virechana* drugs are quite irritant to the stomach and the intestinal mucosa respectively, to cause inflammation. Now the membrane becomes permeable and those substances come out due to the changed permeability which cannot come out in normal condition. Redness, pain, swelling, heat and loss of functions occurs due to the certain changes at microscopic level. Hyperemia or engorgement: Occurs due to dilatation of capillaries and arterioles.

Exudation or discharge: The leakage of protein rich fluid through the vessel wall in the intestinal tissue is exudation. This fluid increase dilutes the toxins. Following factors increase the permeability in response to acute inflammation.

Vasoactive Polypeptide: It results into vasodilatation.

The above factors cause increased permeability of the intestinal mucosa due to inflammation caused by irritant *Virechana Yoga*[30].

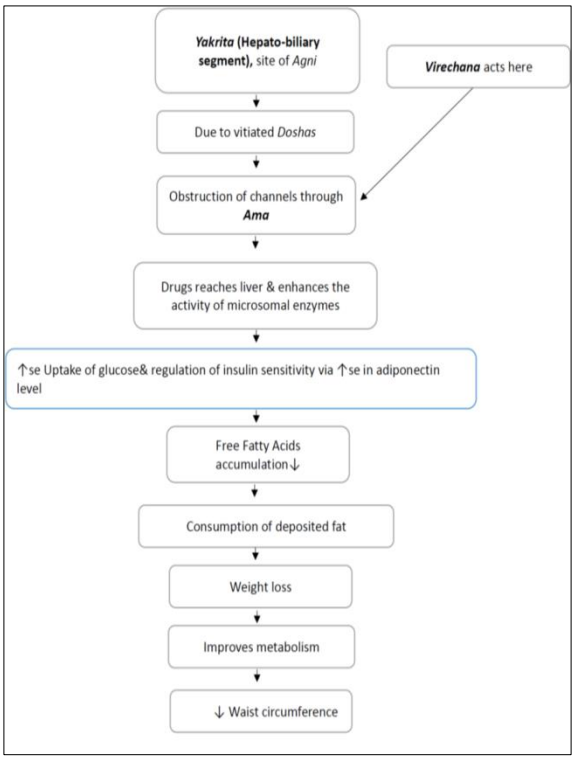

Figure 2. Shows mechanism of action of *Virechana Karma* in Metabolic Syndrome[31].

Hence *Virechana Karma* improves metabolism (especially fat metabolism) which in turn balances the level of cholesterol, HDL, LDL, VLDL and triglycerides. This in turn regulates the Blood pressure. It also reduces the waist circumference. All these conditions together help in pacifying symptoms of Metabolic Syndrome.

CONCLUSION

From the above discussion we can conclude that *Virechana Karma* is an important *Samshodhana* procedure which helps in removing harmful disease causing chemical by-products from the body, hence pacifying the symptoms of Metabolic Syndrome by cleansing the *Strotas* (channels) of the body.

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