

Review

Virechana karma (therapeutic purgation) in the restoration of gut microbiota concerning Amavata (RA): A scientific exposition

Amrit Godbole^{1*}, Sweta², Abhinav³, O.P. Singh⁴

¹Ph.D scholar, Deptt. of Kayachikitsa, Faculty of Ayurveda, IMS-BHU, Varanasi, Uttar Pradesh, India, ²Assistant professor, Department of Rachana sharira, Dr.Vijay Ayurvedic Medical College Hospital and Research Centre, Kaithi Varanasi, Uttar Pradesh, India, ³Assistant professor, Deptt. of Panchakrama, Faculty of Ayurveda, IMS-BHU, Varanasi, Uttar Pradesh, India, ⁴Professor & Head, Deptt. of Kayachikitsa, Faculty of Ayurveda, IMS-BHU, Varanasi, Uttar Pradesh, India

ABSTRACT

Background: *Amavata* is a disease that occurs as a result of the error of metabolism. Poor dietary habits and faulty *Dincharya* (daily regimen) and *ritucharya* (seasonal regimen) leading to deranged metabolism and *Agni* (metabolic fire) which results in the formation of *Ama*(undigested product of metabolism). When *Ama*conceals with *Vata*(subtle energy associated with movement) and circulates in the body under the influence of *Vyana Vayu* (omnipresent air)it clogs the *srotasas* (microchannels) and initiates the inflammatory cascade. *Amavata* is commonly correlated with rheumatoid arthritis (RA) while other forms of auto-immune disorders can also be included in *Amavata*.Dysbiosis of the gut microbiota (GM) has been connected to the onset of diverse autoimmune diseases. In this study, it was hypothesized that *Panchakarma* (bio-purificatory methods) based intervention such as *Virechana Karma* (therapeutic purgation) may influence microbiota.

Materials and Methods: Various Ayurvedic literature were reviewed for the etiopathogenesis of *Amavata*. Different databases were searched with research papers related to Gut Dysbiosis and autoimmunity and management of RA. A connecting link between Intestinal Dysbiosis with the autoimmune mechanisms was established and it was also found that the bowel cleansing introduced a change to the GM.

Conclusion: It was concluded that *Virechana karma* is effective in gut flora Dysbiosis. This study aims to correlate the ancient Ayurvedic principles related to *Agni Bala*(metabolic energy) and biopurificatory treatment modalities like *Virechana karma* (therapeutic purgation)with the modern concept of gut microbiota and its role in the pathogenesis of various autoimmune disorders such as rheumatoid arthritis. The article creates an understanding about principles of Ayurveda and its rationality in today's scientific world and thereby opens newer vistas of research in therapeutics from Ayurveda, which may be helpful in the management of various immune-mediated Diseases through Ayurveda.

Keywords *Amavata*, autoimmunity, Dysbiosis, gut microbiota, rheumatoid arthritis, *Virechana*

1. INTRODUCTION

The concept of '*Agni*' (metabolic fire) in Ayurveda is a unique approach to the understanding of the physiology of digestion and metabolism. The '*Agni*' (metabolic fire) is closely aligned to the entity of *Pitta Dosha* (the heat energy in the body) Hypo functioning of *Agni* results in incompletely formed products of metabolism referred to as '*Ama*'. Thus '*Ama*' is the product of faulty digestion resulting due to '*Mandagni*' i.e. hypo functioning of '*Biofire*'. As per Ayurvedic medicine, it possesses the properties of *Visa* or toxin and is responsible for various local and systemic illnesses and the classical text compares *Amavisato* an acute state of poisoning. *Ama* also refers to such intermediate

or byproduct of metabolism that tends to cause a blockage within the microchannels of the body i.e. '*Srotovarodha*'. Thus *Ama* is a very important morbid factor responsible for various local and systemic diseases. At systemic level i.e. at the level of body tissues, hypo functioning of *Dhatwagni* (metabolic fire at tissue level) causes inadequate tissue metabolism leading to prolonged accumulation of a variety of morbid products i.e. *Ama*, in the system, which are responsible for different kinds of systemic diseases like *Amavata* (Tripathi JS, Singh RH, 1999).

Amavata is a local as well as systemic disorder inflammatory in nature caused due to association of *Ama* with vitiated *Vata* (subtle energy associated with movement). Poor dietary habit and faulty *Dincharya* (daily regimen) and *Rritucharya* (seasonal regimen) leading to deranged metabolism and *Agni* which results in the formation of *Ama* (undigested product of metabolism), at the same time the vitiation of *Vata*due to *Vatavardhakanidana* (etiological factors increasing energy associated with movement) like strenuous exercise immediately after consumption of fatty foods takes place and when *Ama* conceals with vitiated *Vata* and circulates in the body under the influence of *Vyanavayu*

*Correspondence: Amrit Godbole

E-mail: amritgodbole2@gmail.com

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("omnipresent air,") it clogs the *Srotasas* (microchannels) and initiates the inflammatory cascade thus resulting in local /systemic illness (Aswathy YS, Anandaraman PV, 2019).

Studies proved that free radical-damaged cellular material is involved in the production of *Ama*. Free radicals and reactive oxygen species (ROS) are unstable molecules produced as a by-product of cellular metabolism if produced in excessive amounts, these reactive molecules cause extensive damage. Similarly, *Ama* is the intermediate product of hypo functional *Agni*. Neutralization of the free radicals and ROS contributing to the *Ama* production is necessary at the same time eradication of accumulated *Ama* from the body and restoration of optimal health is also needed (Sharma H, 2009).

1.1 Gut microbiota and rheumatoid arthritis

There are trillions of bacteria in human intestine. These commensal flora coevolved with the host are involved in numerous metabolic functions. Microbial colonization occurs before birth and it keeps on changing. The diversification depends upon the environmental factors, dietary habits, and medications. Thus the modulation of GM through diet, drug, and therapies like *Virechana* (therapeutic purgation) may change the clinical outcome. Most of the research work done in the field of rheumatoid arthritis has focused on genetic factors, but the host microbiota, and especially the gut microbiota (GM), has a key role in the etiopathogenesis of RA. Microbial composition of new-onset untreated RA (NORA) in comparison to healthy subjects has an abundance of *Prevotellacopri* with reduced level of *Bacteroides* in RA patient. Moreover, the gut Dysbiosis in RA patients were suggestive of depletion of gram-negative bacteria while gram-positive bacteria were more in number. Overall the gut microbiome Dysbiosis is associated (Bodkhe *Ret al.*, 2019).

1.2 Gut microbiota and autoimmunity

The role of environmental factors, genetic predisposition, and disturbed gut flora has been the source in the development of autoimmune diseases like rheumatoid arthritis, psoriasis, multiple sclerosis, type1 diabetes mellitus, etc. Since birth, GM has a significant impact on the host immune system. Exposure to the microbial component leads to the development of immune response in the newborn baby and these encounters to microbial and environmental factors develops the adaptive immune behaviour. quantitative and subjective changes in the arrangement of the gut microbiome could prompt obsessive Dysbiosis and have been identified with an expanding number of diseases. The process of autoimmunity is insidious and develops over time but preclinical symptoms precede the clinical ailment much before and can be detected through pathological investigations such as peripheral blood smear detecting autoantibodies. The early symptoms of autoimmune disorders are not well defined and arises as easy fatigability, low-grade fever, muscle, and joint aches, and malaise. These symptoms get debilitating once the disease establishes with significant morbidity. In this way we see that control colonization and safe manipulation of GM can be a key to control the disease aggravation and progression and therefore our traditional medical system of *Ayurveda* turns out to be amazingly applicable where the accentuation is given on *Aahar* (food can change the composition of gut flora), *Vihar* (daily and seasonal regimen influences the microbiome), and *Vichar* (point of view influences the immune response) to manage the issue of autoimmunity (Bharti, Sujitet *al.*, 2019).

1.3 Why alternative medical procedure or alternative medicine is needful in the present condition?

The treatment targeting at the neutralization of the free radicals, management of symptoms, and boosting the *Agni* (metabolic fire) such that the symptoms gets alleviated is called as *Shaman Chikitsa* (conservative management). While the eradication of the accumulated *Ama* is taken care by *Shodhanachikitsa* (biological purification of the body) of which *Virechana* (therapeutic purgation) is a type (Gupta SK *et al.*, 2015).

Ayurvedic classics quote the symptoms of *Amavata* as body ache, lack of taste, thirst, laziness, feeling of heaviness, fever, indigestion, and generalised body swelling. When the *Amavata* aggravates then it is difficult to treat and enters the *Shlesmasthanas* (especially synovial joints of the body) and manifest as painful swelling of the afflicted joint. The intensity of pain is too much that it is compared to scorpion sting (MadhavNidana 25/6-7).

2. MATERIAL AND METHODS

2.1 Tools and technique

Various research articles from different databases such as PubMed, Scopus, Web of Science, DHARA were reviewed. Articles were searched to establish a connecting link between autoimmunity and Dysbiosis. Ayurvedic texts such as Madhav Nidana, Yogratnakara, Bhaishajya Ratnavali etc were reviewed to study the role of *virechanain amavata* and its effect on *Ama* and *Agni*. Research papers containing the detailed information about the Dysbiosis and the autoimmune disorders; role of *Agni* and metabolism in disease manifestations; health and autoimmunity related with gut flora etc were studied in detail.

3. DISCUSSION

3.1 How Dysbiosis generate *Ama*?

Dysbiosis (mainly Dysbacteriosis) is the microbial imbalance inside the body. Dysbiosis is most commonly reported as a condition in the GIT during SIBO (small intestine bacterial overgrowth) or SIFO (small intestine fungal overgrowth). It is accompanied by a decrease in the ability to check each other growth and which results in the overgrowth of one or more of the disturbed colonies of microbes. Microbial colonies excrete waste byproducts which are removed by the body by normal removal mechanism but inappropriate large colonies excrete larger amount of byproducts hence the body is unable to remove this much so there will be the accumulation of these morbid matters inside the body. This gives birth to an idea called as *Malasanchayajanya Ama* (metabolic intermediate gets deposited and acts as a toxic substance) Gut flora helps in digestion and metabolism via secreting useful chemicals and another mechanism so when the Gut environment is altered then the metabolism and assimilation is disrupted so more and more *Ama* is produced and a vicious cycle of *Ama* production is started in the body leading to many disorders. Gut flora helps to protect the body from pathogenic infiltration and Dysbiosis increases the number of harmful bacteria in the gut hence immune dysfunction occurs.

Several mechanisms are involved in Gut microbiota alterations leading to an autoimmune response. Autoimmune disease pathogenesis due to Dysbiosis occurs via Epigenetics, molecular mimicry, and decrease immune tolerance, post-translational modification of host proteins, and polarization

towards inflammatory phenotypes as well as induction of intestinal permeability (Zyanya Reyes *et al.*, 2020).

Various studies established the fact that the gut microbiota has a profound effect on the host immune system and can affect autoimmune-related diseases. Commensals residing in the gut keep maintaining essential health benefits to the host. But when the gut microbiota homeostasis is disturbed because of overuse of antibiotics and other environmental factors causes Dysbiosis leading to numerous health disorders and immune deregulation, leading to autoimmune disorders (Wu HJ, Wu E, 2012).

3.2 Role of Virechana (Therapeutic purgation) in Amavata

Treatment guidelines mentioned about *Amavata* depicts stage-wise treatment. The treatment protocol in *Amavata* includes *Langhana* (fasting), *Swedana* (sudation), use of *Tikta Rasa* (bitter)/*Katu Rasa* (pungent) *Pradhanadravyas*, with respect this all leads to *Agnideepana* and *Amapachana* (ignition of metabolic fire and pacification of *Ama*) once the *Ama* state gets converted into *Nirama* (non toxic) state the *Ama* accumulated in the bodily tissues is expelled out of the body through medicated bowel cleansing. In the context of *Amavata chikitsa* for bowel cleansing, *virechana* has been used. In texts, *Virechana* is mentioned as the treatment in cases like *Pittajavikara*, *Amajanyaroga*, *Udararoga* and *Udavartaroga*. Although *Virechana* is the best remedy for *Pitta dosha*, yet it is effective in the vitiated *Kapha* and *Vatadosha* to some extent. Symptoms like *Aanaha*, *Vibandha*, *Antrakujana*, *Kukshishula*, etc. are indicative of *Pratiloma Gati* of *Vata* which are best conquered by *Virechana*. It removes the *Avarana* produced by *Kledaka Kapha*, and pacifies the vitiated *pratilomavayu* (Godbole, Amritet *al.*, 2018).

Proper *virechana karma* leads to clearance in all the *Srotasas* (channels of body), freshness in the sense organs, lightness in the body, improvement in *Agni* (metabolism) and attains disease-free status (CarakaSamhita, Siddhi Sthana, 1/17).

Improvement in the status of *Agni* brings out improved health status, enhancement of *Ojas*, and improved quality of life. *Agni* is supposed to be the pillar upon which the health and longevity of a person are dependent. When the *Agni* is not in equilibrium, i.e. either *Tikshna* (hyperfunction) or *Manda* (hypofunction) or *Vishama* (sometimes hyperfunction sometimes hypofunction) the state of normalcy is disturbed and the individual suffers from various diseases and if *Agni* stops functioning, it leads to death of the individual. Hence, the *Agni* is alleged to be the basic reason for health and longevity (CarakaSamhita, Chikitsa Sthana, 15/3-4).

3.3 Role of bowel cleansing in Dysbiosis

There are various studies in various databases advocating the role of purgation on the intestinal microbiota. One such study showed the instant and substantial change to the intestinal microbiota following purgation. The total microbial load was decreased by 31-fold and the colonisation of the bacteria was restored after fourteen days. Four stool samples were collected from the participants. These incorporated a baseline test gave a day before the bowel cleansing, one following the lavage, and two follow-up tests 14 and 28 days after the bowel cleansing. The faecal microbial DNA was separated and the microbiota was examined by utilizing a phylogenetic microarray. The phylogenetic microarray was enhanced with quantitative PCR (qPCR) investigation of the all-out microbes and methanogenic archaea. The number of microscopic organisms in the samples following bowel preparation was approx 34.7-fold ($p < 0.001$) lower than in the baseline faecal samples. Likewise, the

quantities of methanogenic archaea per gram of stool sample were reduced. The number of bacteria was re-established to the baseline levels following 14 and 28 days. Likewise, the microbiota profiles demonstrated a noteworthy reduction during the bowel cleansing in comparison to the baseline (Jalanka Jet *al.*, 2015). The study adds to the Ayurveda concept of *Virechana* and *Samsarjan Karma* (specific diet post bowel cleansing) where *Virechana Karma* cleans the bowel off the morbid matters as well as would help in correction of dysbiosis while *Samsarjan Karma* restores the *Agni* to its normal level and would establish eubiosis.

4. CONCLUSION

By far we understood that *Virechana* (therapeutic purgation) is the treatment procedure focussing on bowel cleansing and establishment of *Agni* is the resulting outcome. *Virechana karma* is a part of *Panchakarma* ("five therapies" to clean the body of toxic materials) and is the *Pradhana Karma* (major procedure) *Virechana* is preceded by *Deepana-Pachana* while succeeded by *Samsarjankrama*. *Samsarjan* is the most important aspect of *Shodhana* therapy as it establishes the *Agni* to its normal level and alleviating the disease process. Ayurveda the ancient science of life advocates maintenance of *Agni* for every living body and the principle of *Kostha Shodhana* (bowel cleansing) employing *Virechana* helps in it. The primary site of *Agni* is *Kostha* (alimentary canal/ gut) and this is why Ayurveda advocates healthy eating habits like *Ashtaaharavisheshayatan/ Dwadashashanpravicharna* (eight/ten folds dietary regimen) so that *Agni* is not impaired otherwise various diseases will take place in the body. The *Ayurvedic* principles of *Agni* and rationality of *Shodhana* per se *Virechana* (therapeutic purgation) simulates with present theory of gut microbiota and Dysbiosis. We can hypothesize that *Agni* of previous times is maybe related to the gut microbiota of the present era. At the same time, *Agni Dushti* (faulty metabolic fire) could relate to present times Dysbiosis. This review shows a possibility of correlation of recent concept of today's medicine i.e., gut microbiota and Dysbiosis with that of the concept of *Agni* and *Ama*, described in Ayurveda and thereby opens newer vistas of research in therapeutics from *Ayurveda*, which may be helpful in the management of various immune-mediated Diseases through Ayurveda.

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CONFLICT OF INTEREST

Authors declare that there is no conflict of interest

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