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RESEARCH ARTICLE

EFFECTS OF INDIGESTION

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ABSTRACT

The term Ama refers to raw, unripe, unprocessed or improperly digested condition of food substances probably due to the result of mandagni (hypo functioning of Agni). Ayurveda is basically more oriented toward the management of lifestyle disorders which are in prominence due to stress-related phenomena and some other reasons among certain age groups in the society. Agni is the root cause of cause of Ayu, Bala and Varna. Agni may disturbed by life style disorders. Mandagni is the root cause of all diseases and is a causative factor for the production of Ama. Ama is described by all Acharya but the greatest clinical detail for this entity Ama has been for the first time described by Acharya Vagbhatta. It is very necessary how we can diagnose Ama formed in body for the purpose of treatment of disease. Ama acts as an antigen and possesses the potency to induce immunological reaction in a susceptible individual and Ama can also be generated within the body (endogenous ama) by virtue of excessively vitiated doshas (autoimmune). This paper will discuss about the various clinical aspect of Ama (Apakwa food) and its impact over body.

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INTRODUCTION

Ama is the outcome of improper digestion. Incomplete or partial digestion of food leads to ama. Product which brings discomfort in srotas is ama. Abnormal dosa present in grahani manifest improperly digested food as result salivations, constipation, pain, burning sensation, anorexia and heaviness manifest as symptoms of ama. A symptom of undigested food material is the symptoms of ama. Sama rasa means improperly processed substance or tissues. It is the sama rasa which circulates all over the body not the adhya rasa. If kayagni fails to perform normal functions leads to accumulation of undigested food material inside amasaya, which is the initial rasadhatu is called ama. Food which is improperly digested having foul smell, excess unctuousness and develops lethargy in all body organs is called ama. Due to hypofunctioning of agni proper digestion of food doesn't takes place leading to formation of ama, which is responsible for the manifestation of almost all diseases. Some people accept ama as improperly digested food. Some other scholars consider accumulated mala as ama. Others say that it is the primary stage for the vitiation of dosa.Impaired digestion and metabolism due to hypofunctioning of jatharagni is called ama and it excacerbates all the dosa.

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Due to weakness in agni adhya rasa becomes immature, improperly metabolised substance called ama, which manifests in amasaya. Partially digested food transformed into sourness is called ama. Disturbed functions of agni leads to formation of under processed anna rasa and which is immature is called ama. Other opines that ama forms after mixing with agitated dosas like a formation of poison after mixing with various kinds of kodrava. Wherever ama goes it gives rise to pain and initiates reaction among doshas, dushyas, srotas etc. present in that particular area and it can be understood by the presence of symptoms due to ama (Byadgi, 2007).

AMA DOSA OR AMA PRADOSA

The resulting action of ama inside the body is called ama dosa. Manifestation of certain reactions inside the body due to under processed anna rasa is called ama pradosa. When ama amalgamate with dosa and dushya manifest various kinds of disease (Byadgi, 2007).

AMA PRADOSA BHEDA

Mainly two types of amapradosa manifest namely visuchika and alasaka. Sama is a condition manifests due to amalgamation of dosha and dushya resulting into formation of various kinds of disorders. Due to the consumption of nidan, which are capable of exacerbating dosha and brining mildness in agni's, after this whatever is again eaten or drunk by ignoramus person, the same becomes improperly digested,

this transformed into sourness inamasaya is called amavisa (Byadgi, 2007).

ETIOLOGICAL FACTORS OF AMA

If person consumes incompatible foods, eat before the digestion of previous meals, during the state of indigestion, whatever is taken by the individual at this stage gets transformed to sourness, which liberates certain poisons in amasaya leading to manifestation of symptoms of food poisoning. Which is incurable, onset become insidious and treatment becomes antagonist. Antagonisity of treatment is due to changes in the qualities of ama and amavisa. Treatment becomes antagonist because if hot substances employed for the management of ama condition, then ama visa excacerbates, if cold substances given, which enhances ama condition. Due to contradiction in the lines of treatment of both the condition, prognosis becomes difficult or incurable. Consumption of food substances in excess, along with not following the rules and regulation of dietetic described under astavidha ahara visesayatana leads to formation of ama. Intake of food in improper time, which are too heavy, unctuous, cold, dry, despicable, constipative, irritant, unclean and naturally contradictory leads to development of ama. If person eat food when afflicted with passion, anger, greed, confusion, envy, bashfulness, grief, indigestion, anxiety and fear favors development of ama. In Charaka it is mentioned that intake of wholesome food in proper quantity do not get properly digested when the individual is afflicted with grief, fear, anger, sorrows, excessive sleep and excessive vigil. Dosha prakopa etiological factors also play an important role in the manifestation of ama (Byadgi, 2007).

BIOPHYSICAL PROPERTIES OF AMA

Liquid, heavy (high molecular weight), attain different colours, etiological factor for almost all diseases, slimy, viscid, thready, sticky nature, manifests various kinds of pain, yields foul smell, increased sourness,turbidity, obstruct various pathways etc (Byadgi, 2007).

PRODUCTION OF AMA AT VARIOUS LEVELS

It manifests due to (Byadgi, 2007): Jatharagni Mardavata- hypo functioning of bio-digestive power house Dhatvagni Daurbalya- Sluggish functions of dhatwagni. Bhutangi Mandyata- Defect in the functions of bhutagni.

BIOMORPHIC PATHOGENIC STRUCTURE OF AMA AND THEIR CLASSIFICATION

When ama mixes with dosha, dhatu, mala (dhatu mala and sarira mala) develops certain complex adverse reactions, which is the basis for the manifestation of diseases; ama and sama are the main two classification (Byadgi, 2007).

SYMPTOMS OF AMA

Symptom of undigested food material is the Symptom of Ama. Food which is improperly digested having foul smell, excess unctuousness and develops lethargy in all body organs is called Ama. Abnormal dosha present in Grahani manifest improperly digested food as result salivations, constipation, pain in abdomen, burning sensation, anorexia and heaviness in body or abdomen manifest as symptoms of Ama (Byadgi, 2007).

Sama	Nirama
Sama Vata	Nirama Vata
Sama Pitta	Nirama Pitta
Sama Kapha	Nirama Kapha
Sama Rasa	Nirama Rasa
Sama Rakta	Nirama Rakta
Sama Mamsa	Nirama Mamsa
Sama Meda	Nirama Meda
Sama Asthi	Niaama Asthi
Sama Majja	Nirama Majja
Sama Shukra.	Nirama Shukra.
Sama Purisha	Nirama Purisha
Sama Mutra	Nirama Mutra
Sama Rasadhatu Malarupi Kapha	Nirama Rasadhatu Malarupi Kapha
Sama Raktadhatu Malarupi Pitta	Nirama Raktadhatu Malarupi Pitta
Sama Mamsadhatu Malarupi Kha-Mala	Nirama Mamsadhatu Malarupi Kha-Mala
Sama Medadhatu Malarupi Sveda	Nirama Medadhatu Malarupi Sveda
Sama Asthidhatu Malarupi Kesha, Loma and Nakha	Nirama Asthidhatu Malarupi Kesha, Loma and Nakha
Sama Majjadhatu Malarupi Snehamsa in Akshi, Vit and Tvaca	Nirama Majjadhatu Malarupi Snehamsa in Akshi, Vit and Tvaca
S am a Shukradhatu Mal arupi Ojas	Nirama Shukradhatu Malarupi Ojas

CLINICAL DIAGNOSTIC CRITERIA OF AMA

Srotorodha (Obstruction in srotas), Balabhransha (Decrease strength or immunity), Gauravam (Heaviness in body and in head), Anila mudhata (Disturbances in normal movements of vata), Alasya (Lethargy), Apakti (Indigestion), Nisthiva (Excessive salivation), Malasanga (Obstruction of urine and stool and other waste product), Aruchi (Lack of desire towards food) and Klama (Exhaustion) (Byadgi, 2007). Srotorodha- It means obstruction in the channels. Srotorodha may involve whole body or a particular srotas. Kha vaigunya (defective channel) favors dosha dushya sammurchana causing manifestation of diseases. Srotorodha can be understood as blockage (http://en.wikipedia.org/wiki/Atherosclerosis) in the existing route of dosha, dhatus and malas etc. Srotorodha can be understood as blockage in the artery, veins, lymphatic ducts, GI tract, respiratory tract, cardiovascular system, genitourinary tract, locomotory system, central nervous system, ducts of glands as sudoriparous glands (sweat glands), salivary glands, pituitary glands, ciliary glands , endocrine glands, mammary glands, mucous glands, prostate gland etc. According to Ayurveda it may be due to accumulation of ama inside blood vessel which flows with blood as ama rasadhatu and ama rakta dhatu, ama mansa dhatu, ama meda dhatu etc (Byadgi, 2007).

EXAMPLES OF SROTORODHA IN VARIOUS BODY SYSTEMS

/Atherosclerosis (also known as arteriosclerotic vascular disease or ASVD) is a specific form of arteriosclerosis in which an artery wall thickens as a result of the accumulation of fatty materials such as cholesterol and triglyceride. It is a syndrome affecting arterial blood vessels, a chronic inflammatory response in the walls of arteries, caused largely by the accumulation of macrophages and white blood cells and promoted by low-density lipoproteins (LDL, plasma proteins that carry cholesterol and triglycerides) without adequate removal of fats and cholesterol from the macrophages by functional high-density lipoproteins (HDL). It is commonly referred to as a hardening or furring of the arteries. It is caused by the formation of multiple plaques within the arteries (http://en.wikipedia.org/wiki/Atherosclerosis).

Hyperlipidemia is a heterogeneous group of disorders characterized by an excess of lipids in the bloodstream. These lipids include cholesterol, cholesterol esters, phospholipids, and triglycerides. Lipids are transported in the blood as large 'lipoproteins. Synonyms of Hyperlipidemia are Hypercholesterolemia; Hypertriglyceridemia; Hyperlipoprot einemia; Dyslipidemia and High serum cholesterol. Primary hyperlipidemias are probably genetically based, but the genetic defects are known for only a minority of patients. Secondary hyperlipidemia may result from diseases such as diabetes, thyroid disease, renal disorders, liver disorders, and Cushing's syndrome, as well as obesity, alcohol Consumption (http://emedicine.medscape.com/article/126568-overview#a01 04). Hypertriglyceridemia (hTG), a condition in which triglyceride levels are elevated, is a common disorder in the United States. It is often caused or exacerbated by uncontrolled diabetes mellitus, obesity, and sedentary habits, all of which are more prevalent in industrialized societies than in developing nations. In epidemiologic and interventional studies, hypertriglyceridemia is a risk factor for coronary artery disease (CAD). Triglycerides are fats consisting of 3 fatty acids covalently bonded to a glycerol molecule. Triglycerides are synthesized by the liver or, in the case of those derived from dietary sources, are ingested by the liver; they are subsequently transported throughout the circulation by triglyceride- rich lipoproteins. By dry weight, triglycerides make up approximately 86%, 55%, and 23% of chylomicrons, VLDLs, and IDLs, respectively. Triglycerides are present in LDL and high- density lipoprotein (HDL), but in much smaller quantities of 10% or less. Lipoprotein lipase (LPL) releases free fatty acids from chylomicrons and produces chylomicron remnants that are small enough to take part in the atherosclerotic process. Chylomicron remnants, VLDL, VLDL remnants, and LDL are all atherogenic (http:// emedicine.medscape.com/ article/126568- overview#a0104). Renal artery stenosis is a blockage of an artery to the kidneys, which may ultimately lead to kidney failure and hypertension (high blood pressure). In most cases, this blockage is caused by atherosclerosis, the build-up of cholesterol deposits (plaque) in arteries, but may also be caused by conditions such as fibromuscular dysplasia, abnormal cellular development in artery walls, and Takayasu's arteritis, an inflammatory disease that affects the aorta and its branches, including the renal arteries (www.brighamandwomens.org/ Departments_ and_Services/ surgery/services/v ascularsurgery/Services/ RenalArtery. aspx).

Gastrointestinal System

In blockage, the intestine/bowel does not allow food to pass. This may occur due to a twist in the bowel, an intussception, or the wrong type of food lodging in a spot that has a small passageway due to surgery or adhesions or pressure from a tumor (http://gistsupport.medshelf.org/ Blockage_ of_ GI_Tract). Adhesions may be considered as ama. Blockage for the passage of intestinal contents is either by mechanical blockage or failure of motility. Mechanical blockage may be caused by adhesions resulting from surgery or inflammatory bowel disease, an incarcerated hernia, fecal impaction, tumor, intussusception, volvulus, or foreign body ingestion. Failure of motility may follow anesthesia, abdominal surgery, or occlusion of any of the mesenteric arteries to the gut (http://medical- dictionary.thefreedictionary. com/ gastrointestinal+ obstruction).

Abdominal adhesions are bands of fibrous tissue that can form between abdominal tissues and organs. Normally, internal tissues and organs have slippery surfaces, preventing them from sticking together as the body moves. However, abdominal adhesions cause tissues and organs in the abdominal cavity to stick together. As it was discussed earlier ama formation supports the deposition, sluggishes the gastrointestinal motility and favors the substances to stick in one area and manifest various disorders related to gastrointestinal system (http://digestive.niddk.nih.gov/ ddiseases/pubs/intestinaladhe sions).

Blockages of the Arteries to the Intestine

Patients who have atherosclerosis affecting the arteries to their intestines can present with acute or chronic symptoms. If there is a sudden closure of an artery which supplies blood to a major portion of the intestine, patients can present with extremely severe, acute, abdominal pain. The clinical situation is frequently one in which a blood clot travels from the heart (in a patient with atrial fibrillation, for example) and lodges in a major artery of the intestine. There is a group of patients however, who have a chronic lack of circulation to the intestine. This is called chronic mesenteric ischemia and their symptoms are sometimes referred to as "mesenteric angina". This is caused by a gradual buildup of atherosclerotic plaque in the arteries supplying the intestine. Patients typically complain of severe abdominal pain, approximately one hour after eating. The increased demand for circulation to the intestine, which occurs in response to eating a meal, cannot be met by the arteries supplying blood to the intestine because those arteries are partially blocked. This results in the typical mesenteric ischemic pain ("mesenteric angina"). Patients typically will avoid eating because of the pain associated with having a meal. As such, patients with chronic mesenteric ischemia typically have lost a significant amount of weight before the diagnosis is ultimately determined. Many times, patients with chronic mesenteric ischemia have undergone multiple tests before the diagnosis is made. Not infrequently, patients will have undergone ultrasonography and CT scan of the abdomen, colonoscopy and upper endoscopy before the diagnosis of mesenteric ischemia is considered (http://www.vasculardoc.com/intestinal- arteries.aspx).

Retinal Artery Occlusion

Retinal artery occlusion is a blockage in one of the small arteries that carry blood to the retina. The retina is a layer of tissue in the back of the eye that is able to sense light (http://www.nlm.nih.gov/medlineplus/ency/article/001028.ht). Three sets of vessels comprise the circulatory system: arteries, lymphatics, and veins. Arteries bring oxygen-carrying blood from the heart to the tissues. In the normal course of blood circulation, small amounts of fluid and protein leak from arteries and veins. Lymphatic vessels bring this protein-rich fluid back into the circulation. The third type of blood vessel is the vein. Veins bring oxygen-depleted blood from the organs and tissues to the heart and lungs, where it is re-oxygenated. Blood return to the heart tends to be passive and is enabled by muscle contraction in the arms and legs. Because the venous system is a low pressure one, the telltale complaints and physical signs of venous disease on which your physician relies for diagnosis are often subtle and sometimes require further testing.

Diseases of the veins fall into two broad categories: blockage from a blood clot (thrombosis) and inadequate venous drainage (insufficiency) (http://circ.ahajournals.org/ content/106/ 17/ 2170.full).

Obstruction of the Veins to the Heart (Superior Vena Cava Syndrome)

Superior vena cava syndrome (SVCS) refers to a partial blockage of the vein (vena cava) that carries blood from the head, neck, chest and arms to the heart. Cancer is the primary cause of SVCS. SVCS is considered a medical emergency and typically requires treatment for the cancer that is causing it. Treatment may include chemotherapy, radiation therapy and/or surgery (http://news.cancerconnect.com/superior-vena-cava-syndrome/)

Lymphatic Obstruction

Lymphatic obstruction is a blockage of the lymph vessels that drain fluid from tissues throughout the body and allow immune cells to travel where they are needed. Lymphatic obstruction may cause lymphedema, which means swelling due to a blockage of the lymph passages (http://www.nlm.nih.gov/ medlineplus/ency/article/001117.ht)According to Ayurveda it may be due to accumulation of sama rasa, sama rakta and sama meda inside blood vessel.

Urinary Tract

Urinary tract obstruction can develop secondary to calculi (Bladder stones and Kidney stones), tumors (Bladder or ureteral cancer, Colon cancer, cervical cancer, uterine cancer and any cancer that spreads), strictures, anatomical abnormalities, or functional abnormalities, Benign prostatic hyperplasia (enlarged prostate), Scar tissue that occurs inside the ureters and Problems with the nerves that supply the bladder . Chronic urinary tract obstruction can lead to permanent damage to the urinary tract. Infravesical obstruction can lead to changes in the bladder, such as trabeculation, cellule formation, diverticula, bladder wall thickening, and, ultimately, detrusor muscle decompensation. Ama formation in urinary pathways can cause disorders related to urinary tract (http://emedicine.medscape.com/article/438890-overview; http://www.nlm.nih.gov/medlineplus/ency/article/000507.ht m).

Locomotor System

The toxicity or virulence or dosatwa nature of Ama Rasa depends on the degree of Suktabhawa. Thus the Ama produced due to endogenous sources becomes unwholesome to the body and can be depicted as an antigen which is very much capable for inducing immunological reaction in amavata(RA). Ama in the form of Ama rasa enters into the systemic circulation which is not suitable for either Dhatwagni Paka or Bhutagni Paka because of its macromolecular size and incomplete digestion of food by jatharagni and produces different kinds of disorders depending on the severity and site of its location. Ama is a very hazardous substance being macromolecular in size causes obstruction to the channels of head and favours conglomeration of dosha and dushya. Due to the similarity of its biophysical properties with slesma, Ama rasa trickles to the Slesma sthana especially joints and accumulates there.

Ama forms complexes with various dushyas and get converted into extremely virulent substance and causes inflammatory changes in amavata(RA). Thus by observing into the above explanation it can be hypothesized that the following facts regarding the role of Ama in the pathogenesis of amavata(RA)may be described are as follows-Ama acts as an exogenous antigen by virtue of its susceptibility to external etiological factors of amavata(RA). Ama acts as an antigen and possesses the potency to induce immunological reaction in a susceptible individual. Ama can also be generated within the body (endogenous ama) by virtue of its excessively vitiated dosas (immunological reaction) (Neera Saini, 2013). BALABHRANSHA- Loss of bala (Vagbhatavirachita, 2005) or diminution of oja. Acharaya Susruta has said in relation to oja that it is final and excellent essence of dhatus beginning with rasa and ending with sukra. Oja is called bala (Sushruta, 2008) In commentary of Susruta has defined Oja as karana and bala as karya. So we can define balabhransha as decrease capacity to do work or exercise relatively to before. It may be due to formation of ama by which next dhatu formation decreases, if it forms, its quality also diminishes.

In other words it may be understood as balabhransha as decreased immunity (as loss of Oja or shuddha kapha (called bala) which provides protection to body. Ayurveda presents a comprehensive concept of immunity interwoven with the fundamental concept of nutrition and dhatu parinama. The quintessence of all dhatus (tissues) is ojas. The same is bala (strength) and the same is responsible for immunity or resistance against disease i.e. Vyadhiksamatva. Vyadhiksamatva as described in Ayurveda is not necessarily a Ksamatva (immunity) against an infection or specific antigen but is essentially a ksamatava (resistance) against loss of dhatusamya and or homoeostasis which is considered the fundamental issue in Ayurveda. Vyadhiksamatva is the power of resistance *i.e. bala* which is derived from the ojas existing in each cell of life unit and protects it from a disorder by: preventing the loss of internal homoeostasis i.e *dhatusamya and* protection against external injury and infection.
GAURAVAM- It means heaviness in body (http://en.wikipedia.org/wiki/Atherosclerosis) or any part of body in which patient feels as if whole body is covered with wet skin (Susruta Samhita of Susruta and Garbhavyakarna, 2008). It may due to excess storage of ama and flow of ama rasa dhatu and ama rakta dhatu through srotas in those parts.
MALASANGA – Apravrittischa (Vagbhatavirachita, 2005). There is an obstruction for waste substances. Ama causes obstruction to channels where in which body wastes are excreted. Abnormal accumulation of waste in the body is a sigh of ama in that part. Examples are nasolacrimal duct obstruction, Blocked Tear Ducts, Wax blockage, ear congestion, Eustachian tube blockage, Nasal obstruction.

ANILA MUDHATA - Loss of normal movements (Vagbhatavirachita, 2005) of vata inside the channels or it can interpreted as jadatva[10] of vata dosha I;e sluggishness of its functions (Vaidhyaka Sabda Sindhukosha, 1999). Detail description regarding this can be best understood under avarana of vata. ALASYA – Lack of desire to do anything. According to Susruta individual likes things having good feelings (sukhakar sparsa), dislike having bad feelings (dukhakar sparsa) and lack of enthusiasm to do work in spite of having energy (Susruta Samhita of Susruta and Garbhavyakarna, 2008).

Another meaning of alasya is tandra (http://en.wikipedia.org/ wiki/Atherosclerosis) as said by Arunadutta in Sarvanga Sundara (Vagbhatavirachita, 2005). It may be due to excess accumulation of ama in the body. APAKTI-it means indigestion (http://en.wikipedia.org/wiki/Atherosclerosis). It may be due to lack of secretion of digestive enzymes, sluggish peristaltic movement and diminished functions of bio-digestive fire. NISTHIVA- it means spitting out sputum. It can be understand in two meanings as excessive salivation and sputum (Vagbhatavirachita, 2005). KLAMA- May be understand when there is no physical work but having excessive tiredness in body, having dyspnoea and no interested in whatever happening in surroundings (Susruta Samhita of Susruta and Garbhavyakarna, 2008). Other meaning of klama is Glani (Vagbhatavirachita, 2005) in which sweetness of mouth cavity (one of the most important symptom of Ama formation), heaviness in pericardium region and having no desire towards food (Susruta Samhita of Susruta and Garbhavyakarna, 2008).

Conclusion

In the light of properties and functions of Ama discussed above, it can be concluded that Ama is the basic cause of many diseases, as described by Acharya Vagbhatta. Ama, because of its sticky and having stagnant property produces obstruction (srotoavarodha) at the level of smallest channels of body i.e srotasas in any system. This initiates and triggers the process of dosha – dushya sammurchana i.e interaction of doshas with dushyas which initiates the pathogenesis for any disease. Hence, it is very crucial to identify Ama in a patient, by the features stated above and should be treated in the most primary stage to avoid the development of further stages.

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