A concept of Hyperlipidaemia w.s.r. to Rasa-Raktagata Snehavriddhi – A Scientific Review.

Abstract:

Hyperlipidaemia is a prevalent condition worldwide and a major contributor to life threatening diseases like atherosclerosis, coronary artery disease (CAD), hypertension, stroke etc. It is a disorder of lipid metabolism manifested by elevation of plasma concentration of the various lipids and lipoproteins. The ability of Hyperlipidaemia to engage in the pathology of atherosclerotic diseases such as coronary heart disease, which dominates the scenario of diseases causing morbidity and mortality in the region, has piqued the interest of researchers worldwide.

In Ayurveda, there is no exact reference of a single disease entity which can be directly correlated with the term Hyperlipidemia. Also, different scholars have different opinions about the nearest possible disease. Some scholars considered it as *Rasagata Snehvriddhi*, *Rasa-Raktagata Snehvriddhi* or *Rasa-Raktagata Medovriddhi*, while some are suggesting to consider Hyperlipidemia under the broad umbrella of *Medoroga* also. Present study tries to correlate conceptual facts to show relation between Hyperlipidemia and *Rasa-Raktagata Snehvriddhi*.

Keywords: Hyperlipidemia, Lipoprotein, *Rasa-Raktagata Snehvriddhi*, Atherosclerosis, *Medodushti*.

Introduction:

In the present era of modernization, people are getting more civilized which has resulted in lifestyle changeslike, sedentary life, consumption of highly processed food, excessive mental stress, addiction and disturbed sleep pattern. This ultimately hampered the metabolism at macro as well as micro level which over course of time has resulted in many metabolic disorders like Hyperlipidemia. It is described as a disorder of lipid metabolism manifested by elevation of plasma concentration of the various lipids and lipoprotein. It is a prevalent condition worldwide and a major contributor to life threatening diseases like atherosclerosis, coronary artery disease, hypertension, stroke etc.[1]

According to National Cholesterol Education Program Adult Treatment Panel (NCEPATP III) guidelines, Hyperlipidemia includes LDL >100 mg/dl, total cholesterol > 200 mg/dl, HDL < 40 mg/dl and triglycerides >150 mg/dl[2]. There is a strong pathophysiological association of raised LDL cholesterol with initiation and progression of coronary atherosclerosis. Robust data are available that shows that lowering its levels can regress and stabilize atherosclerotic vascular disease[3].

Lipids are the group of naturally occurring molecules acting as a structural component of various cell membranes. They include fats, sterols, fat soluble vitamins, waxes etc. All these have common property of *Snehatwa* (lubricity). As per Ayurveda, human body consists of *Medo dhatu*, *Vasa*&*Majja dhatu*. These also show same property of *Snehatwa* and so lipids can be correlated with these three factors. They show common features but all those are

present at different sites and perform different functions[4]. *Sneha* is essential and offers corpulence to the body when normal, but it leads to various disorders when it is in a disturbed state in terms of *Rasagata Snehavriddhi* or *Rasa-Raktagata Snehavriddhi* which lead to *Medodushti*.

Nidana like excess intake of *Kaphavardhaka* and *Madhur rasa pradhaan ahar,Diwaswapna* and *Avyayama* contribute to *Medoroga*. *Santarpana ahara vihara*, which includes sedentary lifestyle, high calories food intake, lack of exercise which finally leads to morbidity of *Kapha dosha* and *medo dhatu*[5]. Due to *Medodhatvagnidushti* excessive accumulation of abnormal *kapha* and *meda* occurs in various *strotas* in body. *Aparipakwa Kapha-Meda* in the form of *Sneha* present in *Rasa-Raktavaha Strotas* results in obstruction to the movement of *Vata&Rakta* through affected channel, which finally ends up in disease manifestation according to the site of affliction. The state of *apakva Kapha* or *Meda* and its excessive presence, *margavarodh* in *Rasa-Raktavaha strotas* is often compared with the state of Hyperlipidemia. On the basis of above pathophysiology, Hyperlipidemia can be clinically correlated with *Rasa-Raktagata Snehavriddhi*. Furthermore, since this unnecessarily elevated *asthayi medo dhatu* is *Ama* in origin, it is stored in the body for a longer period of time, resulting in *Strotorodh* which further leads to additional complications like *Sthaulya*, *Prameha*, *Hridroga* etc.

Aim:

To scientifically review the concept of Hyperlipidemia and establish its correlation with the Ayurvedic concept of *Rasa-Raktagata Snehavriddhi*, highlighting its etiopathogenesis, clinical features, diagnosis and management from both modern and Ayurvedic perspectives.

Objective:

1. To review the modern concept of Hyperlipidemia, including its definition, classification, etiopathogenesis, clinical manifestations, diagnosis, complications and management.
2. To review the Ayurvedic concept of *Rasa-Raktagata Snehavriddhi* based on classical references from *Charaka Samhita, Sushruta Samhita* and other classical ayurvedic texts.
3. To correlate Hyperlipidemia with *Rasa-Raktagata Snehavriddhi* by comparing their etiological factors, pathogenesis, clinical manifestations etc.

Methodology:

Lipids & Lipoproteins:

Lipids:

Definition: In biology and biochemistry, a lipid is a macromolecule that is insoluble in non polar solvents[6]. Several chemical compounds in food and in the body are classified as lipids. They include (1) natural fats also known as triglyceride (2) phospholipids (3) cholesterol and few others of less importance. As fat (lipid) is insoluble in plasma, so it cannot be transported directly through blood. It is now recognized that lipids (fat/cholesterol) in their various forms are transported by lipoproteins.

Lipoproteins:

Definition[7]: Lipoproteins are group of heterogenous substances, metabolically active, constantly circulating through the vasculature and existing in a state of dynamic equilibrium between tissues and liver. Triglyceride-fats and cholesterol esters are carried internally in a lipoprotein and shielded from water by the phospholipid's monolayer and the apoproteins. Such characteristics make them soluble in salt water-based blood pool.

Synthesis of lipids[8]:

The endoplasmic reticulum synthesizes lipids, especially phospholipids and cholesterol. These are rapidly incorporated into the lipid bilayer of the endoplasmic reticulum to grow more extensive. This occurs mainly in the smooth portion of the endoplasmic reticulum.

Concept of Hyperlipidemia: Hyperlipidemia is polygenic in inheritance that is manifested with the aid of the issues appreciably encouraged through elements which includes imperative obesity, saturated fats intake, and the cholesterol content within the eating regimen[9].

Cholesterol and Triglycerides are the two primary lipids found in blood. Lipoproteins, globular particles that also include proteins known as apoproteins, transport them. Lipoproteins are lipid transport vehicles that carry lipids from peripheral tissues to the liver. Cholesterol is found in all animal cell membranes and serves as the foundation for steroid, hormones and bile acids. Triglycerides play a crucial role in the transmission of energy from meals to cells. Increased lipids in the blood originate from either an increased rate of synthesis or a reduced rate of lipoprotein breakdown. A rise in one or more of the folowing lipids: cholesterol, cholesterol esters, phospholipids, or triglycerides is defined as Hyperlipidemia. A tendency to coronary, cerebrovascular, and peripheral vascular artery disorders can be caused by abnormal plasma lipids. Hyperlipidemia is a condition in which the concentration of cholesterol or triglyceride carrying lipoproteins in the blood exceeds a predetermined normal limit. The liver is responsible for the high levels of cholesterol in the bloodstream. The liver creates around 80% of the cholesterol in the body, while the remainder is derived through foods such as fish, eggs, and meat[10,11,12].

Role of Lipids & Lipoproteins in Atherosclerosis:

Atherosclerosis is caused by a buildup of lipids in the artery walls due to high cholesterol levels. On taking high fat, high cholesterol diet, adhesion of monocytes to arterial endothelium occurs at first. Later monocytes penetrate the endothelium, accumulate in the sub endothelial space and engulf lipid and lipid laden foam cells. The endothelial level is disrupted leading to platelet adhesion and aggregation which release potent growth factor that stimulate smooth muscle cell proliferation and connective tissue accumulation. Thus atherosclerotic plaque develops.

Atherosclerosis affects different parts of the circulatory system in different ways, resulting in different clinical symptoms depending on which circulatory bed is affected.

Classiffication of Hyperlipidemia:

Based on the type of lipid:

Hypercholesterolemia: Elevated levels of cholesterol

Hypertriglyceridemia: Elevated levels of Triglycerides

Based on causative factor:

Primary (Familial hyperlipidemia)[13]:

Because of a genetic abnormality, it is also known as familial. A single gene defect and numerous gene defects are categorized as monogenic and polygenic.

Classification of Primary Hyperlipidemia:

Type	Disorder	Cause	Elevated Plasma Lipoprotein
I	Familial Lipoprotein Lipase Deficiency	Genetic	Chylomicrones
IIa	Familial Hypercholesterolemia	Genetic	LDL
IIb	Polygenic Hypercholesterolemia	Multifactorial	LDL
III	Familial Dysbetalipoproteinemia	Genetic	Chylomicrons Remnants
IV	Hypertriglyceridemia	Multifactorial Genetic	VLDL
V	Familial Combined Hyperlipidemia	Genetic	VLDL, LDL

Secondary (Acquired Hyperlipidemia)[14]:

It is acquired due to the involvement of various disorders such as glomerular syndrome, diabetes, long term alcohol consumption, hypothyroidism, and the use of medications such as beta blockers, corticosteroids, and oral contraceptives.

Symptoms of Hyperlipidemia:

Hyperlipidemia generally does not have any obvious symptoms but they are usually discovered during routine examination or until it reaches the danger stage of a stroke or a heart attack. Patients with high cholesterol level or patients with the familial forms of the disorder can develop xanthomas which are deposits of cholesterol may form under the skin, especially under the eyes. At the same time, patients with elevated levels of triglycerides may develop numerous pimple-like lesions at different sites in their body[15].

Complications of Hyperlipidemia:

Atherosclerosis: It is the most important risk factor for atherosclerosis, which is the major cause of cardiovascular disease. Atherosclerosis is a pathologic process characterized by the accumulation of lipids, cholesterol and calcium and development of fibrous plaques within the walls of large and medium arteries[16].

Coronary Artery Disease (CAD): Atheroscerosis, the major cause of coronary artery disease, characterized by the accumulation of lipid and the formation of fibrous plaques within the wall of the arteries resulting in narrowing of the arteries that supply blood to the myocardium, and results in limiting blood flow and insufficient amounts of oxygen to meet the needs of the heart. Elevated lipid profile has been connected to the development of coronary atherosclerosis[17].

Myocardial Infarction (MI): MI is a condition which occurs when blood and oxygen supplies are partially or completely blocked from flowing in one or more cardiac arteries, resulting in damage or death of heart cells. The occlusion may be due to ruptured atherosclerotic plaque. The studies show that about one-fourth of survivors of myocardial infarction were hyperlipidemic[18].

Ischemic stroke: Stroke is the fourth leading cause of death. Usually strokes occur due to blockage of an artery by a blood clot or a piece of atherosclerotic plaque that breaks loose in a small vessel within the brain. Many clinical trials revealed that lowering of low-density lipoprotein and total cholesterol by 15% significantly reduced the risk of the first stroke[19].

Treatment:

Lifestyle Modification: Lifestyle changes are the cornerstone of Hyperlipidemia as management and are often the first line of treatment, especially for individuals with moderately elevated lipid levels. Lifestyle modifications like Dietary changes, Weight management, Regular physical activity, Alcohol consumption and Smoking cessation can significantly reduce lipid levels and lower the risk of cardiovascular disease.

Pharmacological therapy[20]: When lifestyle modifications alone are insufficient to achieve target lipid levels, pharmacological interventions become necessary. Several classes of medications are available, each targeting different aspects of lipid metabolism. This involves mainly the use of drugs. The major drug involves in the treatment of Hyperlipidemia is "Statin". Generally, the drugs involves in the treatment of Hyperlipidemia are classified as follows;

HMG-CoA reductase inhibitors (Statins):(Lovastatin, Simvastatin, Pravastatin, Atorvastatin, Rosuvastatin) - Statins act by competitive inhibition of Hydroxyl - methyl glutaryl coenzyme - A reductase (HMGCoA) which is the limiting step in the cholesterol biosynthesis in the liver results in reducing the plasma levels of total cholesterol (TC), LDL and ApoB. Statins also result ina little rise in HDL levels and a moderate drop in plasma triglycerides.

Bile acid sequestrants (Resins):(Cholestyramine, Colestipol) - Bile acid sequestering reduces the concentration of LDL cholesterol by inhibiting the absorption of bile acids from the intestine and formed indigestible complexes that are excreted with feces.

Activate lipoprotein lipase (Fibric acid derivatives):(Clofibrate, Gemfibrozil, Benzafibrate and Fenofibrate) - Stimulation of lipoprotein lipolysis.

Nicotinic acid: It exhibits its hypolipidemic effect by its ability to reduce LDL, VLDL, Triglyceride, and Total Cholesterol and increase HDL cholesterol.

Others: Ezetimibe, Gugulipid

Concept of Rasa-Raktagata Snehavriddhi:

Agni is responsible for all the metabolic activities in the body[21] and hence it is solely responsible for any increase or decrease of *Dosha*, *Dhatu* or *Mala*. When this *agni* gets vitiated then it has an impact on health at microcirculatory level depending upon the a*gni* involved. As stated earlier excessive consumption of *madhur*, *drava*, *snigdha*, and *gurugunatmak ahara* causes increase in quantity of *Pruthvi* and *Jala mahabhuta*. It results in *Agnimandya* (*Jatharagni* as well as *Dhatwagni*&*Bhutagni*). This causes formation of

s*ama(apachit) ahara rasa* which is more *snigdha*, *guru*, *manda*, *styana*, *picchil*. The *sama ahara rasa* which is improperly formed won't be assimilated by *dhatus* due to *Dhatwagni mandya*. Such *sama dhatuposhakansh* will be accumulated in *Rasa-Rakta dhatus* in abnormal quantities.

Description of term Rasa-Raktagata Sneha Vikruti in Samhita Granthas:

Acharya Dalhana in his commentary on *Sushruta Samhita* (*Su.Su.*14) has stated that *ahara rasa* nourishes the *Sthayee Rakta (Rudhira)*, *Mamsa*, *Meda*, *Asthi*, *Majja*, *Shukra dhatus* with their respective nutrients homologous through different and distinct routes (channels)[22]. Hence the nearest *sthayee dhatu* is nourished earlier with *rasa poshkansha* and the *dhatu* that lies further nourished with it's nutrient homologous relatively later through longer and smaller pathways or channels. So the *sthayee mamsa dhatu* receives its specific nutrient homologous from *rasa* after the supply to *rakta dhatu*; similarly, the *sthayee meda dhatu* is nourished with its specific nutrient homologous by *rasa* after the supply to *sthayee mamsa dhatu*.

Acharya Chakrapani Datta also in his commentary on *Charaka Samhita* (*Ch.Su*.28/4) has described about *Khale-kapota Nyaya* and *Kedar Kulya Nyaya* of *Dhatu Poshana*. It clears that *Medoposhakansha sneha* is present in the *Rasa-Rakta* earlier the formation of Medo *dhatu*[23].

Acharya Charaka has described about 20 *Kaphaj Nanatmaja Vyadhi* due to *kapha vriddhi vikar*. *Dhamani pratichaya* is one of them[24] which is quite similar to *Rasa-Raktagata Snehavriddhi*.

त्रुप्तिश्च तन्द्रा च निद्राधिक्यं च स्तैमित्यं च गुरुगात्रता च आलस्यं च मुखमाधुर्यं च मुखस्रवश्च श्लेश्मोद्रिरणं च मलस्यधिक्यंच् बलासकश्च अपक्तिश्च **धमनीप्रतिचयश्च**.....॥

Nidana[25,26,27]:

The substances having qualities similar as *meda* increases *sneha* in the body. On the basis of concept of *Samanya-Vishesh siddhanta*, the *nidanas* of *sneha vikruti* can be described as:

Acharya Dalhana in his commentary on *Sushruta Samhita* (*Su.Su.*15/37) mentioned that due to consumption of *Kaphavriddhikara ahara* frequently there is formation of *Madhuratara ahara rasa* firstly in the body. This *madhuratara ahara rasa* results in *Rasa Raktagata Snehavikruti* followed by *Medoroga*[25].

तत्र श्लेष्मल आहारसेविनो अध्ययनशीलस्य अव्यायामिनो दिवास्वप्नरतस्य च आम एव अन्नरसो मधुरतस्य शरीरम् अनुक्रमन् अतिस्नेहात् मेदो जनयति | तद् अतिस्थौल्यम् आपदयति अध्यय नशील्स्य इति अजीर्णभोजनाभ्यासिन: इति अर्थ: || सु.सु. १५/३२.

Similarly *Acharya Bhavaprakasha* explained about *Rasa Raktagata sneha vikruti* in *Madhyama khanda Adhyaya*[26].

अव्यायामदिवास्वप्नश्लेष्मलआहारसेविन: मधुर अन्नरस: प्राय: स्नेहात् मेदो विवर्धयेत् |

तत्र मेदसो विप्रकुष्ट्म् निदानम् आह अव्यायाम एति | अन्नरस: आमरस: ||]१

मेदसाऽवृत् मार्गत्वात् पुष्यन्त्यन्ये न धातवा: |मेदस्तु चीयते तस्मात् अशक्त: सर्वकर्मसु || २

भावप्रकाश मध्यमखण्ड/३९.

Also *Acharya Yogaratnakara* mentioned about *Rasa Raktagata sneha vikruti* in *Nidanasthana Medoroga Adhyaya*[27].

अव्यायामदिवास्वप्नश्लेष्मलआहारसेविन: मधुर अन्नरस: प्राय: स्नेहात् मेदो विवर्धयेत् |

मेदसाऽवृत् मार्गत्वात् पुष्यन्त्यन्ये न धातवा: |

मेदस्तु चीयते तस्मात् अशक्त: सर्वकर्मसु || योगरत्नाकर निदानस्थान मेदोरोग.

Classical Reference	**Nidana mentioned**
Charaka Samhita, Sutrasthana 21/4	अतिभोजन (Overeating), मधुर -स्निग्ध -गुरु आहार (Excessive sweet, unctuous, heavy diet), अव्यायाम (Avyayama), दिवास्वप्न (Divasvapna), हर्ष -नित्यत्व (Excessive comfort and sedentary habits), अव्यवाय (Lack of sexual activity) बीजस्वभाव
Sushruta Samhita, Sutrasthana 15/32	श्लेष्मल आहार सेवन (Shleshmala Ahara), अव्यायाम (Avyayama), दिवास्वप्न (Diwaswapna), अध्ययनशील (Ajirna Bhojanabhyasi – as per commentator)
Bhavaprakasha, Madhyama Khanda, Medoroga Adhyaya 39/1-2	अव्यायाम (Avyayama), दिवास्वप्न (Diwaswapna), श्लेष्मल आहार सेवन (Shleshmala Ahara Sevana)
Yogaratnakara. Nidanasthana, Medoroga	अव्यायाम (Avyayama), दिवास्वप्न (Diwaswapna), श्लेष्मल आहार सेवन (Shleshmala Ahara Sevana)

Samprapti:

Nidana i.e. excess intake of k*aphavardhaka* and m*adhura rasa pradhan ahara*, d*iwaswapna* and a*vyayama* contribute to m*edoroga*. s*antarpana ahara vihara*, which includes sedentary life style, high calories food intake, lack of exercise which finally leads to morbidity of k*apha dosha* and m*edo dhatu*. Due to *medodhatwagni dushti* excessive accumulation of abnormal *kapha* and *meda* ocuurs in various *strotas* in body. *Aparipakva kapha - meda* in the form of *sneha* present in *rasa-raktavaha strotasa* results in obstruction to the movement of *vata*&*rakta* through affected channel, which finally ends up in disease manifestation according to the site of affliction. The state of *apakva kapha* or *meda* and its excessive presence, *margavarodh* in *rasa-raktavaha strotas* is often compared with the state of Hyperlipidemia. On the basis of above pathophysiology, Hyperlipidemia can be clinically correlated with *Rasa-Raktagata Snehavriddhi* or *Dhamani Pratichay*. Furthermore, since this unnecessarily elevated *asthayi medo dhatu* is *ama* in origin, it is stored in the body for a longer period of time, resulting in *strotorodh* which further leads to additional complications like S*thaulya*, P*rameha*, H*rudroga* etc.

Poorvarupa:

In the initial stage of disease patient does not have any complaint or no symptoms seen related to *Rasa-Raktagata Sneha vikruti* but on routine blood investigations many patients are diagnosed with deranged lipid profile. Some of the patient has family history and they are prone to have Hyperlipidemia. As initial manifestations are due to *agnimandya*, the symptoms related with *samata* and *medo dushti* like *atinidra*, t*andra, aalasya, anga gaurava* etc. can be considered as *poorvarupa* of *Rasa-Raktagata Sneha vikruti*.

Rupa (Clinical manifestation):

If the *nidana sevana* continues then *samprapti* continues to occur and following *rupa* can be seen in patients: *kshudra shwas* that is dyspnoea on exertion, *aalasya* that is lethargy, *nidradhikya* that is sleepiness, *gaurava* that is feeling of heaviness.

According to *Acharya Charaka*, the body is deformed by buttocks, abdomen, and breast owing to an excessive rise in *meda* and *mamsa dhatu* and that increased bulk (adiposity) is not accompanied by an increase in energy. As a result, the individual is less enthusiastic about his physical exercise.

The *rasayani* that contain *rasa*, *rakta* lost their normal flow due to *styan*, *guru* and *picchilrasa* i.e. due to increased *sneha* within them. The *styan* and *picchil guna* causes the *sanga* of *rasa* and *rakta* in their own *strotas* i.e. the *sneha* portion of these *dhatus* causes *upalepan* in the *rasayanis* and further causes *Dhamani Pratichay* mentioned as *kaphaj nantmaj vyadhi*.

Chikitsa:

According to ayurveda, the general principle of management of any disorder is divided into three parts:

***Nidana Parivarjana*:**This is the most significant line of treatment for any disease condition. In *Rasa-Raktagata Snehavriddhi*, the aim is to avoid dietary and lifestyle factors that aggrevate *kapha*, *meda* and *ama*, thereby correcting *agni* and *pachana* of the accumulated *sama medas* and preventing further lipid accumulation.

***Samshodhana Chikitsa*:**The role of *shodhana* is in *kaphachedana, dhatwagni deepana* and s*trotoshodhana*. As the proper *shodhana* brings *dhatusamyatwa* and *agni deepti*, which is useful in *Rasa-Raktagata Snehavriddhi*.

Lekhana basti: *Lekhana basti* has been proven to be useful in the treatment of Hyperlipidemia. All ingredient drugs are generally having properties like *Rukshan, Tikshna* and *Strotoshodhana.*

Udvartana: It has been stated for *Bahya shodhana*, as it has properties such as *kaphahara, meda pravilayana, sthirikaranam angam* etc. It aids in the removal of odour, reduces excessive *perspitration*, and relieves exacerbated *dosha*.

Acharya Charaka mentions *vamana*, *virechana* and *raktamokshana* for *Santarpanottha vikara*, which can be utilised to treat Hyperlipidemia. He also recommends *ruksha*, *tikshna*, and *ushna basti* for *sthaulya*, which can help in Hyperlipidemia.

***Samshamana Chikitsa* (Drug Therapy):** As there is involvement of *ama*, *ama pachana* and correction of *agni* should be primary aim of the treatment. As in *Rasa-Raktagata Snehavriddhi*, there is *sanchit ama*, so the role of *pachana* is first and foremost than *deepana*. The term '*Pachana*' itself means, "that which digests *ama*". By *pachana* and *deepana*, *ama* may be pacified and *agni deepana* is achieved which in turn corrects the *Dhatuparinaman.*

Drugs having *katu, tikta rasa, laghu, ruksha, sukshma guna* and *ushna veerya* are useful in this condition as they reduce *kapha* and *meda* and also having properties like *deepana-pachana*, *sneha-meda-kleda shoshana* and *strotovishodhana*. By raising *meda dhatwagni*, *samshamana karma* relieves *vata, pitta and kapha* as well as depletion of *Meda dhatu*.

Dravyas such as *Shilajatu*, *Guggulu*, *Gomutra*, *Triphala*, *Madhu*, and *Lekhana Basti* have been recommended by *Acharya Sushruta*. In response, *Acharya Dalhana* said that *virukshana* helps to diminish *meda*, while *chhedaniya* medications, such as *Shilajatu*, *Guggulu*, *Triphala* and others serve to eliminate blockage from the *strotas*, particularly the *medavaha strotas*.

Pathyapathya:

Abhishyandi ahara (*dadhi, navanna, dugdhajanya padarth* etc.) should be avoided. They are atherosclerotic.

All the *kapha-medokara ahara vihara* (*aanup mamsa, diwaswapa, adhyashana* ect.) are *apathyas* in this condition. Those which produces *agnimandya* should be avoided.

Ahara having *guru, snigdha, picchil gunas* should be avoided.

Use of *takra, madhu*, hot water in the diet should be promoted.

Discussion:

Hyperlipidemia ia an abnormal amount of lipids (cholesterol or fat) in the blood. It causes cholesterol deposits in the arteries and provokes atherosclerosis, which reduces the size of the artery and, in the long term, the blood flow through the affected vessel and that is why it is widely regarded as a major risk factor for coronary heart disease, stroke etc.

It is one of the lifestyle disorders due to the today's faulty lifestyle which mainly includes faulty food habits (*adhyasana, atimatrashan*), minimum physical activity, sedentary lifestyle

along with mental stress resulting into various metabolic abnormalities in the body, one of them is Hyperlipidemia.

There is no direct reference of a single disease entity that can be directly correlated with hyperlipidemia. Different scholars of ayurveda have made attempts to correlate it clinically either as *Rasagata*, *Raktagata*, or *Rasa-Raktagata Snehavriddhi*, *Medoroga*, *Sama medas*, *Sthaulya* etc. In *Rasa-Raktagata Snehavriddhi*, *atisnigdha*, *madhura*, *guru ahara* leads to *kapha vriddhi* and *agnimandya*. This *dushit agni* further forms *ahara rasa* which is more *snigdha*, more *guru* i.e. *ama* in nature. So further *uttarottar dhatus* like *rasa*, *rakta* also becomes more *snigdha*, *guru*, *styana*, *picchil*. So, viscocity of *rasa*, *rakta* increases due to above *gunas* ultimately leads to *Rasa-Raktagata Snehavriddhi* and Hyperlipidemia. Hence being close resembles of these two diseases in terms of *nidana*, *roopavastha*, *upadrava* it can be studied under the heading of Hyperlipidemia.

An ayurveda approach to Hyperlipidemia involves methods to increase power of *agni* and to digest the *ama* because *agni* is responsible for all metabolic activities in the body. It is solely responsible for any increase or decrease of *dosha*, *dhatu* or *mala*. When *agni* gets decreased it leads to formation of *ama*, which is capable of obstructing the metabolic pathways and causing diseases. Correction of *agni* is the basic treatment for increased lipid levels. As per ayurveda, all the diseases develop due to *agnimandya*. This is also true in the case of Hyperlipidemia. Therefore, the treatment of the disease should always be precisely correction of the state of *agni* by using the *shodhana* and *shamana* especially acting on *agnisthana* i.e. *Yakrut* (liver). As according to modern concepts, Hyperlipidemia is a disease of disturbed lipoprotein metabolism and liver is the main stay of lipoprotein metabolism. Hyperlipidemia is a *Prabhuta dosha* disease and treatment of *prabhuta dosha* is *shodhana*. Due to *shodhana karma*, excessive *doshas* are removed out from the body and *dosha dushya anulomana* is attained. If *shamana chikitsa* is done after *shodhana* it will be more effective. *Deepana pachana dravyas* will be beneficial in s*amprapti vighatana* of Hyperlipidemia by doing *ama pachana* at various levels and improving the status of *agni*. Thus, dietary and lifestyle modifications, besides proposed ayurveda strategies are essential factors to be rigorously followed by the patient for effective control of Hyperlipidemia.

Conclusion:

Hyperlipidemia is a disorder of lipid metabolism manifested be elevation of plasma concentration of the various lipids and lipoproteins. Although ayurveda does not describes a distinct disease entity, its etiopathogenesis can be closely understood through the concept of *Rasa-Rakragata Snehavriddhi*.

The critical analysis presented in this review suggests that *Rasa-Raktagata Snehavriddhi* provides a more appropriate ayurvedic correlation for Hyperlipidemia. An understanding of Hyperlipidemia correlating with ayurvedic principles provides a holistic approach that emphasizes *agni deepana*, *pachana*, *kaphaghna* and *medohara* treatment along with diet and lifestyle modification. Timely intervention in the early stages of *kriyakala* will prevent further complications like CAD, Stroke etc. Lifestyle modifications, including dietary changes and increased physical activty, continue to play a crucial role in primary prevention and adjunctive therapy.

Further experimental, clinical, and interdisciplinary research can be done to establish evidence based data of the correlation between Hyperlipidemia and *Rasa-Raktagata Snehavriddhi*.

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