



RESEARCH ARTICLE

CONCEPT OF AGNI IN ATHEROSCLEROSIS AND ITS MANAGEMENT THROUGH YOGA & AYURVEDA

Dr. Rozlin Sultana

M.D. (Ayu), Assistant Professor, Department of SarirRachana, IAAMC, USTM, Meghalaya.

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Abstract

In Ayurveda, the concept of Agni is inevitable in determining the overall health of an individual, where Agni is said to be the base (moola) of life. The whole catabolic and metabolic processes are carried out in human body, regulated by Agni. But if due to Pragyaparadh or faulty lifestyle, the Agni is deranged then the metabolic activity becomes disturbed at cellular tissue and organ level and it facilitates to the formation of Ama. Hence, Ama is a triggering factor of many diseases that in turn destroys the Agni. Atherosclerosis occurs mainly due to lifestyle abnormality which is a direct result of Ama accumulation in the body. It is observed that 17.7 million people die each year from Cardiovascular Disorders, in which Atherosclerosis is the precipitating factor and an estimated 31% of all deaths worldwide (acc to WHO). Atherosclerosis is a condition where the arteries become narrowed and hardened due to a build up of Plaque around the artery wall. This disease disrupts the flow of blood around the body, posing the risk of serious complications. The term 'Atherosclerosis' is derived from the Greek word 'athero' meaning gruel or wax corresponding to the necrotic core area at the base of atherosclerotic plaque and 'sclerosis' for hardening the plaque's luminal edge. Apart from drug, Yoga therapy may play a pivotal role for alleviation of Atherosclerosis. Yoga therapy improves the blood flow to the organs by neuromuscular action. Practice of Pranayama stimulates and changes the lumen size of the arterioles, which helps to regulate the circulation.

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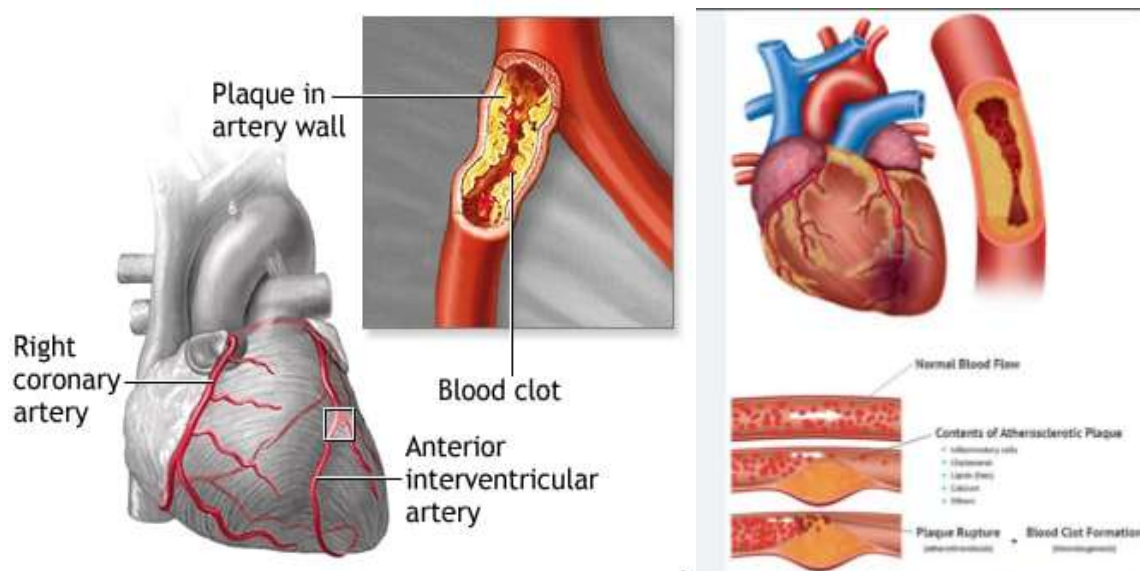
Introduction:-

1. In Ayurveda, the concept of Agni is inevitable for the strength, health, longevity and vital breath of an individual.
2. Agni is said to be the base or moola of life.
3. The whole catabolic and metabolic processes are carried out in human body, regulated by Agni.
4. The food substances that we consume undergo metabolic transformation by the effect of jatharagni, bhutagni and dhatvagni.
5. Initially jatharagni gives stimulation to bhutagni because consumed food is panchabhautika, it has to undergo transformation by the respective bhutagnis then only it becomes easy for digestion by jatharagni and tissue metabolism by dhatvagnis. The concept of pilupaka and pitharapakacan be emphasised here for organic changes and bio-chemical alteration.

Corresponding Author:- Dr. Rozlin Sultana

Address:- M.D (Ayu), Assistant Professor, Department of SarirRachana, IAAMC, USTM, Meghalaya.

6. Then processed metabolic products circulate inside the srotas continuously by the help of Vatadosha(Central Nervous System).
7. Dhatus remain in their normalcy after receiving respective nutrients from metabolised food substances.
8. Pragyaparadh emphasises intake of faulty lifestyle, which causes abnormality in the activity of agni, which hampers in metabolic activity. The Agni if deranged then the metabolic activity becomes disturbed at cellular, tissue and organ level and it facilitates to the formation of AMA.
9. Ama or endotoxins is an important concept in the field of Ayurveda. Ama is a toxic disease causing substance that forms as a result of impaired agni and that in turn destroys Agni.
10. Ama is fairly easy to clear from the digestive tract, but once it spreads into the deeper tissues, it becomes more difficult to eliminate. The accumulation of Ama inevitably clogs the channels of the body (srotamsi) and disrupts tissue nutrition. This Ama can be identified with the PLAQUE formation which may enhance deposition of unwanted fatty material in TUNICA MEDIA and TUNICA INTIMA.



11. Hence Ama is a triggering factor of many diseases which in turn destroys Agni.
12. ATHEROSCLEROSIS occurs mainly due to lifestyle abnormality, which is a direct result of Ama accumulation in the body.
13. It is observed that 17.7 million people die each year from cardio-vascular disorders, in which Atherosclerosis is the precipitating factor and an estimated 31% of all deaths worldwide. (acc to WHO).
14. Atherosclerosis is a condition where the arteries become narrowed and hardened due to a buildup of PLAQUE around the body, posing the risks of serious complications.
15. Ayurveda classifies Atherosclerosis as Sanga and Srota-avarodh; a disorder of kapha predominance effecting vyanvayu in raktavahasrota.
16. Apart from drug, Yoga therapy may play a pivotal role for alleviation of Atherosclerosis.

Aims and Objectives:-

1. Analysis of Agni in relation to abnormality of Atherosclerosis.
2. Management of Atherosclerosis through specific Yoga.

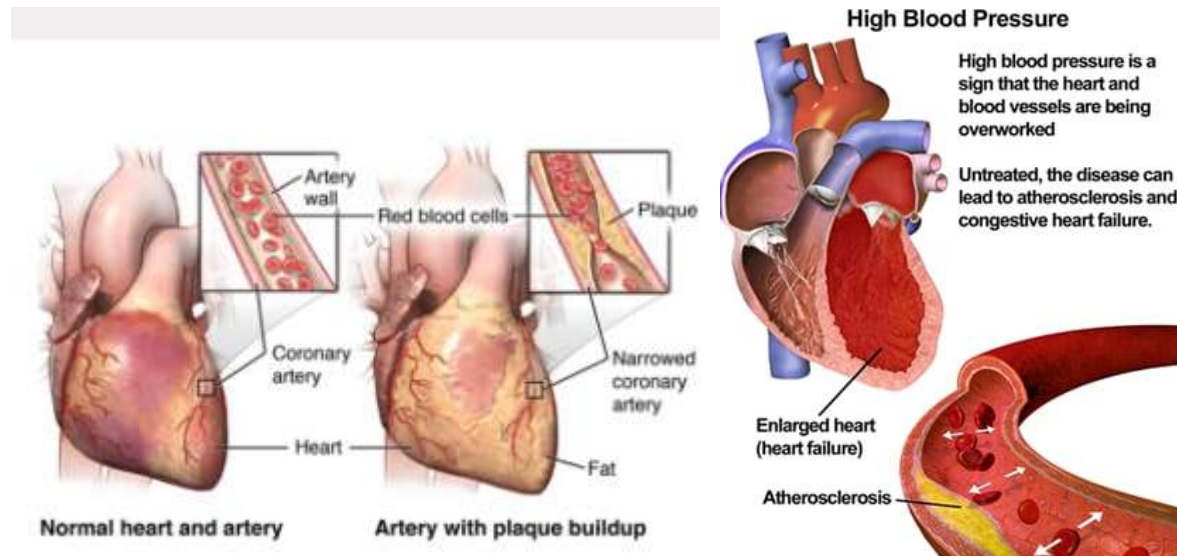
Materials and Methods:-

1. Role of Agni and its abnormality which is assessed in dhatvagni and bhutagni level.
2. Ama, consequences of impaired Agni and its role in Atherosclerosis is seen.

Review and Discussion:-

1. In Ayurveda, Atherosclerosis is a consequence of 2 basic pathogenic phenomenon i.e. SANGA and SROTA-AVARODH; where sanga means deficient flow, stagnation and accumulation whereas Srota-avarodh means obstruction of the cellular passage or canals.

2. Atherosclerosis is a disorder of Kapha predominance affecting vyanvayu in Raktavahasrota. Kapha as its basic character i.e SLISH ALINGAN emphasises its adhesion in specific intima of artery.
3. The causative factor being kapha which is identical with the nature of medadhatu (adipose tissue). If medadhatvagni is not proper then poshya or specific medadhatu is not formed, rather mala medadhatu will be increased, which can be identified with PLAQUE, as stated earlier.
4. Decreased metabolic function at the level of adipose tissue leads to increasing levels of atherogenic lipoproteins esp. LDL, lipoprotein(a) and possibly chylomicron remnants contribute to the development of atherosclerosis. Thus it results in excess medadhatu either as subcutaneous fat or fat that surrounds the organs.
5. Increased plasma concentration and reduced diameter of vessels favour sub endothelial accumulation of these atherogenic lipoproteins.
6. Chemical modifications such as oxidation trigger a self perpetuating inflammatory response during which they are taken up by macrophages to form FOAM cells, a hallmark of atherosclerotic lesions. These processes also have an adverse effect on endothelial function.
7. AMA and reduction of endothelial function involves the activity of vyanvayu.
8. Atherosclerosis is the build up of PLAQUE, which is a combination of cholesterol, other fattening materials, calcium and blood components that stick to the arterial wall lining.
9. The formation of PLAQUE can be compared with the formation and deposition of AMA.
10. Srota-avarodh (obstruction) can occur in any large, small or minute channel or even pores of cell membrane, when it is indicated by stagnation and disturbance in transport and metabolism which may occur even in all these level.
11. This can be understood with deposition of AMA which inhibits contraction and relaxation of the arteries or vessels.
12. The sympathetic nervous system releases neuropeptide Y, which increases the adhesion of human leukocytes to endothelial cells and thus causes SROTA-AVARODH.
13. Obstruction of the movement of VATA-AMA on one side causes disturbance in the action of the part or organ, and on the other hand it causes disturbances in the conduction of nerve impulses and ultimately the activity of the concerned part becomes reduced or halted.
14. Increased medadhatu formation begins to encroach on the upadhatu of raktadhatu (blood) that being the arteries and blood vessels. As the medadhatu accumulates in the raktavahasrota, it begins to block the flow of vyanvayu, as it carries the blood from the heart to the peripheral tissues.
15. Due to the obstruction of the flow of VYAN VAYU, pressure is increased to counter the kapha stagnation in arterial wall, hence HTN presents as a clinical sign of atherosclerosis. Kaphadushti symptoms will be present such as obesity, high blood cholesterol, lethargy, etc. which are increased qualities of kaphaguna like guru, manda, sheeta, sthira.



Management-

Yoga is a mind body technique which is a holistic lifestyle. It has been reported to be beneficial for control of risk factors of regression of advanced coronary atherosclerosis.

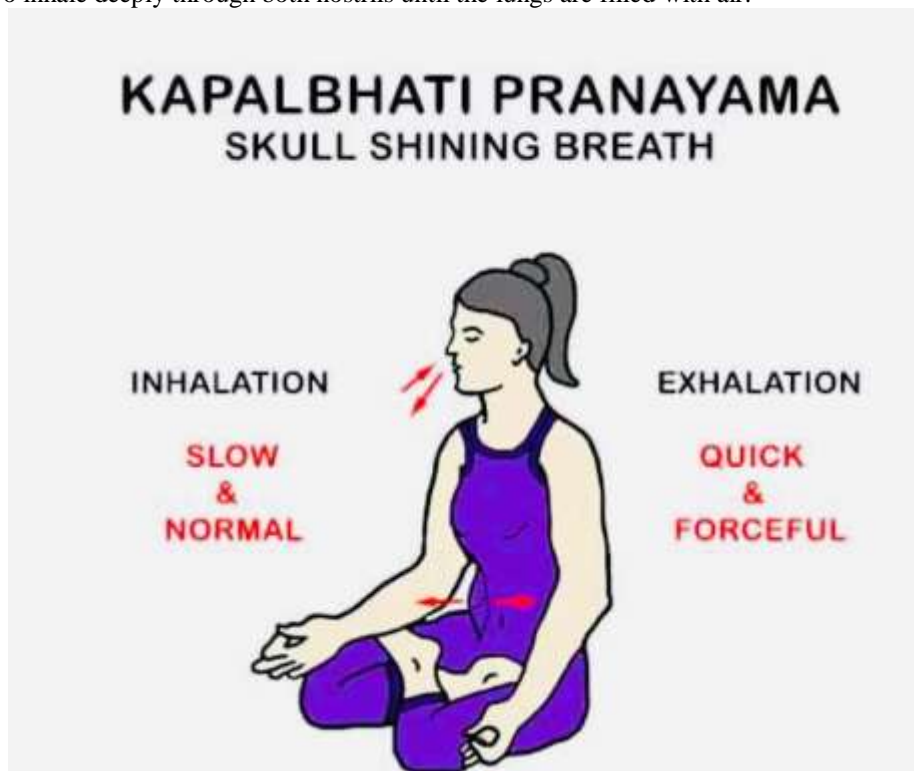
Among them Pranayama (Kapalbhati) and Suryanamaskar plays an important role for alleviation of Atherosclerosis.

Pranayama

1. Pranayama, one of the pillars of Ashtanga Yoga, gen. denotes extension of life; as 'prana' means life force and 'ayama' means expansion.
2. Pranayama maintains health by the practice of prolonging and shortening the breath cycle.
3. This is because the respiratory impulses, one of the main channels of the flow of Autonomic nerve currents are controlled by Pranayama.
4. It helps in regulation of activity in vagus nerve present in postero-lateral sulcus of medulla between olive and inferior cerebellar peduncle. The vagus when descends in thorax, it takes a twig of T2, T3, T4, T5 sympathetic activity near the root of the lung and form the cardiac plexus.
5. Inhalation and exhalation in a synchronising rapid phase helps in activity of these plexus which in other words regulate cardiac flow.

Kapalbhati Pranayama–**Steps-**

- STEP 1-First to sit on Padmasana and to close eyes, keeping the spine straight.
- STEP 2- To inhale deeply through both nostrils until the lungs are filled with air.



- STEP 3-Now, to exhale through both nostrils forcefully, so that the stomach goes deep inside. As we exhale, we feel some pressure in the stomach.
- STEP 4-To repeat the process for 5 mins.

Kapalbhati Pranayama known as automatic inhalation technique, is a rapid breathing technique of pranayama, which is considered as a cure for various ailments.

Benefits-

1. Abdominal breathing produces a slow yet large tidal volume and is known to produce emotional stability and controlled responses to the stressful environment. This can be due to elevated parasympathetic over sympathetic activity leading to better oxygenation of brain and heart in spite of low heart rate.
2. As it is a forceful respiration, it helps in the movement of muscles of activity of anterior abdominal wall along with fatty layer. Adipose tissue binding may be disturbed in all these specific areas of fat deposition including mesentery or omentum. It also helps in reduction of PLAQUE or even lipoprotein which is basic morbidising factors of atherosclerosis.
3. Deep inhalation makes the dead space of the lungs active, thus improving oxygenation of tissues and cleanses the body as a whole.
4. Kapalbhathi is considered as a form of abdomino-respiratory –autonomic exercise which stimulates the respiratory, abdominal and gastro-intestinal receptors.
5. Since Kapalbhathi induces a positive influence on the centres within the skull, the vital areas of the brainstem, cortex, and their efferent pathways and effectors organs may also get stimulated.
6. As a result, the synchronous discharge from the ANS, pineal gland and hypothalamus that regulate the endocrine and metabolic processes increase which in turn accelerates fat metabolism. This eventually increases basal metabolic rate, reduces fat deposition in arteries and ultimately ends up in weight reduction.
7. Kapalbhathi results in loss of subcutaneous fat rather than visceral fat.
8. The exercise also increases hepatic and lipoprotein lipases which induces increased uptake of TG (Triglyceride)

Suryanamaskar

*Suryanamaskar or Sun Salutation was developed in India which involves performing a series of yoga postures or asanas during the sunrise or sunset. Normally, there are 12 asanas in total, but there are many variations available.

*Suryanamaskar gives more benefits with less expenditure of time.

Steps-

1. STEP 1-Prayer pose-pranamasana
2. STEP 2-Raised arm pose –hastauttanasana
3. STEP 3-Hand to foot pose-hastapadasana
4. STEP 4-Equestrian pose-ashwasanchalanasana
5. STEP 5-Stick pose-dandasana
6. STEP 6-Salute with eight parts or points-ashtanganamaskara
7. STEP 7-Cobra pose-bhujangasana
8. STEP 8-Mountain pose-parvatasana
9. STEP 9-Equestrian pose-ashwasanchalanasana
10. STEP 10-Hand to foot pose-hastapadasana
11. STEP 11-Raised arm pose-hastauttanasana
12. STEP 12-Standing mountain pose-tadasana



Benefits-

1. In Suryanamaskar, a deep rhythmic breathing process is synchronized with each movement, which empties the lungs more vigorously and refills them with oxygenated air. All the alveoli of the lungs are expanded, stimulated and then cleaned. The oxygen content of the blood is increased, which improves the overall vitality and oxygenation of whole body, especially heart and brain.
2. The cardiac muscles are also strengthened, microcirculation to the heart is increased which reduces chances of heart attack
3. It clears elimination channels, helping our body to get rid of toxins
4. Suryanamaskar is a total co-ordination of body, breath and mind
5. The dynamic movements in each step of Suryanamaskar make the body contract and expand its muscles alternatively and tones up the joints.
6. Suryanamaskar also improves peristalsis of the intestines, stimulates blood circulation throughout the body, massages and tones up the kidneys so that the wastes are efficiently eliminated from the body at ease and helps the body to eliminate toxins through increased perspiration.
7. Suryanamaskar increases the efficiency of the immune system

Conclusion:-

1. Atherosclerosis is a disease which can affect any artery in the body. When it occurs in the heart, it may cause angina, MI and sudden death. In brain if it occurs, it causes stroke and transient ischaemic attack and in limbs, it causes claudication and critical limb ischaemia.
2. It is associated with abnormal endothelial function. They develop when inflammatory cells, predominantly monocytes, bind to receptors expressed by endothelial cells, migrate into the intima, take up oxidised LDL particles and become lipid-laden macrophages or foam cells.

3. When AGNI is deranged either at the cellular level i.e. bhutwagni or in tissue or organ level i.e. dhatwagni ,it causes morbid substances identified as Ama in classics.The basic abnormality in atherosclerosis i.e formation of plaque as well as endothelial deposition of lipoprotein all are its consequences.
4. SANGA and SROTAVARODH can be identified as two mechanism of atherosclerosis.
5. For its management, PRANAYAMA and SURYANAMASKAR plays an important role.Both these causes increased oxygen concentration ,high activity of abdominal and thoracic muscle,rhythmic contraction of blood vessel,thereby benefits in reduction of Atherosclerosis.

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