

PATHOPHYSIOLOGICAL CHANGES DUE TO AGEING: A REVIEW

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ABSTRACT

Ayurveda has a holistic approach toward all the miseries of man and ageing is one of these. Ageing is classified as one of the natural and yasya (palliative) diseases. As age advances, several changes take place in the body in the external appearance in the condition of dosha, dhatu, mala, agni, oja and so on, as well as in the mental and cognitive functions. By 2030, one in five in the world population will be over 65 years old. There are different hypothetical theories explaining the process of ageing. The chronological ageing and biological ageing occur simultaneously in case of timely ageing. In present era we can observe early/premature ageing due to improper life style. Ayurveda has given detailed explanation about physiology of ageing and placed Jarachikitsa amongst the ashtanga of ayurveda. Ayurveda has given importance for geriatrics and has unique contributions in the management of Jaravyadhi. Concepts of Vaya, Kaalaja-Akaalajajara and the physiological changes in Jaravastha along with concept of ageing according to ayurveda and the interpretations of functional impairment occurring during old age have been discussed in detail in this article.

KEYWORDS: Ageing, Jaravastha, Vaya, Kaalaj-Akaalajajara, Geriatrics.**INTRODUCTION**

Ageing is natural inevitable processes that occur in each and every living being. There is continuous deterioration in the vitality of body leading to various degenerative changes and functional impairments as the age progresses. Ageing has been defined as the total sum of physiological changes that progressively leads to the death of the individual. It is also defined as the intrinsic, inevitable and irreversible age-associated loss of viability that render us more susceptible to a number of diseases and death or a progressive functional decline of physiological function and a decrease in fecundity with age.

Ayurveda was introduced to the earth so that man could enjoy a long and healthy lifespan. Several types of principles have been described in Ayurveda. A person interacts with various factors, for example other panchabhautika (manifested) creations, living or non-living. It is very well known that at the base of all creation, there are nine dravya, (causative factors) that is panchamahabhuta (akasha, vayu, agni, jala, prithvi), mana, atma, kala and disha.

Panchamahabhuta provide the basic structure for all the manifestations and this manifested creation is known as the universe. The universe resides within the limitations of Kala and Disha in a clockwise manner. On account of

the interaction of kala, various changes occur in the body during the period of ayu; these are natural and cannot be changed. According to the type of changes that occur, the lifespan has been divided into three parts, also known as vaya; these are balyavastha, madhyavastha and jirnavastha or vriddhavastha. The major changes carried out in the body during these stages are growth, achievement, maintainance and decay. Thus, ageing is the process of decaying and these manifests in the form of various degenerative changes. Although these changes are natural, they are not pleasant. Ayurveda considers all these states, which are not pleasant in nature, to be disease: they cause suffering to mankind and any suffering is termed as a disease.

Ayurveda has considered Jara as a natural and inevitable process as well as a swabhavajavyadhi (natural disease). According to charaka normal lifespan of human being is 100 years, though lifespan is plummeting alarming; so now a days it is considered as 70 years. In today's era study of Ageing is based on model of pathology i.e. how to diagnose the disease and chronic disabilities afflicting the elder people to give probable remedies. Proposed article aims to discuss pathophysiological changes that occur with Ageing and also how tridosha plays a vital role in the process of ageing.

AIMS AND OBJECTIVE

1. To re-evaluate and discuss various ayurvedic concepts related to Ageing.
2. To understand the pathophysiological changes of ageing.

MATERIAL AND METHODS

This article is based on a review of Ayurvedic texts. Materials related to ageing, vya and other relevant topics have been collected. The main Ayurvedic texts used in this study are Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, AshtangaSamgraha, Bhava Prakash and Sharangadhar Samhita and available commentaries on these. We have also referred to modern texts and searched various websites to collect information on the relevant topics.

CONCEPTUAL STUDY**CONCEPT OF VRIDDHAVASTHA**

Vridhavastha is the last part of the lifespan and is mainly characterized by degenerative changes. Ageing refers to multidimensional process of physical, psychological and social change. The changes are always degenerative in nature. Brihatrayis have classified vya with 3 major categories as baalyavastha (childhood), Madyamavastha (youth) and Jeernavastha (old age). The five major classification of Ageing according to different texts have been discussed below:

Classification 1: From the time of birth to 30 years is Baalya, 30-60 years as Madhyama and age above 60 years is vridha. The progressive degeneration occurs in old age which results in reduction of strength of dhatus and indriyas. There is decreased vigour, masculinity, bravery, power of understanding, retaining and memory, speech and analyzing facts.

Classification 2: Baalya as age from birth to 16 years, 16-70 as madhyavastha and above 70 years as vridha. Laxanas like wrinkling of skin, greying of hair and baldness as signs of old age.

Classification 3: As the age progress there is gradual decline in dhatus and functions of senseorgans and motor organs. Signs and symptoms like kasa, shvasa, vali, khalitya, agnisaaada, slathasaara-mamsasandhyasthi, tvakaparushya, avanaama, vepathu etc.

Classification 4: There is different classification of vya as Garbha (from intrauterine phase till birth), Baala(up to 1 year), Kumara (1-16 years), youvana (17-34 years), Madhyama (35- 70 years) and Vardhyaka (above 70 years).

Classification 5: Baala (upto 16 years), Yuva (16-25 years), Madhyama (35-70 years), Vardhyaka (above 70 years).

Jara/Jeernavastha is referred to as old age. It is referred as a SvabhavikaVyaadhi (naturally occurring disease). It can be classified into two types further as kaalajara (timely ageing) and akaalajara (early ageing). In case of KaalajaJara the symptoms of Ageing appear on appropriate time and there will be simultaneous occurrence of chronological ageing and biological ageing. In Akaalajara, ageing occurs before prescribed

time due to not taking care of shareera by following swasthavritta and sadvritta. Thus we interpret that biological ageing is more intense than chronological ageing.

DIFFERENT THEORIES OF AGEING AS PER AYURVEDA

1. **SVABHAVOPARAMVADA**-According to charakthis is theory of natural destruction in which process of degeneration occurs due to svabhava (natural).
2. **OTHER EXTERNAL FACTORS**-Ayu of person depends on two factors i.e. daiva (deeds of previous life, unknown factors) and purusha karma (deeds of present life).
3. **KAALA (TIME)**-Time plays important role in ageing process. In world all things undergoes change before complete destruction i.e. called Parinama which occurs under the influence of Kaala. Thus, it is interpreted that jara is also result of KaalaParinama.

PATHOPHYSIOLOGY

In modern medicine there are various theories of ageing. But here we will limit ourselves to only ayurvedic point of view. Physiology, Anatomy, Growth and Development of the body is completely dependent on four factors: Kaala, Svabhava, Diet and absence of obstructive factors in growth and development of body. Amongst all above four factors diet is very important as it nourishes Dhatu and is responsible for maintenance of compactness, strength and formation of an excellent form of dhatu. Further as the dhatu is well nourished it reflects in form of Sara (absoluteness of body tissues) which makes a person look young and beautiful. When the rules are not followed regarding diet as well as lifestyle (indulgence in day sleep, daily coitus without use of vaajikarana), daily alcohol consumption, excessive physical work, lack of exercise, mental and emotional disturbance and also when there is defect in diet intake in terms of Gramya-Ahara (a deficient and unplanned diet) then as indicated in Second Pada (sub-chapter) of Rasayana (rejuvenation) there is vitiation of Tridosha, which leads to various progressive pathological changes due to improper utilization of diet. These pathological changes include loss of compactness of the muscles, looseness of joint, vitiation of Rakta (blood), excessive production of meda (fatty tissue), failure of majja(marrow) accumulation in bones, failure of production of shukra (semen), and loss of Oja (vital factors). Due to this pathology it leads to various symptoms for example, no enthusiasm due to increase in sleep, drowsinessand lethargy; the respiratory rate is increased; person is unable to initiate and perform physical and mental work; the memory, intellect and complexion deteriorate; and the person become susceptible to various types of diseases and fails to live out his complete lifespan. When these changes are produced according to Kala (time) and Svabhava(nature), it is known as KalajaVridhavastha (natural ageing).

These changes can be avoided and slowed down and thus this stage may be prevented; and it can be managed if changes have already manifested. Due to defective lifestyle and diet when these changes are produced, vriddhavastha begins earlier and it is known as AkalajaVriddhavastha (untimely ageing). These can be managed and treated. Kala Jara can also be treated but it is very impractical and difficult to follow the principles as mentioned in texts.

ROLE OF TRIDOSHA IN AGEING

Ayurveda has mentioned doshavastha in different stages of life that is during childhood kaphadosha is predominant, in middle age pitta dosha and in later satgesvatadosha is predominant.

ROLE OF AGNI IN AGEING

Apart from Doshas, agni (digestive fire) also plays a major role in ageing. For nourishment of body Ahara is the main fuel and the digestion process is regulated by the agni. When agni functions normally there is proper nourishment of all Dosha and Dhatu. With preceding old age Vatadosha becomes dominant and it affects jatharagni which results in Vishamagni. This affects the digestion process and gradually the nourishment to body is depleted.

PREVENTION OF AGEING

As there was some limitation of space, so only the principles are described here. As we know that process of ageing is totally dependent on diet and lifestyle. Hence ageing can be prevented by:

1. By following Dincharya (daily regimen) in daily routine, for example Anjana (a type of eye treatment); Abhyanga (body massage); mainly shiroabhyanga (head massage); nasya (oily nasal drops); Snehagandusha (re-tinting of oil in mouth); and so on.
2. By following other principles of Swasthavritta such as utilization of Tryopstambha (diet, sleep and coitus) according to rules as described in samhita. By suppressing urges (mental fluctuations, anger etc) and by expelling unsuppressible urges (natural urges) and regular removal of aggravated doshas according to ritu (season) by panchakarma; regular utilization of Rasayana (rejuvenating treatment) and Vaajikarana (aphrodisiac) along with principles of Sadvritta and AcharaRasayana and so on.
3. Taking diet strictly according to rules as described in texts.

MANAGEMENT OF AGEING

In CharakaSamhita in Sutrasthancharaka has mentioned about ageing as natural and yapy (palliative) disease in context of Agryadravya (foremost) as JaraYapyanaama. As in this age susceptibility to various chronic diseases is increased so it is essential to manage this period of ageing properly. The following principles can be considered in this context.

1. Keep the lifestyle as close as possible to the ideal as

prescribed in Ayurveda.

2. Avoid the provocative causes of kshaya and vata, for example, excessive physical and mental work, vigorous exercise, tolerance of unsuppressible urges, intolerance of suppressible urges, and so on.
3. Follow, as far as possible, all the rules regarding diet; take a Laghu (light) and Santarpaka (nutritive) diet.
4. Use of Rasayana, Vaajikarana and YapanaVasti regularly.
5. Follow as far as possible, all the rules regarding diet.
6. Follow the principles of Sadvritta and AcharaRasayana.

TREATMENT OF AGEING

Ageing is considered a kind of disease and its treatment has been clearly described in various Ayurvedic texts. Even in sushrutasamhita, there is a chapter titled Svabhavavyadhipratishedhiya, in which Rasayana Chikitsa (rejuvenating treatment) is described. Various treatment principles for natural diseases have been mentioned in chapter svabhavavyadhipratishedhiya in which Rasayanachikitsa is described. In this chapter treatment principles which are described related to ageing are completely dependent on Rasayana. However some vaajikarana formulations are also useful. However the treatment principles described are impractical and is impossible to be followed in this era, for example, drugs are either unavailable or less effective. Also the lifestyles of people are fast and busy and low level of satva.

DISCUSSION

Ageing is one of the inescapable processes occurring in each and every living being and one cannot avoid it. Classics have mentioned it as a SvabhavikaVyadhi (naturally occurring disease) because risk of developing various diseases increases in old age. There are structural and functional changes at cellular level, tissue level and organ level. The biochemical composition of cells and tissues undergo changes with age, physiological capacity reduces and the ability to maintain homeostasis in adapting to various stressors decline thereby person becomes more vulnerable to diseases. For understanding the process of aging in terms of Ayurveda, needs the analysis of the physiological changes occurring at the level of Tridoshas, Saptadhatus, Malas, Srotas, Indriyas, Agni and Ojas. The main Dosha involved is Vata and there is Agnimandya leading to improper nourishment of various entities of body. There may be gradual and partial functional loss or complete functional loss. There is increase of Vata in old age which causes improper nourishment of Rasa Dhatu. The dependent Dhatus also undergo improper nourishment. This process is gradual and leads to irreversible process of aging.

CONCLUSION

KaalajaJara (Chronological aging) is inevitable but a person can delay the premature aging by following healthy life style. Ayurveda is essentially the science of life and longevity. It presents a sound concept of aging; it

has mentioned various measures among Dincharya, Ritucharya and Sadvritta which directly or indirectly work on delaying aging. Ayurveda has wide scope in geriatric medicine as it has enriched knowledge of Rasayana Chikitsa.

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