

PHYSIOLOGY OF AGING ACCORDING TO AYURVEDA – A REVIEW

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ABSTRACT

Aging is a complex phenomenon which has progressive deterioration in vitality and failure of the body's homeostatic adaptive response over time leading to death. There are different hypothetical theories explaining the process of Aging. The chronological aging and biological aging occur simultaneously in case of timely aging. One can observe early/premature aging in the present day due to improper life style. *Ayurveda* has given detailed explanation about physiology of aging and placed *Jara Chikitsa* among the *Ashtanga* of *Ayurveda*. Concepts of *Vaya*, *Kaalaja - Akaalaja jara* and the physiological changes in functions of *Pancha Vata-Pitta-Kapha* in *Jaravastha* have been discussed in detail in this article.

Keywords: Aging, *Vaya*, *Jaravastha*, *Kaalaja Jara*, *Akaalaja Jara*

INTRODUCTION

Aging is a natural inevitable process that occurs in each and every living being. As the age progresses there is continuous deterioration in vitality of body leading to various degenerative changes and functional impairments. There are various contributing factors for process of aging including genetic mutation, random damage of cells, environmental factors, person's food and lifestyle etc. but exact mechanism of aging is not understood. According to population census 2011 there are approximately 104 million aged people (aged 60 years or above) in India; out of these, 53 million are females and 51 million are males. Both the share and size of elderly population is growing over time therefore aged population has become one of the major subjects of concern due to

its health related issues. *Ayurveda* has systematically classified *Vaya* and gave three major classifications as *Baala*, *Madhyama*, *Vriddha*. *Ayurveda* has given importance for geriatrics and has unique contributions in the management of *Jara vyadhi*. *Jara chikitsa/Rasayana* is being placed rightly among *Ashtangas* of *Ayurveda* by *Acharyas*^[1]. Before planning the treatment in geriatric conditions it is very much important to understand the physiology of aging and the functional changes occurring at the *Tridosha* level in old age. Hence this work emphasizes the basic understanding of concept of aging according to *Ayurveda* and the interpretations of functional impairment occurring at the level of *Tridoshas* during old age.

CONCEPT OF AGING IN AYURVEDA

Vaya (Age) has been defined as the duration of time since birth to the present of a living individual [2]. The *Brihatrayis* have classified *Vaya* with 3 major categories as *Baalyavastha* (childhood), *Madhyamavastha* (youth) and *Jeernavastha/Vruddha* (old age) but there are few difference of opinions regarding the range of ages that are placed in these categories. The five major classifications of aging according to different texts have been discussed below,

Classification 1: From the time of birth to 30 years is considered as *Baalya*, 30-60 years is *Madhyama* and age above 60 years is *Vruddha*. The progressive degeneration occurs in old age which results in reduction of strength of *Dhatu*s and *Indriya*s. There is decreased vigor, masculinity, bravery, power of understanding, retaining and memory, speech and analyzing facts [3].

Classification 2: *Baalya* as age from birth – 16 years, 16-70 years as *Madhyama* and above 70 year as *Vruddha* [4]. *Laxanas* (signs and symptoms) 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 the *Dhatu*s and functions of sense organs and motor organs. Signs and Symptoms like *Kasa* (cough), *Shvasa* (dyspnea), *Vali* (wrinkles), *Khalitya* (alopecia), *Agnisaada* (diminished digestive capacity), *Slatha Saara- Mamsa Sandhyasthi* (degenerative changes in musculoskeletal system), *Tvakparushya* (skin loses its texture), *Avanaama* (changes in stature and posture), *Vepathu* (tremors) etc. [5]

Classification 4: There is a different classification of *Vaya* as *Garbha* (from intrauterine phase till delivery), *Baala* (up to 1 year), *Kumara* (1- 16 years), *Youvvana* (17-34 years), *Madhyama* (35-70 years) and *Vardhakya* (above 70 years) [6].

Classification 5: *Baala* (upto 16 years), *Yuva* (16-25 years), *Madhyama* (25-70 years), *Vaardhakya* (above 70 years) [7].

Jara/Jaravastha is referred as old age. It has synonyms like *Sthavira*, *Vaardhakya*, *Jeernaavastha* and

Vruddha. It is referred as a *Svabhavika Vyadhi* (naturally occurring disease) [8]. It can be classified into two types further as *Kaalaja/Parirakshana krita* (timely aging) and *Akaalaja/Aparirakshana krita* (early aging) [9]. In case of *Kaalaja jara* the symptoms of aging appear on appropriate time and there will be simultaneous occurrence of chronological aging and biological aging. In *Akaalaja jara*, aging occurs before prescribed time due to not taking care of *Shareera* (body) by following *Swasthavritta* and *Sadvritta*. It can be interpreted as biological aging is more intense than chronological aging.

THEORIES OF AGING

- 1) ***Svabhavoparama Vada***- this is the theory of natural destruction mentioned by *Charaka*. According to this theory, process of degeneration occurs due to *Svabhava* (natural) [10]
- 2) **External factors**- life span of a person depends on two factors namely *Daiva* (unknown factor, deeds of previous life) and *Purusha Kaarana* (deeds of present life) [11]
- 3) ***Kaala (time)*** - *Kaala* plays important role in aging process. All things in the world undergo several changes before complete destruction. This is called as *Parinama* which is taking place by the influence of *Kaala*. Thus it can be assumed that *Jara* is also the result of *Kaala Parinama* [12]
- 4) ***Shareera Vruddhikara Bhava–Abhava*** – there is mentioning of some of the factors which promote growth. These factors are *Kaala Yoga* (time), *Sabhavasamsiddhi* (natural phenomenon), *Aharasaustava* (food which is taken) and *Avighaata* (absence of devastating causes). The gradual reduction or lack of the above factors may lead to reduced growth of a person there by aging occurs.

ROLE OF TRIDOSHA IN AGING

Ayurveda states the *Doshavastha* (state of *Dosha*) at different stages of life as follows, during childhood *Kapha Dosha* is predominant, in middle age *Pitta* and in old age *Vata Dosha* becomes dominant [13].

The properties of *Vata Dosha* like *Ruksha* (dry), *Laghu* (light), *Sheeta* (cold), *Khara* (rough), *Vishada* (non-slime) attribute to the signs and symptoms of old age such as decreased skin texture, dry skin, reduced strength etc.

When the specific functions of *Pancha Vata-Pitta* and *Kapha* are analyzed we can interpret them as follows.

Table 1: Functions of *Pancha Vata* affected in old age

Type of <i>Vata</i>	Physiology	Manifested symptoms
<i>Prana Vata</i>	<i>Udgara</i> (belching), <i>Nishvasa</i> (breathing), <i>Anna Pravesha</i> (deglutition)	frequent belching due to delayed digestion, exertional dyspnea, difficulty in deglutition
<i>Udana Vata</i>	<i>Vaak Pravrutti</i> (speech) , <i>Bala</i> (strength), <i>Varana</i> (complexion) <i>Smruthi</i> (memory)	Indistinct or unclear speech (loss of teeth), diminished strength, complexion and memory
<i>Samana Vata</i>	<i>Anna Grahana-Pachana</i> (ingestion and digestion of food), <i>Saara Malaadi Vivechana</i> (separation of nutritive and waste portion), <i>Munchana</i> (formation of stool and excretion)	Less ingestion capacity and reduced appetite, weakened digestion, irregular bowel
<i>Vyana Vata</i>	<i>Shareera Gati</i> (body movement), <i>Jaleeya Dhatu Gati</i> (circulation of fluid entity)	Gait is affected, improper blood circulation
<i>Apana Vata</i>	<i>Utsarga</i> (expulsion) of <i>Shukra</i> (semen), <i>Arthava</i> (ovum/menstrual blood) and <i>Mala</i> (metabolic waste products like urine, stool)	Delayed seminal discharge, menopause, constipation, urinary incontinence, scanty urine

Table 2: Functions of *Pancha Pitta* affected in old age

Type of <i>Pitta</i>	Physiology	Manifested symptoms
<i>Pachaka Pitta</i>	<i>Pachana</i> (digestion), <i>Kshudha</i> (appetite)	<i>Rasadi Dhatu Poshana</i> (nourishment of <i>Rasa</i> etc.) is hampered, Reduced appetite
<i>Ranjaka Pitta</i>	<i>Rasa Ranjana</i> (colouring of <i>Rasa Dhatu</i>)	Anemia
<i>Alochaka Pitta</i>	<i>Roopa Grahana</i> (visual perception)	Presbyopia, glaucoma, cataract
<i>Bhrajaka Pitta</i>	<i>Prabha</i> (lusture), <i>Deha mardava</i> (soft skin texture)	Wrinkles, loss of skin elasticity, complexion and dryness
<i>Sadhaka Pitta</i>	<i>Buddhi Medhadi Mano artha grahana</i> (intellectual perception)	Psychological changes

Table 3: Functions of *Pancha Kapha* affected in old age

Type of <i>Kapha</i>	Physiology	Manifested symptoms
<i>Avalambaka Kapha</i>	<i>Trika Avalambana</i> (protection of mediastinum)	Reduced functions of cardiovascular system
<i>Tarpaka Kapha</i>	<i>Indriya Tarpana</i> (nourishment of sense organs)	Reduced functions of sense organs
<i>Bodhaka Kapha</i>	<i>Rasa Bodhana</i> (taste perception)	Atrophied taste buds, anorexia
<i>Shleshaka Kapha</i>	<i>Asthi Sandhi Shleshana</i> (binds and nourishes joints)	Degenerative and osteoporotic changes in joints
<i>Kledaka Kapha</i>	<i>Anna Kledana</i> (softening the food taken)	Atrophy of gastric mucous glands and reduced gastric secretions

ROLE OF AGNI IN AGING

Apart from *Doshas*, *Agni* (digestive fire) also plays major role in aging. *Ahara* (food) is the main fuel for

the nourishment of body and the digestion process is regulated by the *Agni*. When *Agni* functions normally there is proper nourishment of all *Dosha* and

Dhatu. In old age *Vata Dosha* becomes dominant and it affects *Jataragni* resulting in *Vishamagni* [14]. This affects the digestion process and gradually the nourishment to body is depleted.

ROLE OF OJAS IN AGING

Vyadhikshamatva (immunity of a person) is dependent on few factors like *Ojas* (essence of all seven Dhatus), *Bala* (strength), *Prakruta Kapha* and *Shonita*. *Ojas* is also termed as *Bala* [15]. In old age the *Oja Kshaya* occurs and the person is prone for health issues as his body's resistance power is diminished.

ROLE OF SROTAS

Srotas are the channels of body which transfer the body fluids. The *Srotodushti* (pathological changes in *Srotas*) leads to various diseases and the main cause for *Srotodushti* is vitiation of *Vata* and *Mandagni* (reduced digestive power) which is predominant in old age.

AKAALA JARA

The *Akaala Jara* refers to premature aging which is commonly seen in the present era. In *Ayurveda* there is mentioning of the sequential loss of certain biological Factors in Aging [16] which are seen early in the present era. There are descriptions of several etiological factors for premature aging in the classical texts which are broadly placed under three headings as *Aharaja*, *Viharaja* and *Manasika Nidan*.

Aharaja Nidana: *Rasa* like *Amla* (sour), *Katu* (spicy), *Lavana* (salt), and excess consumption of *Ahara Dravyas* which are *Guru* (heavy to digest), *Ruksha* (dry), *Klinna* (softened), *Abhishyandi* (those which obstruct the channels of circulation), *Puti* (putrid), *Paryushita* (stale) accelerate aging process. *Pishtanna* (rice flour preparations), *Nava Shuka dhanya* (newly harvested pulses), *Shushka Mamsa Rasa* (dried meat), different types of *Viruddhaahara* (incompatible food), *Asatmya Ahara* (unwholesome diet) etc. produce *Ama* leading to *Agnimandya* (reduced digestive power) and accelerate aging. Excess eating of junk foods, street foods, soft drinks, carbonated drinks etc. contribute premature aging as they are rich in calorie. Studies suggest that high

calorie diet influences the rate of aging and the onset of associated diseases in animals and possibly, humans [17]. Modern scientists have observed that Caloric Restriction (CR) extends life span and retards age in certain animals. CR reduces metabolic rate and oxidative stress, improves insulin sensitivity and alters neuroendocrine and sympathetic nervous system functions in animals [18]. Addiction to smoking, alcohol etc. is well known etiological factor of premature aging.

Viharaja Nidana: the *Viharas* (regimens) which are generally contraindicated like *Divaswapna* (day time sleep), *Avyayama* (sedentary life style), *Ati Vyavaya* (excess indulgence in sexual act) are applicable in this case also.

“A sedentary lifestyle increases the propensity to aging-related diseases and premature death. Inactivity may diminish life expectancy not only by predisposing to aging-related diseases, but also because it may influence the aging process itself.

A sedentary lifestyle (in addition to smoking, high body mass index and low socioeconomic status) has an effect on Leukocyte Telomere Length and may accelerate the aging process. This provides a powerful message that could be used by clinicians to promote the potentially anti-aging effect of regular exercise” is said by study author Lynn F. Cherkas, of King's College London, in a prepared statement [19]. The excessive use of electronic gadgets, exposure to radiations, environmental pollutions accelerate skin aging as well as reduced functions of sense organs.

Manasika Nidana: The emotions like *Bhaya* (fear), *Shoka* (grief), *Lobha* (greed), *Moha* (excessive worldly attachments) also accelerate senescence. Various kinds of stress like occupational, financial, family stress etc. lead to premature aging by lowering body's immunity.

DISCUSSION

Aging is one of the unavoidable processes occurring in each and every living being and one cannot prevent it. Classics have mentioned it as a *Svabhavika Vyadhi* (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 *Agni-mandya* leading to improper nourishment of various entities of body. There are different patterns of functional deteriorations occurring with aging. There may be gradual and partial functional loss or complete functional loss.

Akaala Jara Samprapthi

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. The *Akaala Jara Samprapthi* (aetiology of premature aging) can be briefly summarised as follows: *Nidanas* (causative factors) such as *Ati Ahara-Vihara* (excess food intake and improper lifestyle), *Manasika Vega Adhaarana* (non-suppression of unpleasant emotions) leading *Srotolepa* (blocks the body channels) which in turn causes *Agnimandya* and *Ama*. When the function of *Agni* is vitiated, there is improper nourishment of *Rasa* and successive *Dhatus*. Finally leads to *Shareera Apachaya* (improper nourishment of body) and *Ojo Haani* (damages the *Ojas*) resulting in *Akaala Jara* (premature aging).

CONCLUSION

Kaalaja Jara (Chronological aging) is inevitable but one 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

Dinacharya, *Rutucharya* and *Sadvrutta* which directly or indirectly work on delaying aging. There is wide scope for *Ayurveda* in geriatric medicine as it has enriched knowledge of *Rasayana Chikitsa*.

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