

OSTEOARTHRITIS IN POST-MENOPAUSAL WOMEN – AN APPROACH THROUGH AYURVEDA

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ABSTRACT

Menopause is a gradual and natural transitional phase of adjustment between the active and inactive ovarian function and occupies several years of women's life and involves biological and psychological changes adjustments. This period is usually associated with unavoidable manifestation of ageing process in women. With menopause, women enter an estrogen deficient phase in their lives, which accelerates the ageing process. Though *Rajonivritti* as a disease condition is not described separately in classical literature, *Rajonivritti kala* is mentioned by almost all classical texts. According to *Sushruta Samhita* and other references too, 50 years is mentioned as the age of *Rajonivritti*, when the body is fully in the grip of senility. *Sandhigata Vata* is a most common condition which occur during this phase because of *Dhatukshaya*. *Sandhigata Vata* can be explained under the degenerative osteoarthritis according to contemporary science. Contemporary science suggests supplementation of estrogen as hormone replacement therapy in postmenopausal osteoarthritis. *Sandhigata Vata* in *Rajonivritti* has to be understood under *Dhatukshayajanya Samprapti*, which throws light into the utilization of *Rasayana* therapy, those specific to *As-thidhatu Poshana* in specific. *Anupahata* (unimpeded) *dhatu Agni*, *Srotus* and *Vyana Vayu* which is responsible for the sustenance of *Sharira dhatu* which is being fed by their *poshaka dhatu*s, the derangement of which leads to hormonal disorders. This article aims at understanding the concept of *Sandhigata Vata* in *Rajonivritti*, considering

Arthava Kshaya as the *Nidana*. *Rasayana Chikitsa* throws light into the scope of alternative therapy to hormone replacement therapy which works at the level of *dhatu Agni*, *Srotus* and *Vyana Vayu*. Application of phytoestrogens in such condition should also be considered as the supportive line of management.

Keywords: *Sandhigata Vata*, Menopause, Estrogen, *Rajonivritti*, *Rasayana*, Osteoarthritis and Hormone Replacement Therapy (HRT)

INTRODUCTION

Menopause is a physiological process universally affects all women who reach midlife. Studies indicate that women complete the transition to menopause, an estimated 85% report one or more symptoms, of which about ten percent seek medical help¹, necessitating the need to find effective and safe alternatives. Osteoarthritis, the most common articular disorder begins asymptotically after menopause in the 2nd and 3rd decades and is extremely common by age 70².

OA is a chronic degenerative disorder of multifactorial aetiology characterized by loss of articular cartilage and peri-articular bone remodelling. It is probably not a single disease but represents the final end result of various disorders as joint failure. OA may cause joint pain, bony or soft tissue swelling, tenderness, bony crepitus, peri-articular muscle atrophy, bony hypertrophy, deformity and marked loss of joint motion. It commonly affects the hands, feet, spine, and large weight-bearing joints, such as the hips and knees. It can present as localized, generalized or as erosive osteoarthritis³.

OA strikes women more often than men and it increases in prevalence, incidence and severity after menopause⁴. Radiographic generalized OA is three times more common in women aged 45-64 years compared to their male counterparts. 64% of females with knee osteoarthritis suffered the onset of symptoms either peri menopause or within 5 years of natural menopause or hysterectomy⁵. The manifestation of osteoarthritis after the decline of estrogen in menopause has a different pathology compared to the osteoarthritis that occur as degenerative joint disease. A better understanding of the role that estrogen and its deficiency plays in the molecular mechanisms of menopause induced osteoarthritic changes that affect the different joint structures has helped development of new and precise therapeutic

strategies to prevent and/or restore damaged articular tissues in OA.

Sandhigata vata is mentioned in the context of *gata vata* in the classical texts. The *lakshana* are swelling in the joints, and pain which increases on extension and flexion of joints^{6,7,8,9,10,11}. Osteoarthritis (OA) which is mentioned in western medicine has its similarities with the signs and symptoms of *sandhigata vata*.

The prevalence of degenerative diseases like *Sandhigata vata* increases with the commencement of *parihani avastha* (the phase of deterioration) after 40 years of age. Treatment principles related to aging are completely dependent on *Rasayana*.^{12,13} *Rasayana chikitsa* aims at maintaining the excellence of the body tissues by restoration of *dhatu-agni*, *srotas* and *vyana vayu*. Contemporary science suggests hormone replacement therapy (HRT) in postmenopausal osteoarthritis, considering the presence of estrogen receptors in subchondral bone.

The article aims at understanding the pathogenesis of *sandhigata vata* in *rajonivritti* and its management approach. The article aims at providing an insight towards the alternate to HRT in *Ayurveda*.

Background:

Estrogen plays an important role in the growth and maturation of bone as well as in the regulation of bone turnover in adult bone. Estrogen deficiency leads to increased osteoclast formation and enhanced bone resorption. In menopause estrogen deficiency induces cancellous as well as cortical bone loss. Depending on the ratio between formation and resorption, sub-chondral bone remodelling can culminate in either a sclerotic or an osteoporotic phenotype¹⁴. Estrogen deficiency in post-menopausal or peri menopause women culminates in OA which is a Osteoporotic phenotype. Thus, in a post-menopausal women key changes in the

subchondral bone include high bone turn over with decreased BMD and bone biomechanical structural damage in the early stages of OA, which either coincide with or precede cartilage degeneration. Subchondral bone degeneration may be the trigger for changes in the cartilage biomechanical and biochemical microenvironment, thus promoting cartilage erosion and ultimately OA progression.^{15,16} Estrogen deficiency may lead to increased serum IL-6 in postmenopausal patients with OA, which has been found to promote OA progression.¹⁷

Estrogen-related drugs that act on both subchondral bone and cartilage are good candidates for early-stage OA treatment, especially osteoporotic OA because of its anti-resorptive property.¹⁸ These drugs are potent in antagonizing bone resorption, which can effectively decrease bone remodelling and prevent subchondral bone loss and the deterioration of microarchitecture and biomechanical properties. Thus, the protective effect of these drugs on articular cartilage may be an indirect effect through protection of the subchondral bone. Additionally, these drugs directly target cartilage tissue, preventing cartilage damage and maintaining healthy cartilage. In addition to the direct or indirect protective role of these drugs on articular cartilage, subchondral bone, and the surrounding joint tissues, including the synovium and muscle, the joint tissues themselves interact with each other, thus maintaining joint organ homeostasis as a whole and finally delaying joint degeneration.¹⁸

Sandhigata Vata In Rajonivritti

Sandhigata vata after *rajonivritti* can be understood under *dhatukshayajanya samprapti*. The prevalence of degenerative diseases like *Sandhigata vata* increases with the commencement of *parihani avastha* (the phase of deterioration) after 40 years of age. Treatment principles related to aging are completely dependent on *Rasayana*.^{12,13} *Rasayana chikitsa* aims at maintaining the excellence of the body tissues by restoration of *dhatu-agni, srotas* and *vyana vayu*.

According to *Charaka Samhita*, *nidana sevana* aggravates *vata* and this *prakupita vata* gets accumulated in *rikta srotas*, where there is *snehadi guna kshaya* and

gives rise to various generalized and localized diseases.^{19,20} In the manifestation of *Janu Sandhigata Vata* the *prakupita vyana vata* travels along and gets lodged in *Janu Sandhi* where there is already existing *khavaigunya*, resulting in diminution of *sleshaka kapha*. Combined effect of all these processes manifests the symptoms of *Janu Sandhigata Vata*.

Menopausal syndrome does not find mention as disease in Ayurvedic literature, the reason could be women at that time belonged to a society which had Ayurveda as its health standard. They entered in old age as *kalaja vridhhavastha* (timely aging) and *Rajonivritti* (menopause) occurring at about age of 50 years passed uneventful. According to contemporary medical science, this physiological transition from reproductive to post-reproductive life is associated with decline in estrogen levels.

Ayurveda considers aging as *Nishpratikriya*²¹ (changes cannot be resisted) and *Swabhavabala Roga*²² (natural disease). *Rajonivritti* occurring in *Jarapakva Shareera* at the age of 50 years²³ is comparable to the present-day studies showing the mean age of menopause to be 45 years.

With advancing age there is gradual diminution in the qualities of *dosha, dhatu, mala, agni and oja*.²⁴ The *anupahata dhatu agni, srotas* and *vyana vayu* is responsible for the sustenance of *shareera dhatu* which is being fed by their *poshaka dhatus*²⁵, the derangement of which leads to hormonal disorders. *Artava* is an *upadhatu*, formed from *Rasa dhatu* within a month after proper metabolization of *rakta dhatu* by its *dhatvagni and bhutagni*.²⁶ The *kshaya* of *rakta dhatu* causes *artava kshaya* due to *utarottara dhatu kshaya*. *Kshaya* of *updhatu artava* and *shukra*, manifest as cessation of menstruation. Further, due to same reasons loss of *ojas* makes women more susceptible to illness. *Dhatukshysya* leads to *vata* Vitiation. With advancing age, progressive vitiation of *vata* due to its fundamental properties of *ruksha, chala, laghu, bahu, shighra* and *sheeta*, further precipitates the *soshana* and *kshaya* of different *dhatu*. This degeneration manifests as *Indriya kshaya* (loss of this perceptive powers of sensory organs), *Bala kshaya* (loss of strength) and *Virya kshaya*

(loss of reproductive strength). This may explain various symptoms of menopause related to degenerative changes in body²⁷. *Ama*, formed due to *mandagni* causes *stroto avarodha*, which in turn increases *Medodushthi* and decreases the nutrient supply to subsequent *dhatu*s namely *asthi* (bone/skeletal system), *majja* (bone marrow), and *shukra* (sperm/ fertility promoting substance)²⁸. One of the functions of *dhatu* is *shareera dharana* (bear/ supports the bodies frame). Among the *dhatu*, *asthi dhatu* is specific for *shareera dharana*. According to the principal of *Ashraya- aashreyee bhava*,²⁹ *asthi dhatu* is the seat of *vata dosha*, and *asthi* and *vata* are inversely proportionate to each other³⁰. Increase of *vata* vitiating factors will cause decrease of *asthi dhatu*. With advancing age vitiating *vata* leads to *kshaya of asthi dhatu* (decreased bone density). It can be compared with osteoporosis.

Further, vitiated *vata* due to *kshaya of rasa dhatu* when gets lodged in *sandhi*, causes *sandhigata vata*. This may explain the increased incidence of skeletal ailments like arthralgia, osteopenia, osteoporosis, osteoarthritis and increased predisposition to fractures as seen during menopause. The menopause transition represents a period of dynamic change from middle age to old age. This transition from *pitta* dominance to *vata* dominance causes most of the symptoms of menopause for *Pitta* is more akin to metabolic activities and *vata* have an active role in degeneration.

Approach Towards The Management

Charaka Samhita has mentioned common treatment for *vata vyadhi* i.e., repeated use of *snehana* and *swedana*, *basti* and *mrudu virechana*.³¹ Other classical literature have mentioned the treatment for *Sandhigata vata* in specific, i.e. *snehana*, *upanaha*, *bandhana*, *agnikarma*, *unmardana*.^{32,33,34,35} and other *shamanoushadhi*.

In *Sushrutha Samhita* it is mentioned that the given description of *sandhi* is only for *asthi sandhi*.³⁶ *Dalhana* in his commentary *Nibandha Sangraha* states that *sandhi* means *asthyashrita Sandhi*.³⁷ So *Sandhigata vata* is considered as *Asthi-Sandhigata vikara*. *Asthi* and *sandhi* are the *moolasthan* of *majjavaha srotas*. *Majja kshaya* makes the person afflicted by *vataroga*.³⁸ Considering the above points, *Asthi majjagata vata chikitsa*

is adopted in *Sandhigata vata* where *bahya* and *abhyantara sneha* is employed.³⁹ *Charaka Samhita* mentions *Panchakarma chikitsa* especially *Basti with ksheera* and *sarpi* processed with *tikta dravyas* are useful in *asthyashrita vyadhi*.⁴⁰

Considering osteoarthritis in postmenopausal women as Osteoporotic phenotype, contemporary science proposed estrogen as HRT to treat the condition. To treat the menopause means to relieve the discomfort and disorder due to hormone deficiency and at the same time to ward off degenerative processes of old age or at least to mitigate their effects and slow down their rate of advance. HRT solves only half of the problem but to provide optimum physical and mental fitness search for alternatives other than HRT are warranted.

So, considering *sandhigata vata* in *rajonivritti* as a degenerative disease in *parihani avastha* of an individual due to derangement in *dhatu agni*, *srotas* and *vyana vayu*, the treatment modalities can be designed as follows⁴¹:

1. Maintaining the excellence of *anupahata* (unimpeded) *dhatu agni*, *srotas* and *vyana vayu* which is responsible for the sustenance of *sharira dhatu* which is being fed by their *poshaka dhatu*s.
2. Regular consumption of artava bahukala sthapana hetu⁴².
3. As *Sandhigata Vata* is a disease of old age, *Rasayana chikitsa* is employed.
4. Those treatment methods which are directly mentioned as the *chikitsa sutra* of *Sandhigata Vata*. Those are *snehana*, *upanaha*, *agnikarma*, *bandhana*, *mardhana* and *swedana*^{32,33,34,35}.
5. The general *vatavyadhi chikitsa* applicable to *Janu Sandhigata Vata* based on the *lakshana* and *sthana* of the disease like *virechana* and *basti karma*³¹.
6. Considering *sandhigata vata* as *asthivaha srotho dusti*, *asthi majjagata vata chikitsa* is adopted in *sandhigata vata* where *bahya* and *abhyantara sneha* is employed⁴³.
7. Considering *Sandhigata Vata* as *asthi-ashritha vata vyadhi*, *Panchakarma chikitsa* especially *basti with ksheera and sarpi* processed with *tikta dravyas* are useful⁴⁴.

DISCUSSION

Two main components which need to be addressed in women having problems during menopause are advancing age and allied changes, and menopausal symptoms. An intellectual adoption of the suitable treatment options which includes planned usage of multiple variables as per individual needs is best approach for its management.

Rasayana Chikitsa, is a unique concept of Ayurveda. It provides a comprehensive physiologic and metabolic restoration for aging. *Rasayana chikitsa* is mainly used for maintaining the health of healthy individuals although it can be used for diseased also. The word 'rasa' in *Rasayana* refers to the *rasa dhatu* in the context of *rasadi sapta dhatu* and to the pharmacodynamic properties of a drug in the context of *rasa guna* etc. *Ayana* means circulation, the measures by which one is capable of getting the nourishing *rasa*. Acting through a complex and comprehensive mechanism of *rasa-samvahana* (circulation of nutrient juices), *dhatu agni*, *srotas* and *vyana vayu* it nourishes bodily tissues through micro-nutrition, thus helping in regeneration, revival and revitalization of *dhatu*.

Acting at all levels of *rasa* are the drugs such as *Draksha* (*Vitis vinifera* Linn.), milk, *Shatavari* (*Asparagus racemosus*), *Salaparni* (*Desmodium gangeticum*) etc. they act by enriching the nutritional value of the circulating plasma. Research studies have shown that drugs like *Ashwaganda* and *Shatavari* have anti osteoporotic and phytoestrogenic properties. Study was carried out on aqueous and methanolic extracts of *Asparagus racemosus* root in ovariectomized rats to evaluate the antiosteoporotic activity. Study showed significant effect on mineralisation, ossification and osteoclastic activity suppression in histopathological examination. It showed significant results in biochemical parameters, also reduced serum alkaline phosphatase activity, serum calcium significantly and also inhibited the ovariectomized induced excessive loss of calcium in urine. *Shatavari* is a phytoestrogen rich herb. Saponins (in the form of *shatavarins*) and flavonoids (in the form of isoflavonoids) are phytoestrogens. It has high calcium levels in the roots. It has anti-inflammatory

properties and possess wide range of fat- and water-soluble vitamins preventing inflammation in osteoarthritic patients. *Shatavari* enhances the bone formation and decreases the bone resorption^{45,46}.

Sushruta Samhita explained the principle as *tatra swayoni vardhana dravya prayogah pratikaraha* (Su.Su15). *Swayoni vardhana chikitsa* helps in regeneration, revival and revitalization of *dhatu*. Acting at the level of *Agni* i.e. at the level of digestion and metabolism are the drugs such as *Pippali* (*Piper Longum* Linn.), *Haritaki* (*Terminalia chebula*), *Citraka* (*Plumbago zylenica*), etc. they improves the digestion, absorption and metabolism, and has anabolic effect. Acting at the level of *Srotamsi* (the microcirculatory channels carrying nutrition to the tissues) are the drugs such as *Guggulu* (*Commiphora mukul*), *Pippali* (*Piper Longum* Linn.), *Rasona* (*Allium cepa*), etc. These *Rasayana* cleans and activate the micro-circulatory channels i.e. *Sroto Shuddhi* leading to improved tissue health and their quality⁴⁷. The proper functioning of *vyana vayu* helps in proper circulation of *rasa dhatu* through the *srotus*.

Vagbhata in *Shareera sthana* of *Astanga sangraha* mentions *arthava bahu kala sthapana hetu*. Women who are habituated to the use of ghee, milk, etc daily, who are cheerful, who belong to *kapha* constitution will retain the *arthava* for long time, delaying the menopause⁴². *Ksheera* and *ghrita* are considered among *nitya sevaneeya rasayana dravyas*.

For symptoms occurring due to transition from *madhayamavastha* (*pitta* dominant phase) to *vridhhavastha* (*vata* dominant), use of *Ghrita* can be recommended. *Ghrita* is *Vata-pitta shamaka*, *Balya*, *Agnivardhaka*, *Madhura*, *Soumya*, *Sheeta-Virya*, *Shulahara*, *Vrishya* and *Vayasthapaka*⁴⁸. Thus, it not only pacifies *Vata* and *Pitta* but also improves the general condition of the body and acts as a rejuvenator of the body. *Ghrita* is *Yogavahi*⁴⁹ (special affinity to carry and to potentiate the actions of the main drug to which it is mixed) and thus helps in increasing bioavailability of other drugs without losing its own property. Medicated *ghrita* such as *Amalaki Ghrita*, *Shatavari ghrita*, *Guduchi ghrita*, *Chitraka ghrita*, *Panchakola ghrita* and *Panchatikta ghrita* are various medicated *Ghrita*

preparations suitable for menopausal women. *Ksheera* by *madura rasa*, *guru snigdha guna* and *sheeta veerya* is *vata-pitta shamaka*. It is *medhya*, *rasayana*, *vrishya* and *jivaniya*⁵⁰. Milk basic protein increases bone mineral density and improves bone metabolism in healthy young women⁵¹. It prolongs the reproductive lifespan and counteracts the adverse effects of reactive oxygen species on the number and quality of ovarian follicles. Appropriate applications have potential to ward off problems related not only to aging and natural menopause but also in menopausal symptoms induced due to surgical, medical and other reasons. Aging though considered *Nishpratikriya* has been dealt scientifically in Ayurveda. Emphasizing *Ayu* (lifespan), its *chikitsa* (therapeutics) is called as *Vaya Sthapana* (age stabilizing). Ayurveda *Avatarana* has been guided by zeal of mankind to have *Dirgha Hitakara* and *Sukhakara Ayu* (a longer healthy and happy life). It recommends the countering of aging and related changes by use of *Vayasthapaka* drugs (age stabilizers), to rejuvenate the aged body by *Jeevneeya* drugs (vitalisers) and for allied aging problems *Jarachikitsa* i.e. *Rasayana Chikitsa* (rejuvenating process and formulations).

CONCLUSION

Menopause is related with the *vatadosha* dominated stage of life. Menopause is attained at the age of 50 years according to the various literature and with the commencement of *parihani avastha* of an individual. In this stage the seven *dhatu* undergoes gradual deterioration. Among which *asthi kshaya* and *sandhi shaithilya* occurs in *asthidhatu kshaya*. Arthritis and osteoporosis occur in this condition. Osteoarthritis in post menopause stage is considered as a phenotype of osteoarthritis which include high bone turn over with decreased BMD of subchondral bone. In the above phenotype of osteoarthritis, along with the regular management protocols of *sandhigata vata*, the attempt has to be made to check the bone resorption. Achievement of *Anupahata* (unimpeded) *dhatu agni*, *srotas* and *vyana vayu* is responsible for sustainance of *shareera dhatu* which can be achieved by *Rasayana chikitsa*. It is quoted in *Astanga Sangraha* that regular consumption of

ksheera and *ghrita* preserves the *artava* for longer duration, and hence delays menopause. The drugs having phytoestrogen properties like *ashwaganda*, *shatavari* are good candidates for early-stage OA treatment, especially osteoporotic OA because of its anti-resorptive property. These drugs are potent in antagonizing bone resorption, which can effectively decrease bone remodeling and prevent subchondral bone loss and the deterioration of microarchitecture and biomechanical properties. Additionally, these drugs directly target cartilage tissue, preventing cartilage damage and maintaining healthy cartilage. In addition to the direct or indirect protective role of these drugs on articular cartilage, subchondral bone, and the surrounding joint tissues, including the synovium and muscle, the joint tissues themselves interact with each other, thus maintaining joint organ homeostasis as a whole and finally delaying joint degeneration.

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