WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 18, 108-115. Review Article ISSN 2277– 7105

INTEGRATED APPROACH TOWARDS OSTEOPOROSIS WSR MENOPAUSE

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Article Received on
24 August 2023,

Revised on 24 Sept. 2023,
Accepted on 04 Oct. 2023,

DOI: 10.20959/wjpr202318-28037

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ABSTRACT

Osteoporosis is a multifactorial and slowly emerging global health problem. Osteoporosis is the most common bone metabolic disease and the fourth major enemy of humans after cancer, cardiovascular disease and stroke, which increases with age. Osteoporosis is characterized by low bone mass and destruction of bone tissue structure, leading to increased bone fragility and susceptibility to fractured bone.[1] One out of three women between age group of 50-60years in Indiasuffers from osteoporosis. Indian women have an early age of onset of osteoporosis as compared to western counterparts. After menopause in women the process of osteoporosis is accelerated due to deficiency of estrogen. Estrogen helps in the positive calcium metabolism and osteogenesis. Menopause accelerates the bone loss to 2.5% per year, which may continue till 10 years. Prevalence of Osteoporosis increases with age in women and not in men. It is reported that 42.5% women and 24.6% men above the age of 50years suffers from osteoporosis in India. Hence there is need for early diagnosis, identification of high-risk groups and prevention and treatment of Osteoporosis.[2]

KEYWORDS: Post menopause, Bone Mineral Density, Osteoporosis, Rajonivritti, Asthikshay, Asthisaushirya.

INTRODUCTION

Osteoporosis is one of the emerging health problem worldwide. Osteoporosis is disease related to bones in which bone mineral density and bone mass decreases. It causes decrease in bone strength as well as there is change in structure of bones. It causes fragility of bones and leads to fragility fracture. Osteoporotic fractures are becoming a major cause of morbidity

and mortality in old age group. As osteoporosis initially do not develop any symptoms for many years, it is known as a 'silent' disease and you may not even know that you are suffering from the osteoporosis until you break a bone. Osteoporosis occurs in all bones of body and fracture can happen in any bone but most often it occurs in bones of the hip, vertebrae in the spine and wrist. Except such medical conditions, aging is the major cause of osteoporotic changes however the process is faster in female who are in menopausal transition.

Clinical Presentation

Although many patients are symptomatic the clinical presentation of osteoporosis is as follows –

1. Fragility fracture
2. Back pain
3. Height loss
4. Kyphosis

Causes of Osteoporosis[3](Table 1)

1. Genetic	Low body weight; Family history
2. Endocrine	Hypogonadism; Menopause; Hyperparathyroidism
3. Gastrointestinal disease	Inflammatory bowel disease; Malabsorption;Chronic liver disease
4. Inflammatory disease	Ankylosing spondylitis; Rheumatoid arthritis
5. Drugs	Corticosteroids
6. Lifestyle	Inadequate calcium intake; Exercise; Highly trained athletes
7. Substance abuse	Alcohol; Smoking
8. Inherited	Osteogenesisimperfecta;Gaucher's disease
9. Other	Myeloma; Neoplasia; Pregnancy associated juvenile

Menopause and Osteoporosis

Menopause is one of the important cause of osteoporosis. World Health Organization (WHO) defines natural menopause as at least 12 consecutive months of amenorrhea not due to physiologic and pathologic causes. Statistics shows that the mean age of natural menopause is 51years in industrializednation.[4] With the average life span extended to 70 years, most women will spend more than one third of their life time beyond the menopausal transition. Besides, the proportion of Menopausal women is rising since the aging population is expanding rapidly. Thus, the health of Menopausal women becomes a prime concern worldwide.

Menopause is a natural physiological phenomenon resulting from primary ovarian failure secondary to apoptosis or programmed cell death. Ovarian function declines with age. The onset of Menopause features the decreasing production of estradiol, as well as increasing levels of follicle stimulating hormone (FHS). During the menopausal transition period, women will experience a number of bothersome symptoms, such as hot flashes, night sweats, vaginal atrophy and dryness, dyspareunia, sleep disturbance and mood swings. Besides these, osteoporosis is the most prevalent disease in menopausal women and is strongly associated with low quality of life and we concentrate on postmenopausal osteogenesis in this review.[5]

In normal individuals, bone mass increases during skeletal growth to reach a peak between age 20-40 but falls thereafter. There is an accelerated phase of bone loss in women after the menopause as a result of estrogen deficiency which causes uncoupling of bone resorption and bone formation, such that the amount of bone removed during the bone remodeling cycle slightly exceeds that which is replaced. Bone mass and bone loss are regulated by a combination of genetic and environmental factors. Genetic factors play an important role, accounting for up to 80% of the population variance in peak bone mass and other determinants of fracture risk such as bone size. Polymorphism have been identified in several genes that contribute to the pathogenesis of osteoporosis including the estrogen receptors, Vitamin D receptor and collagen type l, though most of the genes responsible remain unidentified. Environmental factors such as exercise and calcium intake during growth and adolescence are important in maximizing peak bone mass and in regulating rates of postmenopausal bone loss.[6]

Investigation and Diagnosis

Osteoporosis is a multifactorial systematic skeletal disease, is characterized by low bone mineral density (BMD) and micro-architectural deterioration of bone tissue resulting in bone fragility.[7] Measurements of BMD are necessary for the diagnosis of osteoporosis. The preferred technology is dual energy X-ray absorptiometry (DXA) and the preferred measurement site are the lumbar spine and hip. Bone densitometers work on the principal that the calcium in bone attenuates passage of X-ray beam in proportion to the amount of minerals present. By comparing the degree of attenuation with known standards, BMD values can be estimated for various skeletal sites and the values are expressed in grams of hydroxyapatite per cm ^{2}of the area scanned. In addition to giving absolute BMD values, DXA machines give results as ‘T-score’ and ‘Z-score’. The T-score measures by how many standard deviations

the patient's BMD values differ from that of a young healthy control, whereas the Z-score measures by how many standard deviations the BMD deviates from that of an aged matched control.[6] Osteoporosis is diagnosed when the T-score value fall to -2.5 or below, whereas T-score values that lie between -1.0 and -2.5 are defined as being in the osteopenic range. Values of BMD above -1.0 are considered as normal.

AYURVEDIC REVIEW

In Ayurveda there is no clinical entity which is described in Samhitas like Osteoporosis but this can be discussed under Asthisaushirya and Asthikshay. Asthisaushiryameans porous bones, Hemadri commented on word Saushirya as Sarandhratwam which means pores. Ayurveda is the only science which gives prime importance to prevention. In Ayurveda there are many upkramas (procedures) like Basti, Lepa, Sechan, etc., which are useful for strengthening the bones.

Asthidhatu

The word Asthi is derived from the root "As+Kathin" meaning to stay or in the fifth dhatu among seven dhatus. Nails and hairs are malas of Asthidhatu. It is pitrajghatak.[8] It's properties are guru,sthula, sthira and murtimant. According to Charakacharya in dhatuutapattinyay, Asthidhatu formed from medodhatu and from Asthidhatu the nutritious part becomes majjadhatu. It's functions are dehadharana, majjapushthi and ashrayaofvatadosha. The increase and decrease of Asthi and vatadosha are inversely proportional to each other ie. When vata increases Asthidhatu decreases and vice versa. Hence the hetu which increases of vatawill cause decrease of Asthidhatu. In sthulasthi, internally there is majjadhatu present.[9]

Asthivikara

In Ayurveda there is no exact clinical entity mentioned in Samhitaslike osteoporosis but it can be correlated to Asthikshay and Asthisaushirya.

Asthikshay

In Asthikshay there is pain, deformity in Kesha, Nakha and in Majjakshay there is Asthisaushirya, timirdarshan ie. Giddiness.[10]

Asthisaushirya

Asthisaushirya means porous bones. Hemadricommented on word "Saushirya" as Sarandhratwam which means with pores. This condition explained in context of Majjakshay.[11]

In this way we can consider osteoporosis as Asthisaushirya and Asthikshay.

Management

Lifestyle modification

- Weight bearing exercise, walking, jogging
- Balanced diet with calcium and protein intake
- Avoid high coffee intake, smoking and alcohol

Non-Hormonal treatment

- Supplementary calcium – 1-1.5gm/day
- Vitamin D–1.VitD3 (1500-2000 IU/day)

Also exposure to sunlight enhances synthesis of cholecalciferol in the skin

- Bisphosphonates- It prevents osteoclastic bone resorption. It improves bone density and prevents fracture eg. Ibandronate, Alendronate, Residronate
- Calcitonin- It inhibits bone resorption by inhibiting osteoclast. It is a polypeptide hormone. Simultaneous therapy with calcium and vitamin D should be given.[12]

Hormonal therapy (HT)

HT prevents bone loss and stimulate new bone formation. HT increases BMD by 2.5% and reduces the risk of vertebral and hip fracture (25-50%)[12]

eg.

1) Oral estrogen regime- CEE, 0.3mg or 0.625mg given daily.
2) Estrogen and cyclic progestin- Mainly used progestin is Medroxyprogesteron acetate (MPA). In this regimen estrogen given for 25days and progestin added for last 12-14days.
3) Continuous estrogen and progestin- but prolonged use of this combination may cause breast cancer.

Also there are transdermal administration, subdermal implants, percutaneous estrogen gel, transdermal patch, LNG-IUS options are available for HT.

Ayurvedic Management

Nidanparivarjan

As Asthikshay occurs due to Vataprakopa, avoidance of VataprakopakAhar-Viharis the prophylactic way to prevent Asthikshay, described in ayurvedicSamhitas. Avoid laghu, ruksha, sheet ahar, excessive exercise, krodh, shoka, bhayadimansikhetu also.

Shodhan

- Basti- Basti is known as almost half way treatment for vatadosha. Basti acts on Asthivaha and Majjavahastrotas'mainly. As per Acharya Dalhan, purishdharakala is resembles to Asthidharakalaso basti is the way to reach uptothe Asthidhatu directly.[13] In which Tiktakshirbasti is found to be very helpful in Asthikshay because of its Panchabhoutik Samghatanaie. Vayu and Akash. Thus basti plays an important role in strengthen the bones and can be used as preventive measure also.
- Matrabasti- Charakacharya described that the matrabasti is very useful in vatajvikaras and bhagna vikaras.[14]
- Other upakramas- Snehan, Swedan, Sechan, Lepan, Nasya, Mardan(mridu), Vedhan, Raktamokshan are also useful in vatavikaras.

Shaman Chikitsa

1) Arjuna: Terminalia Arjuna

The healing process in ulcerated, contused wounds and fractures are greatly enhanced by systematic administration of Arjuna. The bark contains calcium carbonate 34%, other calcium salts 9% and tanin16%. Besides it also contains aluminium, magnesium, organic acids, colouring matter and Sugar.[15]

2) Asthishrunkhala: Cissusquadrangularis

Due to anabolic properties of Cissusquadrangularisit is found to be helpful in the recovery of bone mineral density (BMD). Various studies shows that Cissusquadrangularis extract helps in increasing of serum calcium, BMD, VitD3, serum estrogen and Bone mineral content and it inhibits the anti anabolic effect and exert recovery of BMD.[16]

3) Laksha: Sasurrialacca

It makes bone stronger and helps in re-gaining natural bone mineral density. Generally, it is used with guggulin several ayurvedic joint supplements. Lakshadiguggul is a common ayurvedic medicine, which contains lac as a main ingredient. It is used for joint disorders and in disease that occurs due to loss of bone mineral density such as osteoporosis and osteomalacia.[17]

4) Ashwagandha: Withaniasomnifera

It is used in Indian traditional medicine for its various health benefits. Withaferin-A, a steroidal lactone present in this herb, has shown proteosomal inhibition -based enhancement of bone mineralisation. The controlled release of bioactive molecules enabled enhanced proliferation and differentiation of pre-osteoblasts.[18]

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