Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/18746
DOI URL: http://dx.doi.org/10.21474/IJAR01/18746

RESEARCH ARTICLE

OSTEOPOROSIS WITH SPECIAL REFERENCE TO ASTHIKSHAYA, A PREVALENCE ASSESSMENT

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Manuscript Info

Manuscript History
Received: 19 March 2024
Final Accepted: 25 April 2024
Published: May 2024

Key words:-
Osteoporosis, Osteopenia, Asthikshaya, Prevalence

Abstract

Osteoporosis the most common degenerative disease in old age characterised by reduced bone mineral density. Osteopenia is considered as the precursor of osteoporosis when bone mineral density is less than normal. Old age, nutritional deficiency, reduction in sex hormones, systemic illness and long-term use of steroid drugs are the common aetiologies. The prevalence of osteoporosis is found to be the highest in post-menopausal women and old age men. The present study was done in Govt Ayurveda College, Thiruvananthapuram by observing 342 patients who attended the OPD and IPD in an intention to assess the prevalence of osteoporosis and osteopenia in patients seeking treatment in Govt. Ayurveda College, Thiruvananthapuram.

Introduction:-

"Osteoporosis is defined as a reduction in the strength of bone that leads to increased risk of fractures. Loss of bone tissue is associated with deterioration of skeletal architecture." According to WHO, osteoporosis is confirmed when bone density reduces 2.5 standard deviations below normal. This is known as a T score lower than – 2.5. [1] Osteopenia is a condition where bone mineral density is lower than normal. It may be considered as a precursor of osteoporosis. On evaluation of BMD, a value of -1 to -2.5 is diagnosed as osteopenia.[2] Osteoporosis is known as silent killer as there are no visible symptoms until there is a fracture. Osteoporosis results from a number of factors including age related bone loss, nutritional deficiency, hormonal changes, chronic diseases and medications. During growth bone modelling takes place where long bones modify in their structure to perform the functions assigned to them. Some sex hormones secreted at the time of maturity is also required for bone formation and suppression of osteoclastic activity. After menopause there is significant reduction in oestrogen level which accelerates the osteoclast activity. Oestrogen deficiency also causes bone loss. Osteoporotic fracture is most common in post-menopausal women. Nutritional deficiency especially in early ages during bone formation results in poor absorption of vitamin D and calcium. Serum calcium level remains low which is replenished by resorption from bones. This reduces structural integrity of bones and resultant osteoporosis. [3]

More than 50% of bone fracturesamong post-menopausal women accounts for reduced bone mineral density. Around the world, one in three women and one in five men above 50 years suffer from osteoporotic fracture in their lifetime [4,14]. The reported prevalence of osteoporosis in women is 9% in the United States 15% in France and Germany and 38% in Japan [5].In men prevalence is 1% in UK, 4% in Japan, 3% in Canada and 8% in France. Approximately 9.0 million osteoporotic fractures were reported in 2000 all over the world [6]. Out of these 1.6 million were fracture of hip, 1.7 million were at forearm. There were also 1.4 million clinical vertebral fractures [7].

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All these studies show that osteoporosis is a very common disease especially in post-menopausal women [8]. Prevalence of osteoporosis ranges from 8% to 62% in Indian women of different age groups [9]

Pathophysiology of osteoporosis

During growth new bone tissues are produced by osteoblasts which get apposed over the outer surface of existing skeleton to grow linearly. The formed bones then undergo a process called modelling by which they become adapted to receive stresses placed on them. Numerous genes also control skeletal growth and bone mass. A genetic locus on chromosome 11 is seen in families with high bone mass [10]. Absence of point mutation in LRP 5, a low-density lipoprotein is associated with low bone density and increases incidence of osteoporosis. A disequilibrium between bone formation and extend of bone resorption is the key factor in osteoporosis. Bone re-modelling is the principal process in skeletal formation. It has two major functions – to repair microdamage within the skeleton and supply calcium from the skeleton to maintain serum calcium. Bone remodelling is also mediated by circulating hormones like oestrogen, androgens and parathyroid hormones [10]. The communication between osteoblasts, other marrow cells and osteoclasts are mediated by RANKL, a member of TNF family. Excessive degeneration of bone tissue is due to an increase in osteoclastic activity and decrease in osteoblastic activity. In young adults the resorbed bone is always replaced by an equal amount of new bone tissue. Thus, the total skeletal mass remains constant[10]. During old age, this process becomes imbalanced and resorption exceeds formation. In addition to this, an increase in re-modelling sites to overcome resorption produces a reversible reduction in bone tissue which results in permanent loss of bone tissue.[10]

On the basis of pathophysiology and presentation osteoporosis resembles asthikshaya. Swapramanahani of asthidhatu takes place leading to asthisoola, toda, sandhisaithilya and kesanakhapata.[11]Vata dosha is the main culprit in samprapti. Vatakopa can occur in two pathways.[12]Avarana or dhatuksaya. Age related cellular senescence, depletion of sex hormones at old age, increased bone resorption can be considered as dhatuksaya which aggravate vata dosa. Over the time, soumya amsa of asthidhatu get reduced leading to its degeneration. Sthanasamsraya in asthidhatu may be due to genetic composition of the individual. In conditions like obesity, uncontrolled diabetes and inflammatory autoimmune diseases avaranasamprapthi sets in creating margarodha to vata dosha. Autoimmune inflammatory diseases are associated with accumulation of ama. Pravrudhameda or ama leads to avarana of vatadosa and vatakopa in asthi sandhi results in asthiksaya. Sthanasamsraya in asthisandhi may be due to genetic composition of the individual like the presence of RANK ligand and lack of LRP5 genes. Obesity also accounts for reduction of bone density by sthanasamsraya in asthi sandhi predominantly weight bearing joints. Increase in medodhatu in sthoulya leads to asthiksaya and manifests in weight bearing joints.

Objective:-

The present study was conducted in Govt. Ayurveda college, Thiruvananthapuram in patients attending OPD and IPD of Department of Kayachikitsa to evaluate the prevalence of osteoporosis among patients seeking treatment at Govt. Ayurveda College, Thiruvananthapuram. To identify subclinical presentations of osteopenia and evaluate its prevalence in the current study setting.

Rationale

Physiologically bone density decreases during old age due to increased bone resorption and reduced bone formation to compensate the osteoclastic activity. Patients with osteoporosis may not have any symptom until there is a fracture. The symptoms may resemble other diseases leading to misdiagnosis. Hence by assessing prevalence of osteoporosis in OPD helps in proper screening of all patients with musculoskeletal complaints and get a proper diagnosis. Osteopenia is considered as the precursor of osteoporosis. Osteopenia is mostly subclinical and can be diagnosed by assessing BMD only.[13]

Methodology:-

Patients attending the OPDs and IPDhaving any joint related complaints were screened by measuring BMD using an ultrasound bone densitometer and evaluated with T score[15]. Collected data was categorised and prevalence rate was assessed. Patients who were diagnosed with osteoporosis were directed to department of Kayachikitsa. for further management.

Result:-

Bone mineral density of 342 patients were measured and result was categorised and assessed. It was observed that out of 342 patients,119 were male, 223 were females and 257 were above 40 years of age. 285 Patients came to the op seeking treatment for joint related complaints. 239of them were having comorbidities. BMD of these patients were assessed at the tibial bone using an ultrasound bone densitometer. T score was used as the assessment scale. 13 Malesand 21 females were having T score less than – 2.5 and diagnosed as osteoporosis. 91 Malesand 127 females were confirmed with osteopenia.

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