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Management of Osteoporosis

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Abstract:
Osteoporosis is a metabolic disease of bones that leads to bone fragility.70-80% of females and 20-30% of males will suffer a fracture related to osteoporosis in their lifetime. The current study identifies the causes of osteoporosis and its management, different types of treatments and most preferably given treatments. That was adopted for the study was performa which was used to assess the management of osteoporosis. The study group consisted of 25 patients (19 females and 6 males; age 30-80years).The patients were selected from Jinnah and Mayo hospital Lahore and also from CENUM. The data of patients revealed that osteoprotic patients are treated with both calcium and vitamin-D and pharmacological (antiresorptive drugs and anabolic steroids) drugs. So the analysis revealed that, poor life style, poor nutrition, ,and absence of follow up visits led to non compliance. So there is a great need of patient counseling and follow up visits to improve their quality of life and safety of other people around.
Key Words: *Osteoporosis, management, Pharmacological and calcium and Vitamin D treatment.*

Introduction:

Osteoporosis is a disorder of decreased bone mass, micro architectural deterioration and fragility fractures and can effect man and woman. Major risk factors leading to fragility fracture , family history of osteoporosis,include low body weight, history of fracture, family history of osteoporosis, and smoking. All individuals should ingest adequate calcium and vitamin D, exercise, and prevent falls.[1]. In clinical practice, the W.H.O. recommendation (2007) enables a more advantageous assessment of individual absolute risk fracture based on BMD and clinical risk factors independent of BMD (sex, age, prevalent fracture, parent fractured hip, use of glucocorticoids, rheumatoid arthritis, secondary osteoporosis, smoking, and excessive alcohol intake) [2]. Osteoporosis affect both men and women. Risk of fractures in elderly men is less than that reported in women . Caucasian women are generally at greater risk of fractures than Asian women, who, in turn, are at greater risk than African women.[3]. Risk fractures for osteoporosis are numerous. The menopause and hypogonadism in both women and men strongly predispose to osteoporosis.[4] Glucocorticoids have a direct effect on bone, causing inhibition of bone formation and enhancing bone resorption. Glucocorticoids decrease calcium absorption from the intestine and increase renal excretion. Osteoporosis occurs in at least 50% of persons who require long-term glucocorticoid therapy[5]. Changes of bone turnover with aging are responsible for bone loss and play a major role in osteoporosis. The bone mineral density (BMD) measured by dual-energy X-ray absorptiometry (DXA) at different skeletal sites is an important source. Bone formation is assessed by serum osteocalcin (OC), serum bone-specific alkaline phosphatase (B-ALP), serum C-propeptide of type I collagen (PICP), and bone resorption by the urinary excretion of two pyridinoline cross-linked peptides (NTX and CTX). Bone turnover is increased in perimenopausal women with both irregular menses and elevated serum follicle stimulating hormone (FSH). In elderly women, 20 years since menopause and over, but not in younger ones, serum PTH was negatively correlated with serum 25-hydroxyvitamin D . Thus assessing bone marker levels may be useful in the evaluation of osteoporosis risk[6]. Pharmacotherapeutic interventions (e.g., bisphosphonates, selective estrogen receptor modulators, calcitonin, and teriparatide) in women with postmenopausal osteoporosis provide substantial reduction in fracture risk .The importance of nutritional support along with an appropriate exercise regimen,

avoiding smoking and excessive alcohol use is to be emphasized along with the pharmacologic approach to osteoporosis[7][8].They studied that daily intake of calcium and vitamin D is encouraged at least 800mg and 400 to 800IU (10 to 20microg) respectively. Calcium and vitamin D are also important for maximizing the effect of drug for osteoporosis. Calcium and vitamin D supplementation could be a supportive measure. The efficacy and safety of Ca(2+) and vitamin D supplements at preventing bone loss and reducing the risk of hip are higher. The adequate consumption of calcium, in conjunction with vitamin D, proteins & vitamin-K in early life will likely optimize peak bone mass. Vitamin K may also have an important positive effect on the development and maintenance of bone through its role in promoting carboxylations of the matrix protein,osteocalcin[9][10][11]. Physiotherapy have an important role in the prevention of osteoporosis[12] .The prevention of osteoporotic fracture is an essential socioeconomic priority. Selective estrogen-receptor modulator (SERM), and bisphophonates are potent inhibitorofbone resorption.However50% vertebral fracture can be prevented .Both alendronate and risedronate are available in once-weekly formulations that have efficacy and tolerability profiles similar to the once daily doses[13]. Postmenopausal osteoporosis was associated with lack of estrogens, therefore, treatment option in is a group of medicines known as selective estrogen receptor modulators (SERMs) such as raloxifen, which is currently used to treat the osteoporosis[14] A new therapy is to use anabolic agent such as teriparatide [recombinant human parathyroid hormone(1-34)] for osteoporosis. Teriparatide increases bone density and bone turnover, improves bone strength. Teriparatide is approved for both postmenopausal women and men with osteoporosis[15].

Material and Methods: The study group consisted of 25 patients (19 females and 6 males; age 30-80year.The patients were selected from Jinnah and Mayo hospital Lahore and also from CENUM. A performa was designed using standard methods. Age, sex, weight, blood pressure, type of osteoporosis and type of treatments were recorded. Family history, personal history and past medical history were also taken. All the patients with osteoporosis were selected and data was recorded. Results are given in the forms of tables.

Results & Discussion:

Osteoporosis is a metabolic disease that leads to bone fragility.About 30-40% of women and 20%–30% of men will suffer osteoporosic fracture in their lifetime. Theroies regarding the development of osteoporosis indicate an imbalance between bone resorption and bone formation ,a process triggered by various risk factors such as aging, menopause, nutritional deficiency of calcium and vitamin-D, decreased level of oestrogen in females & testerone in males, family history of osteoporosis, smoking , various malabsorption diseases and use of certain drugs such as glucocorticosteroids and anticovulsants [2, 16 - 18].

Various pharmacological treatments such as bisphosphonates, selective estrogen receptor modulators, calcitonin, and teriparatide) and treatment with calcium , vitamin-D , vitamin-K and other minerals are used for treatment of osteoporosis[19][20].

Table 1: Occurance of Osteoporosis in males and females

Gender	Percentage
Female	72%
Male	28%

The results shown that occurance of osteoporosis in older population is higher in females.(Table-1) Similar results were

reported previously by Shapses SA & Riedt CS.,2006)[21]. The reason for osteoporosis in postmenopausal were various such as low

Table 2: (a) Calcium and Vitamin D treatment options

Treatments	Percentage(%)
Calcium	100%
Vitamin-D3	88%
Other Vitamins	32%
Other Minerals	36%
Exercise	40%

(b) Pharmacological treatment options

Treatments	Percentage (%)
Bisphosphonates	48%
SERM	8%
Calcitonin	4%
Anabolic drugs	4%

Table 3: Types of Osteoporosis diagnosed

Types of Osteoporosis	Percentage (%)
Postmenopausal	48%
Senile	20%
Vitamin-D deficiency	4%
Corticosteroid related	12%
Renal disease	4%
Diabetes related	4%
Anemia associated	4%
Immobilization	4%

level of oestrogen , low intake of calcium and vitamin-D, hyperthyroidism & hypercalciuria. Similar studies were reported previously (Metka M.,1990 , Cerdá GD *et al.*, 2009.)[22][23]. Our studies showed that various treatment options are available for treatment of osteoporosis (Table-2). Osteoporosis also occurs due to use of corticosteroids as corticosteroids have antiresorptive action on the bones.Both inhaled and systemic corticosteroid have antiresorptive action on bonrs[24].The results described that most common prevailing types of osteoporosis are postmenopausal osteoporosis(48%) , senile osteoporosis(20%) & cortico- steroid relatedosteoprosis(12%).(Table-3) . And different options are available for treatment of osteopoorsis. These include Pharmacological (bisphosphonates, selective oestrogen modulators (SERMs), anabolic drugs and calcitonin) and treatments with calcium, vitamin-D, and nonpharmacological exercise and surgical interventions). It was previously reported by (Fleurence RL. *et al.* 2007)[25] . But studies showed that therapy with calcium and vitamin D are used as an adjunct therapy to the pharmacological therapy. Thus to prevent and manage osteoporosis it is necessary to improve the dietary intake of calcium and vitamins and also to adopt active life style. This not only strengthens bones but also improve the quality of life.

Conclusion:

The current studies shows that the management of osteoporosis requires a healthy life style along with treatments with calcium, vitamin-D, minerals such as phosphorus, bisphosphonate, SERMs and anabolic drugs.

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