Original Article

Assessment Of Risk Factors As Predictors For Osteoporosis Fragility Hip Fractures Using Dexa Scan

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A R T I C L E   I N F O

A B S T R A C T

Aim : To evaluate the role of dexa scan and assessment of risk factors as predictors for fragility hip fracture. Method : Prospective study of 240 patients with suspected osteoporosis and underwent dexa scan.The inclusion criteria are patients above 50 years of age and trivial injury. The exclusion criteria are any pathological fracture, age below 50 years, any associated fractures. All 240 patients were assessed by various risk factors like age, gender, weight,alcohol etc. Result : The mean T score for normal, osteopenic and osteoporosis patient are -0.47,-1.71 and -3.43 respectively. On taking in to account of the risk factors 92% of patient between age group seventy one to eighty,51% of male ,59% of smokers ,60% of alcoholic,74% of chronic medical illness had fractures. Conclusion : The negative t-score value along with risk factors increases the risk of osteoporosis fragility hip fracture significantly .

1. Introduction

Fragility fractures are defined as fractures resulting from a fall from a standing height or less, or presenting in the absence of obvious trauma. Fragility fractures affect up to one-half of women and one-third of men over age fifty, and are often associated with low bone density. Such fractures occur most commonly in the hip, spine, and wrist. The dual burdens of suffering and health care costs are enormous for all fracture patients, particularly those with hip fractures.Thus, it is important that these patients not only receive treatment for the presenting fracture, but also for prevention of future fractures. Aim of this study is to evaluate the role of dexa scan and assessment of risk factors as predictors for fragility hip fracture.

2. Materials and Methods

Prospective study done in SRI RAMACHANDRA UNIVERSITY during the period of April 2011 to Dec 2012.240 patients who came to our hospital as in patient or out patient with suspected osteoporosis and underwent dexa scan. The inclusion criteria were patients above 50 years of age and trivial injury. The exclusion criteria were any pathological fracture, age below 50 years, any other associated fractures. All the 240 patients included in our

study underwent dexa scan and were divided into three group containing 80 patients. Group I --- Normal (T - score below -1.00) , Group II --- Osteopenia (T - score between -1.00 to 2.5) Group III --- Osteoporosis (T – score above -2.50) .Out of 240 patients 114 patients had fracture. All 240 patients were assessed by the following risk factors age, gender, weight, ,alcohol, smoking, chronic drug intake like steroids, anticonvulsants, chronic medical illness (Diabetes, cardiovascular disease, chronic kidney disease, COPD, bronchial asthma, cerbrovascular disease, seizure disorder.)

3. RESULTS

In group I none of the patient had fracture. In group II 40 patients had fracture while in group III 74 patients had fracture. The mean BMD for normal patient is .945,osteopenia patient is .799 and for osteoporosis patient is .593. The mean T score for normal, osteopenic and osteoporosis patient are -0.47,-1.71 and -3.43 respectively. On taking in to account of the risk factors 92% of patient between age group seventy one to eighty, 51% of male , 59% of smokers ,60% of alcoholic,74% of chronic medical illness had fractures.

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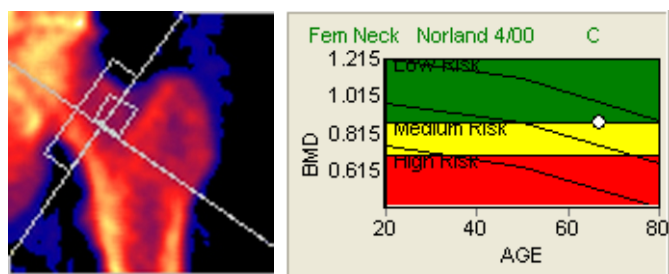Ph:919444779755, E.mail: ganesangram@yahoo.com

CASE ILLUSTRATION
GROUP I

Mr. R, Hp no: 011,66/m ,No h/o fracture,No other medical illness,H/O Alcoholic ,
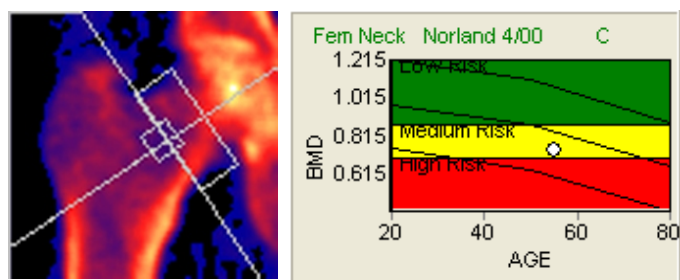
BMD: .8748, T-Score: -0.96,

WHO CAT: Normal

RISK: low

GROUP II

Mr. C ,55/m ,Hp no: J7287,No h/o fracture,H/O Hypertension,H/O Smoking/alcoholic,
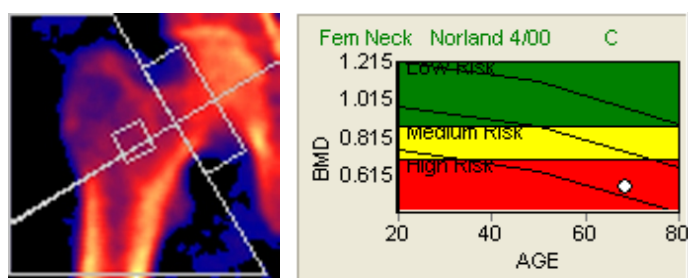
BMD: .7445,T-score: -2.07,WHO CAT: Osteopenia,RISK: Moderate

GROUP III

Mrs.KM,68/f ,Hp no: 629922 ,H/O Slip and fall,H/O hypertension Left hip Neck of femur #,H/O Post menopause,BMD: 0.5582,T score: -3.66'

WHO CAT: Osteoporosis RISK: High

DISSCUSSION

In our study we have assessed 240 patients who underwent dexa scan and assessed with various risk factors like age, sex, weight, smoking, alcohol, steroid intake, and chronic medical illness and results were discussed here.

BMD

BMD provides a strong risk indicator for fracture risk that is largely independent of sex. The significance of BMD as a risk factor depends on the level of BMD when used to predict any fracture or any osteoporotic fracture[1].There was a significant decrease in BMD for fracture patients Compared to uninjured people of the same age group[2] .In our study also we found decrease in BMD in fracture patients in comparison with uninjured people.

Age

With an increase in age there is a significant decrease in BMD and the chance of hip fracture is high. The prevalence of hip fracture increase exponentially with age, 90% of fractures of hip occur in individuals who are more than 70 years old. 90% of these fractures are as a result of a simple fall[3] . In our study(Table:1) we found numbers of fractures were more in 60-70 years age group and significantly high in 71-80 years, which proves that increase in age, has a significant chance of hip fracture.

Table 1:AGE

Age group	No of patients	With fracture	Percentage
50-60	88	12	13.6%
61-70	76	32	42.1%
71-80	76	70	92.1%

Gender:

Compared with women, elderly men presenting with hip fracture with associated risk factors have high chance for osteoporosis. Like women with hip fracture, men are usually fragile, with pre-existing medical illness and fracture-related complications contributing to their overall poor outcomes[4] .In our study risk of hip fracture in elderly men was higher than women(Table:2).

Table 2:SEX

Sex	No of patients	With fracture	Percentage
MALE	110	56	51
FEMALE	130	58	45

Weight:

Weight increases the mechanical strain on bone, stimulating bone remodeling; increased soft tissue overlying the greater trochanter reduces the force applied to the proximal femur in a fall; and low body weight can be a marker for poor health status, itself a risk factor for falls and fractures .Low body weight < 58kg has

increased risk of hip fractures, Low body weight is very useful predictor of hip fracture were BMD is Unknown[5].In our study risk percentage of hip fractures those who are less than 58 kg is significant (52%)(Table:3).

Table 3:WEIGHT

Weight	No of patients	With fracture	Percentage
< 58 KG	112	58	52
> 58 kg	128	56	44

Steroid intake:

They impair the replication and differentiation of osteoblasts, as well as induce apoptosis in mature osteoblasts. Glucocorticoids also down regulate genes encoding matrix proteins such as collagen and osteocalcin. Finally, glucocorticoids are associated with reduced intestinal calcium absorption as a result of down regulating the gene encoding TRPV6, a Ca2+ channel normally expressed in duodenal epithelium. Although vitamin D supplementation given alongside glucocorticoids can negate the damage to bone[6] . Influences of corticosteroids on bone density are numerous. There is consistent evidence that use of these agents is associated with a reduction in bone density, particularly in areas which contain a large proportion of trabecular bone. Chronic steroid intake percentage of risk factors was 30%[7].In our study risk of hip fractures with chronic steroid intake was 63%(Table:4).

Table 4:STEROID

No of patients	With steroid intake(44)	Without steroid intake (196)
240	With fracture(28)	With fracture(106)
percentage	63	54

Alcohol:

This relationship is not simply a result of falls under the influence of alcohol as histological changes have also been noted in the bone structure of alcohol abusers. However, these may be partially explained by confounding factors associated with alcoholism such as liver damage, hypogonadism and nutritional deficiencies. Nevertheless, alcohol is known to increase parathyroid hormone (PTH) and to reduce concentrations of vitamin D metabolites required for efficient calcium absorption. Furthermore, alcohol suppresses bone mineralization by osteoblasts[6].In our study risk of hip fractures with alcohol intake was 60%(Table:5).

Table 5:ALCOHOL

No of patients	Alcoholic(50)	Non alcoholic(190)
	With fracture	With fracture
240	30	84
percentage	60	44

Smoking:

Roughly one in eight hip fractures is attributable to cigarette smoking[8]. Hip fracture risk among smokers is greater at all ages but rises from 17% greater at age 60 to 71% at age 80 and 108% at age 90. Risks are lower in former smokers, suggesting a benefit of quitting smoking in slowing the rate of bone loss8. Smoking may cause changes in the metabolism of hormones that affect bone strength, in their study risk of hip fractures due to smoking is 19 %[9].In our study risk of hip fractures with smoking is 59%(Table:6).

Table 6:SMOKING

No of patients	Smokers (44)	Non smokers (196)
	With fracture	With fracture
240	56	88
percentage	59	45

Medical illness:

Falls are common among the elderly, and represent the leading cause of hip fractures with associated complications as organ system failure and mobility dysfunction. A lot of causes of falls in older people are reported including medical conditions, increasing age, medication use and social factors. The rapid growth of the elderly population has resulted in a proportional rise in the number of elderly individuals with chronic disability during this phase of life. Chronic disability directly interferes with the quality of life of the elderly, since it changes their way of living and their health conditions[9]. In our study there is a increase risk of hip fracture with Chronic medical illness (74%)(Table:7).

Table 7:CHRONIC MEDICAL ILLNESS

No of patients	With illness(146)	Without illness(94)
	With fracture	With fracture
240	108	06
percentage	74	6

CONCLUSION

· Patients in group I in dexa scan with risk factors are unlikely to have a risk of hip fracture.

· Patient in group II in dexa scan with risk factors have a 50% chance of risk for hip fractures.

· Patients in group III in dexa scan with risk factors have a very high risk for hip fracture.

· Early diagnosis of osteopenia / osteoporosis by dexa scan and identification of risk factors and proper management for osteoporosis and elimination of risk factors will go a long way in bringing down the number of osteoporotic hip fracture.

- Hence we conclude that negative t-score value along with risk factors increases the risk of osteoporosis fragility hip fracture significantly

- The increase in hip fracture cases is greater than expected due to an aging population, suggesting the existence of other factors influencing this higher incidence. This information should alert the health authorities so they may begin to initiate plans of prevention and management of these very debilitating injuries.

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