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The Frequency of Fractures Among Patient Referred for DEXA in Eastern Province of Saudi Arabia

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Osteoporosis is the disease in which the density and quality of bone are reduced. As bones become more porous and fragile, the risk of fracture is greatly increased. Fractures are serious complications of osteoporosis and they may have socioeconomic consequences (at lumbar spine and hip bones). 117 patients were collected from King Fahad General Hospital in Al-Ahsa' and King Fahad University Hospital in Al-Khobar. For each patient DEXA scan was performed and a questionnaire was answered. Patients with either of the following abnormalities were excluded from the study. The diseases are: cancer, osteomalacia, osteomyelitis, benign tumors, Paget's disease, osteogenesis imperfecta, endocrinal disturbances and rheumatoid arthritis. 34 (29.1%) of our study sample experienced previous fracture during the last two years. Upper and lower limb fractures constitute 53% of the total fractures, spinal fracture was 23.5%. 41.5% of patients who had osteoporosis according to T-score of any region had fracture during the last two years. 40 – 50% of total patients classified as osteoporotic based on T-score measured at any site had fracture. Patients with osteopenia at right and left hips (42% and 41% respectively) had fracture during the last two years. BMD is a good predictor for future fractures. Individuals with osteoporosis based on right hip T-score are expected to develop fracture at upper limb while individuals with osteoporosis based on spine T-score are expected to develop fracture at upper limb and ribs.

Keywords: Fractures, osteoporosis, DEXA

INTRODUCTION

The International Osteoporosis Foundation (IOF) defines osteoporosis as a disease in which the density and quality of bone are reduced (WHO, 2003). As bones become more porous and fragile, the risk of fracture is greatly increased (Cooper, 2020). The loss of bone occurs silently and progressively. Bones reach their maximum density (peak bone mass) in early 20s (Gill C, 2020). With age progression, some of the bone cells begin to dissolve bone matrix (resorption), while new bone cells deposit osteoid (formation). For people with osteoporosis, bone loss outpaces the growth of new bone. Bones become porous, brittle and prone to fracture.

The National Plan for Osteoporosis Prevention and Management in the Kingdom of Saudi Arabia state that the prevalence of osteoporosis and osteopenia in Saudi Arabia (KSA) is 37.8% and 28.2% in men and women above the age of 50 years. Other epidemiological analysis showed that 34% of healthy Saudi

women, and 30.7% of men, 50-79 years of age are osteoporotic (Sadat et al, 2012).

Fractures are serious complications of osteoporosis (Pauline M, 2020). Fractures mainly at lumbar spine and hip bones have socioeconomic consequences. Concerned societies, foundations etc. developed strategies to prevent fractures and reduce fracture risks. Treatment should include educating victims with the disease and giving them keys to live along with it without complications (Alwahhabi, 2015).

The overall incidence of osteoporosis related femoral fractures in KSA are 7,528 with the direct cost of SAR 564.75 million ($150.60 million) (Sadat M et al 2015). This indicates that the approximate cost is 75,000 SAR per fragility femoral fracture. Indirect costs - costs due to productivity losses - were assumed to be three times the direct costs. So, it is very important to detect and treat osteoporosis early in order to avoid the high cost burden when patients present at much later stages with a fragility fracture (Demster D, 2011).

Patient awareness to osteoporosis was studied at Asir area and it was found low among Saudi ladies, thus attitude and practices also low towards this disease (Osman A, 2013). This finding is similar to other studies done in the kingdom in different cities, but there was no response. So this will enhance health authorities to create program to upraise the awareness of the community for this important disease, especially at primary health care levels and at school (WHO, 2001).

This study aims to find the association between occurrence of fractures and osteoporosis among pts referred for DEXA scan in eastern province. It is designed to test the following hypothesis: individuals who were already diagnosed with osteoporosis are more likely to have a fracture.

MATERIALS AND METHODS

The study sample was 117 patients collected from collected from Maternity and Children Hospital in Al-Ahsa and King Fahad University Hospital in Al-Khobar (KFUH). Each patient was requested to respond to a questionnaire designed to obtain information regarding fracture history. Study sample was collected during the period between February and April 2018. For each case a copy of DEXA report and her/his response to the questionnaire were collected. DEXA scans were performed with Hologic - Delphi QCR series Model 4500A at both sites. The reports include demographic data for patient, BMD, T-score, Z-score, WHO classification and fracture risk for right hip, left hip and lumbar regions.

Exclusion criteria: Patients with either of the following abnormalities were excluded from the study. The diseases are: cancer, osteomalacia, osteomyelitis, benign tumors, Paget's disease, osteogenesis imperfecta, endocrinal disturbances and rheumatoid arthritis

IBM SPSS version 23 was used to perform statistical analysis and to measure correlation between different variables. Simple frequency and descriptive analysis were performed, important crosstabs, correlation and significant tests were also performed. Results were presented in tables, bar and pie.

RESULTS AND DISCUSSION

All patients (117) included in this study were from Eastern Province. The majority were females 107 (91.5%), males 10 (8.5%)

Figure (1) shows the percentage of normal, osteopenia, and osteoporosis in right hip, left hip and lumbar spine. The percentage of osteoporosis based on right and left hips T-score are 19% and 13.5% respectively, while 64.9% based on spinal T-score. A study conducted in Arar Central Hospital concluded that in the age group 40-75 years, 58% had low BMD (Oommen and Alzahrani, 2014) 34 patients (29.1%) of the samples experienced previous fracture during the last two years. Figure (2) shows that limb fractures both upper and lower constitute 53% of total fractures, spinal fracture 23.5% while the lowest is at pelvis 9 %.

Table (1) shows the frequency and percentage of previous fracture distributed by WHO classification based on T-score measured at right hip, left hip and lumbar spine. 41.5% of patients who had osteoporosis according to T-score of any region (right hip, left hip and lumbar spine) had fracture during the last two years. Only 7.1% and 7.8% of patients with normal and osteopenia experience fracture. 40 – 50% of patients classified as osteoporotic based on T-score measured at any site had had fracture. Individuals with osteopenia should not be ignored. High percentage of patients with osteopenia measured at right and left hips (42% and 41% respectively) had fracture during the last two years. This confirms that individuals with low BMD are more likely to develop fractures. The most common reason for spine and upper limb fractures was falling, so, proper health education to both patient and his/her family is an integral part of treatment plan.

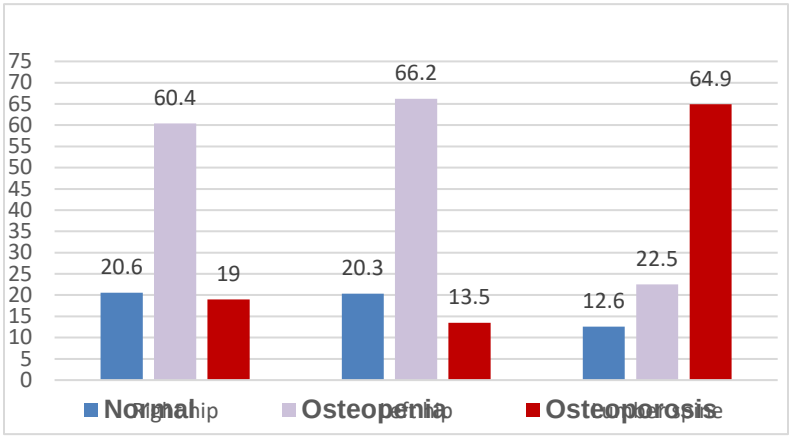

Figure 1: The percentage of normal, osteopenia, and osteoporosis in right hip, left hip and lumbar spine.

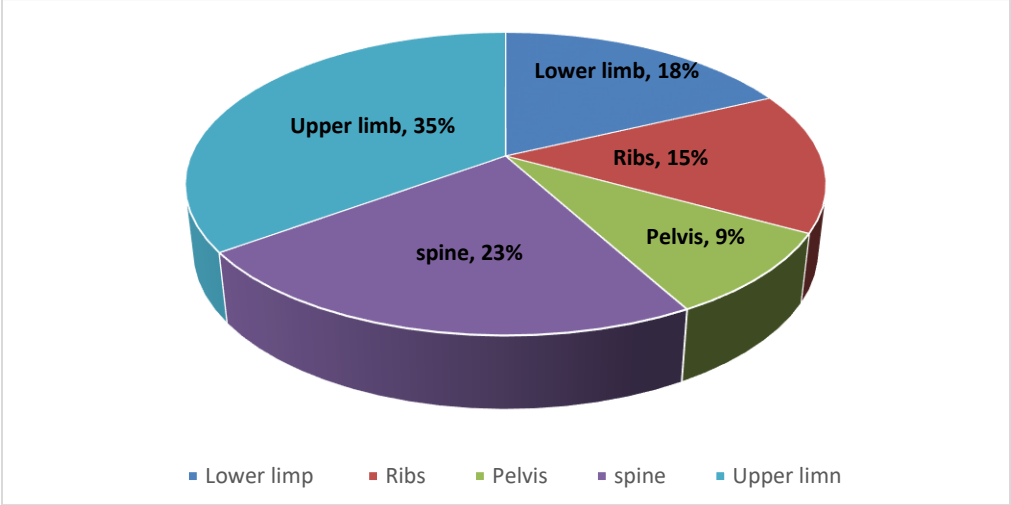

Figure 2: shows percentages of location of fractures

Table 1: The frequency and percentage of previous fracture distributed by WHO classification based on T-score measured at right hip, left hip and lumbar spine

	Right hip		Left hip		Lumbar spine		Total	
	Yes	No	Yes	No	Yes	No	Yes	No
Normal	0 (0%)	13	2 (15%)	13	1(8%)	13	3 (7.1%)	39 (92.9%)
Osteopenia	16 (42%)	22	20 (41%)	29	4 (16%)	21	40 (7.8%)	75 (92.2%)
Osteoporosis	5 (41.5%)	7	5 (50%)	5	29 (40%)	43	39 (41.5%)	55 (58.5%)

Table 2: The individuals who had previous fracture within the last two years distributed by WHO

classification

	Had previous fracture	Had not had previous fracture
Normal	2.9%	16.9%
Osteopenia	11.8%	27.3%
Osteoporosis	85.3%	55.8%

Table 3: The locations of fracture distributed by WHO classification

		Lower limb	Pelvic	Ribs	Spine	Upper limb
Right hip	Normal	0%	0%	0%	0%	0%
	Osteopenia	20%	20%	20%	40%	0%
	Osteoporosis	18.8%	6.2%	14.4%	18.8%	43.8%
Left hip	Normal	0%	0%	50%	0%	50%
	Osteopenia	0%	20%	20%	20%	40%
	Osteoporosis	20%	10%	5%	25%	40%
Lumbar spine	Normal	0%	0%	0%	0%	100%
	Osteopenia	20.7%	10.3%	10.3%	27.7%	31%
	Osteoporosis	0%	0%	50%	0	50%

Table (2) shows the individuals who had previous fracture within the last two years distributed by BMD status according to WHO recommendations.85.3% of patients with osteoporosis had fracture during the last two years. 97.1% of patients with low BMD (osteopenia and osteoporosis) had previous fracture.

Table (3) shows the locations of fracture distributed by BMD status. Patients with normal BMD based on right hip and spinal T-score did not experienced fractures at any site. 43.8% of patients with osteoporosis at right hip had fractures at upper limb. Patients with osteoporosis based on spinal T-score develop fractures at both upper limb and ribs (50%) for each part. This indicates that patients who diagnosed with osteoporosis according to spinal T-score are more likely to develop fractures at upper limb and/or ribs.

CONCLUSION

The study proves that individuals who were already diagnosed with osteoporosis are more likely to have fracture. Individuals with osteoporosis based on right hip T-score are expected to develop fracture at upper limb. Individuals with osteoporosis based on spine T-score are expected to develop fracture at upper limb and ribs..

Recommendations:

1-DEXA is the golden standard procedure for diagnosis of osteoporosis. It is also a good predictor for expected future fractures.

2-Proper health education program is necessary for patient with low BMD and his/her family. It should include safety accessories and instructions regarding how they do daily tasks.

3-Health authorities concerned organization and societies should increase public awareness about the disease and how to live with it safely.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

All author contributed in all parts of the paper.

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