Osteoporosis

Food & Diet

Abstract: As the world's population lives longer, the significance of osteoporosis and fractures increases. Introduction: Osteoporosis is an age-associated disease, which is influenced by genetic, epigenetic and environmental factors. Age is a high hazard factor for osteoporosis.

Lack of vitamin D and insufficiency of calcium absorption are the most popular reason for the osteoporosis in the elderly. (Jakob et al, 2014)Jakob, F., Seefried, L., ; Schwab, M. (2014). Alter und Osteoporose. Der Internist, 55(7), 755-761.? Jakob F, e. (2018). [Age and osteoporosis.

Effects of aging on osteoporosis, the diagnostics and therapy]. - PubMed - NCBI. [online] Ncbi. nlm. nih. gov. Available at: https://www. ncbi. nlm. nih. gov/pubmed/24903137 [Accessed 16 May 2018]. It is mostly a disease of old age people. The prevalence of osteoporosis increase significantly with age and it is an independent risk factor for the improvement of osteoporosis and osteoporotic fracture.

As indicated by NationalHealthand Nutrition Examination Survey (NHANES) data the diffusion of osteoporosis based on reduce density of hip bone was estimated at 4% in women 50 to 59 years of age compared to 44% in women 80 years of age and older. The number of seniors in risk for osteoporosis will continue increasing with the aging of society. (Vondracek et al , 2009). Vondracek, S. F., ; Linnebur, S. A. (2009).

Diagnosis and management of osteoporosis in the older senior. Clinical interventions in aging, 4, 121.? I choose this topic because when I was in clinical area I saw many old patient they came to do x-ray and when I read

the justification I saw they have osteoporosis. So I want to know how the x-ray help to diagnosis this disease.

In this assignment I will talk about first the principles of the osteoporosis, the equipment components required for carrying out the osteoporosis examination and their functions. Also, I will discuss the role of radiographer and technical and radiation exposure considerations of it.

Finally, I will talk about one clinical example for osteoporosis patient with clear images. Principle: Osteoporosis was described as a pathological in which there is non-attendance of bone tissue, however that tissue which remains is completely calcified. Osteoporosis creates when bone resorption happens too rapidly and substitution happens too gradually. (Makhdoom, et al, 2014)

The older senior is at high risk for osteoporosis. It is important for healthcare providers to be fully aware of the potential risks and benefits of diagnosing and treating osteoporosis in the older senior population. Data indicate that bone mineral density testing is under-utilized and drug therapy is often not initiated when indicated in this population.

Bone mineral density testing with central dual energy x-ray absorptiometry is essential and cost-effective in this population. All elder people should be instructed on a bone-healthy lifestyle containing age-appropriate weight-bearing exercise andsmokingcessation if necessary. The very important role in the risk for osteoporotic fractures, especially in the older senior is a falls play.

The risk for vitamin D insufficiency and deficiency is high in the older senior and can contribute to falls and fractures. To treat this problem they should intake sufficient amount of calcium and vitamin D. (Vondracek et al, 2009) Vondracek, S. F., ; Linnebur, S. A. (2009). Diagnosis and management of osteoporosis in the older senior.

Clinical interventions in aging, 4, 121.? DEXA procedure detects the osteoporosis disease and this early diagnosis will improve the disease management practices and would help in impeding national productivity losses by mass screening and awareness. Also, it can help prevent osteoporosis. (Makhdoom, et al, 2014)

Makhdoom, A., Rahopoto, M., Siddiqui, K. A., ; Qureshi, G. A. (2014). Early Detection of Osteoporosis by Dual Energy X-ray Absorptiometry. Pakistan journal of medical sciences, 30(6), 1265.? Equipment component and function: The technique used to measure the mineral bone density and the average concentration of mineral in a defined section of bone is the Dual-energy x-ray absorptiometry (DEXA).

It performed with a low radiation dose and accurate (exact measurement of BMD), precise and flexible (different regions can be scanned). A DEXA scanner consists of a low-dose x-ray tube with two energies for separating mineral and soft-tissue components and a high-resolution multidetector array.

It has one of two different system a fan-beam device that emits alternating high (140 kVp) and low (70–100 kVp) x-rays and sweeps across a scan area or a constant x-ray beam with a rare-earth filter and energy-specific

absorption, which separates photons of higher (70 keV) and lower (40 keV) energy.(Lorente-Ramos et al, 2011). Lorente-Ramos, R., Azpeitia-Armán, J., Muñoz-Hernández, A., García-Gómez, J. M., Díez-Martínez, P., ; Grande-Bárez, M. (2011), Dual-energy x-ray absorptiometry in the diagnosis of osteoporosis: a practical guide.

American Journal of Roentgenology, 196(4), pp 897-904. Role of radiographer with osteoporosis patients: Understanding every step of the procedure is important for maximizing the usefulness of the imaging evaluation to patients and referring clinicians in this procedure the radiographer play a great role in preparing the patient and taking care of the patient before, during and after examination.

Before the examination, the radiographer must be Check patient history, old x-ray, Select the optimum exposure factors, Prepare the room for examination and Prepare the patient for the examination. During examinationThe radiographer must be Explain the procedure to patient and relative , Reassure and care for patient during examination, Position the patient, Place radiation protection and Constantly assess the patient's condition and then Expose.

After examination they should be Move the tube away from patient, lower x-ray table down and finally given instructions to patient. Radiation exposure in X-ray-based imaging techniques used in osteoporosis: In old patients, central DEXA measurements of the lumbar spine and proximal femur are recommended.

Two regions should be measured so that if one is unavailable, the forearm can be imaged. Appropriate patient positioning is essential for optimizing BMD measurement. The patients are placed in the supine position for poster anterior imaging of the lumbar spine and femoral neck and sitting next to the table for imaging of the forearm. Images are assessed for patient movement.

The area of interest exceeding 1–2 cm and superior and inferior limits should be included to verify that the complete anatomic region is scanned. The bone axis should be straight and centered and the lesser trochanter should not be seen on images of the proximal femur. Equipment from various manufacturers generates automatic ROIs, which should be reviewed. Correct numbering of vertebral bodies is the main goal in DEXA of the lumbar spine.

The indicators of correct positioning are as follows: the ribs appear at T12, the largest transverse processes are L3, the vertebral area values increase from L1 to L4, BMD increases from L1 to L3, and the BMD of L4 is similar to or slightly less than that of L3. Sometimes radiographs are necessary for correlation.

Altered vertebrae (deformed or with lesions or artifacts in them) should be excluded from the analysis. If only one vertebral body is left, the region is not useful for diagnosis. In hip scanning, it is important to avoid undesired bone. The anatomic landmark selected for femoral neck ROI placement is the greater trochanteric notch.(Lorente-Ramos et al, 2011)

Case study: A 70 years old patient was admitted to Khawla hospital due to presence of lower back pain and restricted waist movement. A lumbar x-ray

was done to the patient and showed sever narrowing of the disc space between L3 and L4 with no fractures over the lumbar bodies. For further investigation, a bone densitometry test was done that showed the presence of severe presence of osteoporosis with increased risk of fracture.

Thus, discectomy was done for the herniated portion of the disk between L3 and L4 that compresses the nerves and causes the pain and instrumented fusion of L3 and L4 was also done to stabilize and strengtnus the spine after the intervertebral joint space reduction that occurred between L3 and L4. Finally, the patient was prescribed with vitamin D and calcium tablets to compensate the calcium and vitamin D reduction due to the osteoporosis. (khawla hospital, 2018) .(khawla hospital, 2018)

Conclusion: Over all, Osteoporosis is a systemic disorder of the skeleton that is characterized by a reduction in bone mass. Although the condition affects a higher percentage of old people. The importance of osteoporosis lies in the fact that osteoporotic bones are more fragile and susceptible to fracture than normal bones.

DEXA is a quick, accurate, low-cost imaging method for the diagnosis of osteoporosis. It comprises adequate performance (symmetry, morphology, positioning), ROI placement, detection of artifacts, pathologic evaluation (incidental findings and those affecting analysis), and evaluation of bone mineral density.