

The Association Between Knee Osteoarthritis (OA) and Hip Fracture



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Abstract

Introduction: Hip fracture a serious osteoporotic fracture, and a leading cause of disability in elderly, result in extended nursing home care and diminished mobility and independence, most patients experience a rapid and major deterioration in healthy quality of life. Most hip fractures occur as low-energy falls in elderly, Falls are uncommon in young adults due to better balance and strength and when it occurs; they do not cause = hip fracture pattern of injury that is commonly seen in the elderly. This is a case control study undertaken to collect data on risk factors for hip fracture, focusing on the effect of ipsilateral knee osteoarthritis as a risk factor in adult. During the period of the study (March 2017 –June 2018) we conducted 55 patients with unilateral hip fractures (cases) and 113 people as a control attended to the AL Basra General Hospital. The incidence of clinically diagnosed knee OA was very high in our cases (92.7%) in compares to the controls with P value 0.000, which is highly significant.

Conclusion: Patients with a clinical diagnosis of knee OA and with knee pain have an increased risk of hip fracture. Knee pain and OA should be regarded as an independent risk factor for hip fracture.

Keywords: Hip Fracture; Knee Osteoarthritis; Risk Factors

Introduction

Hip Fractures

The proximal femur fractures (hip fractures) are the most serious osteoporotic fractures in the population and individual level [1], and a leading cause of disability in elderly, and when it occurs it raise the need of nursing home care [2]. About 20 percent with hip fractures dead within a year, and, who survivors, may never regain their level of physical function before the fracture life [1], and only 40% recover their previous activity , and as a result of decrease the mobility and independence major and rapid deterioration in healthy quality of life occurs [3]. Hip fractures are low-energy falls in elderly patients, and not common in young people because of better balance and strength and when it happened it's not the same of hip fracture injury that is seen in the elderly [4,5]. Once fracture happened, all the serious medical complications can arise, as aging patients confined to bed. This complication that can turn simple break to a life-threatening illness [5]. The articles studied this association between the presence of knee osteoarthritis and the risk of occurrence of osteoporotic fractures have produced conflicting results. As this association not explained by any differences in

bone mineral density (BMD), weight, sex, hormones or physical activity; but suggest that there is increased the risk of fracture in person with osteoarthritis (OA) is most likely to be due to mechanical factors such as the risk of falling [6].

Incidence of Hip Fracture

The incidence has been increasing almost everywhere, especially in developed countries [7]. This increase because of the aging society, and as the population ages, the number of hip fractures that occur each year will be raises [8]. The commonest injuries fall-related are fractures hip; spine; upper arm; forearm; and bones of the pelvis, hand, and ankle, and the Most serious one is the hip 95% [9].

Risk Factors

In older people the high rate of hip fractures either due to increased skeletal fragility and/ or increased risk of fall-related trauma [1]. Aging, female gender, heredity (genetically bony mass, body size, bone density influences), race more in white than black and asian, nutrition like (vitamin D deficiency), tobacco and alcohol consumption, osteoporosis, use of long-

acting benzodiazepines, antidepressants, psychotropic drugs, opioids, sedatives, tranquilizers, allergy medications, [1,6,7,10-13]. Other chronic medical conditions, Diabetes mellitus, Hypogonadism, Gastrointestinal disorders with Calcium and vitamin D malabsorption [14], Rheumatoid disorders, History of Stroke as a risk factor for femoral neck fracture, poor post fracture outcome and reduced survival of these patients, Neurological disorders [8]. Fracture history, one hip fracture has a 60 % higher for subsequent other hip to fracture than other, and distal radial fractures appears to be associated with an increased risk of hip fracture of between 50 and 100 %. This association between old fracture and later hip fracture appear to be stronger in men than in woman [1].

Environmental hazards, home hazards Poor lighting especially on stairs, exposed electrical and telephone cords, and no grab bars in the bathroom may increase the risk of falling [15]. physical activity, Is important for health, but vigorous physical activity can have unwanted side effects, like musculoskeletal injury, particularly among older adults [16], so moderate to low impact physical activities like walking can reduce hip fracture risk through increase bone density, and increase muscle support for the hip joints for reduction falls [16,17].

Risk of Fall

More than 95% of hip fractures caused by falls, and less than 2% of hip fractures occur spontaneously (pathological fractures), both bone strength and the force impact are important factors that cause hip fracture [18]. In addition to the number of falls, risk of fracture is influenced by the direction of the fall, the protective responses of the faller, and bone strength, an increase in the rate of falling may increase the risk of fracture when a fall occurs [19].

Osteoarthritis (OA)

The Subcommittee on Osteoarthritis of the American College of Rheumatology Diagnostic and Therapeutic Criteria Committee defined osteoarthritis (OA) as „A heterogeneous group of conditions that lead to joint symptoms and signs which are associated with defective integrity of articular cartilage, in addition to related changes in the underlying bone at the joint margins“ The concept that binds the different conditions labeled ‘OA’ together is a pathological one [20-22].

Knee OA

It is a common cause of disability in people over 65 years [23], Radiographic severity grades for osteoarthritis of the knee:

Grade 1 Doubtful narrowing of joint space and possible osteophytic lipping.

Grade 2 Definite osteophytes and possible narrowing of joint space.

Grade 3 Moderate multiple osteophytes, definite narrowing of joint space, and some sclerosis and possible deformity of bone ends.

Grade 4 Large osteophytes marked narrowing of joint space, severe sclerosis, and definite deformity of bone ends [21].

The effect of Knee Osteoarthritis

The effect of knee osteoarthritis will lead to Knee joints are body's primary weight-bearing joints, they are among the joints most commonly affected by osteoarthritis. They may be stiff, swollen, and painful, making it hard to walk, climb, and get in and out of chairs and bath, if not treated can lead to disability [18,24]. Pain, Quadriceps weakness, Stiff knee, Disability, and Increases the Risk of fall [25-29], the functional consequences of knee OA are profound because of its high prevalence and the related lower-extremity mobility limitations, the activities most commonly reported as difficult by people with knee OA that usually increases the rate and severity of fall. These mobility tasks must be an important component of physical rehabilitation for people with knee OA [27].

Patients and Methods

This is a case control study of the risk factors for hip fracture, focusing on the effect of ipsilateral knee osteoarthritis as a risk factor in adult. From the first of March 2017 to the first of June 2018, the cases were people live in Basrah south of Iraq, about forty years of age or older, both sexes, admitted to the hospital as a case of hip fracture (femoral neck, intertrochanteric, subtrochantric fractures). The cases were admitted to the Basrah General Hospital as emergency cases and included into the study irrespective of their place of origin, age, sex, body size, health status, and mental status.

All hospital records and x-ray reports were scrutinized to confirm eligibility and ascertain type of hip fracture. We identified (55) hip fracture cases. We excluded any other cases from this study as fractures due to malignancy, high-energy trauma (traffic accidents, and bullet injuries), and infection. According to their physical activities we classified the cases according to The American Rheumatism Association's into [30]:

Class 1: patients can carry out all usual activities without handicap.

Class 2: patient can perform normal activities despite handicap.

Class 3: patients are limited to few duties of their usual activities or self-care.

Class 4: patients are largely or completely incapacitated, or bedridden.

The controls were chosen at the same time interval, from the same city, and they were matched for their residence, age, sex, body weight, physical activities and history of fall (without fracture). While the case came from a hospital ward, the control was randomly chosen from the emergency and the outpatient clinic due to other causes. We asked about the age, occupation, residence, previous medical illness like DM, history of stroke, history of falls or dizziness, vision problem, and

neuropathy. They were also asked about their current therapy and their therapy during the previous year such as calcium, vitamin D, estrogen, diuretics, antacids, corticosteroids, thyroid hormones, anticonvulsant agents, neuroleptic drugs, tricyclic antidepressants, and benzodiazepines. In addition, they also asked about the self-safety of the usual living place, considering how the equipment of the usual living place influenced their ability to perform the activities of daily living (walking, bathing, dressing, toileting, grooming).

Questionnaires covered data related to surgical operation such as operation of intestinal tract resection, tumor resection, old fractures, knee surgery, hysterectomy, oophorectomy, thyroidectomy, surgery for cataracts, and others. The amount of dietary calcium was assessed by a food-frequency of drinking milk and eating its products, and caffeine intake was estimated, they asked for their smoking habits and alcohol intake. We also asked about walking; exercise; the number of hours spent sitting and lying down per day; and the amount of difficulty experienced in walking, climbing and descending stairs, shopping, and doing housework, in order to assess the class of physical activity. All cases and controls were examined routinely, general and systemic examination looking for features of risk factors like cushioning syndrome, DM, etc.

The cases and controls were examined in the ward or at the outpatient clinics, for ascertained their hip and waist circumference, to assessment the waist – hip ratio. Waist in inches is divided by the hip measurement in inches. In which we measured at the narrowest part of body (at the level of natural waist), wrap a cloth measuring tape around body, Keep it horizontal, and don't measure at umbilicus, Do not make patient hold breath as we take the measure, Don't pull the tape so tight that it compresses the skin. Now place the tape horizontally at the widest point of the hips and buttocks. Write down the value to the nearest ¼ inch to both waist and hip circumference. Now measure the waist –hip ratio, for men a desirable waist-hip ratio (WHR) is less than 0.9, meaning that the number of inches around the waist is 90 percent of the circumference of the hips. For middle-aged and elderly women, the WHR should be less than 0.8 (waist 80 percent of hips). We look in both cases and controls for the clinical features of knee osteoarthritis, and they were diagnosed according the clinical criteria of The American College of Rheumatology's for the knee OA. Roentgenograms were taken for knees and hip joints for all cases, and knees roentgenograms only for controls, looking for evidence of hip fractures (for the cases) and radiological signs of the knee OA (for cases and controls). Full investigations (hematological and biochemical tests for blood and urine), were sent for cases to assess the general medical conditions.

During the period of the study (March 2017 –June 2018) we conducted 55 patients with unilateral hip fractures (cases) and 113 people as a control attended to the AL Basra General Hospital. The age of the cases were minimally 35 years of old and maximally 90 years old, most of the age were ranging from

65-74 years old (21 cases about 38.2%). The age of control were minimally 43 years old and maximally 90 years old, and also most of their age ranging from 65-74 (40 persons about 35.3%), The difference between cases and the controls is not significance (p value= 0.178 I e P Value>0.05). Most of cases were female (F =36 about 65.5% and M =19 about 34.5%), and also the female is slightly more in the controls (F =58 equal to 51.3% and M =55 about 48.7%). The difference between cases and controls is not significant (p value =0.051 I e P Value>0.05). The Caucasian race was more than Negro in cases and controls, (47 cases about 85.5% Caucasian and 8 cases about 14.5% Negro, while 95 Caucasian about 84% and 18 Negro about 16%) in the controls. The difference between cases and controls is not significance (P Value= 0.505).

The number of smokers among cases was 10 cases about 18.2% and 36 persons about 31.8% of the controls. The difference is not significant (P Value >0.05), P value = 0.068 We had a difficulty to get information about alcohol intake. Only (8 cases about 14.5%) and (24 persons about 21.2% from the control) had diabetes mellitus, but there is no significance difference between cases and controls (P Value >0.05), p value =0.403.

The history of stroke was found in 11 persons (9.7%) of the controls and 9 cases (16.4%) with previous histories of stroke, we found no significant difference between cases and controls (P Value >0.05), p value = 0.216. No one from the cases had peripheral neuropathy, and (9) about (8%) of the controls were suffering from different type of neuropathies (which is already diagnosed by old EMG and nerve conductive studies), the different between cases and controls is significant p value = 0.031 (P Value<0.05) which means that controls more likely to have peripheral neuropathies.

Ten cases had visual problems (18.2%), and 15 of the controls (13.3%) also were complaining from poor vision, there is no significant difference between cases and controls (P Value>0.05), P value = 0.11. No one from the cases had previous fractures and only 5 controls (4.5%) suffered from old non hip fractures involving the upper limb. The difference between the cases and controls is not significant (P Value >0.05), P value= 0.174. For previous surgeries especially gastrointestinal surgeries, (1) case (1.8%) had gastric ulcer surgery and (3) of controls (2.7%) also had a surgery, and the different also not significant (P Value>0.05), P value = 1. Regarding the history of old fall 14 cases (25.5%) fell previously and 44 (39%) of the controls also, the difference is not significant (P Value>0.05), (Table 1).

Two cases (3.6%) were on regular treatment of sedative drugs and 3 of controls (2.7%), but no one declare about their antipsychotic medication, the difference is not significant (P Value >0.05). Regarding steroid intake no case was on regular treatment of steroid, and 10 controls (8.2%) were on chronic steroid therapy in different route and for many reasons, and the

difference is not significant (P Value>0.05), (Table 2). physical activities: It has been found that most of the cases and the controls are in class 2, as 22 of cases about 40%, and 69 controls about 61.1%, (Table 3). Calcium intake: Only 22 cases (40%) they were on regular intake of milk and its products, and so for 45 controls (39.8%) only, the difference between cases and controls is not significance (P Value >0.05) *P value 0.55. body size: has been found that the highest WHR in both cases and controls were ranging from (0.75- 1.04), for the cases were 40 (72.72%), and for the controls were 70 (62%) 32, and difference also not significant (P Value >0.05), (Table 4).

Knee Osteoarthritis

We found that (51 cases) complaining from different stages of ipsilateral knee (OA) clinically diagnosed, and (44 controls) suffering also from the disease, the difference between the cases and controls is significant (P Value <0.05), (Table 5). In this study we found that most of the cases age are 65 years and older (65.5%) and also were the controls (60.2%), and there were no significant difference between case and control, this goes with all studies that signified the age as a risk factor [7,14]. Most of the cases are females (65.5%) with no significant differences with the control and this result is matched with many other studies that regarding the females more risky to have hip fractures [31].

Because most of our people in this community are from brunet color, we found that most of our cases and controls are brunet and brunette 85.5% for the cases and 84.1% for the controls with no significant differences and this result are supported by many studies that regarded the race as a risk factor to get hip fractures like [10]. The other factors that increase the risk of hip fractures like; smoking, we found only 18.2% of the cases were smoker in comparison to the number of the smoker in the controls (31.9%) and the differences between cases and controls were not significant which can be explained as the smoking rate between both the cases and controls were not significant to considered that risk for developing hip fractures in our cases. While regarding the past medical illness and the other chronic medical illnesses that may increase the risk of hip fractures, most of our cases had low percent of these illnesses, like; DM only 14.5% of the cases and 21.2% of the controls with significant difference.

While for history of Stroke 16.4% of cases and 9.7% of controls had stroke the difference were also insignificant between cases and controls. For the poor vision we found no significant difference between the cases and controls that can be explain by that no one of these factors can be considered as a leading cause of hip fractures in this study. This is also true for the past surgical histories that may increase the risk of hip fractures, we found that the percentage of these illness like (history of old fracture, old surgical operations like intestinal resections that may causes malabsorbtion) in the cases are lower than the controls, with their P values show that no significant difference between the cases and controls regarding this factors.

a) Drug history also provides that drugs intake (like antipsychotic, sedative, steroids) were low, with P values shows no significant difference.

b) The physical activity which plays important roles in incidence of hip fracture in our study shows both the cases and the controls most of them were in the class 2 (40% and 61.1% respectively).

Diet and calcium intake is an important issue in our concern, unfortunately most of our people in this study were poorly intake only 40% of cases and 39.8% of controls were on regular drinking milk and eating their products, and there were no significant differences that can explained the high rate of hip fractures in the cases than the controls. Body weight is an important risk factor for both osteoporosis and OA and could therefore potentially explain the association, however; it was very difficult to measure the body mass index by calculating the body weight for fractured patients as it was not practical, we replace it by new method of categorization body sizes by waist - hip ratio, an easy-to-take measurement and is used extensively in epidemiological studies, we find that both the cases and the controls their waist - hip ratio ranging from 0.75 - 1.04, and this is also not explained the differences in the rate of hip fractures between the cases and controls. The incidence of clinically diagnosed knee OA was very high in our cases (92.7%) in compares to the controls with P value 0.000, which is highly significant, and it is matching the result in other studies [6,32,33]. This is not explained by the increased risk of falls but is more likely to be due to the severity of falls sustained that increase the risk of hip fracture in compared with those without radiographic osteoarthritis [30,34-39].

Conclusion

Patients with a clinical diagnosis of knee OA and with knee pain have an increased risk of hip fracture. Knee pain and OA should be regarded as an independent risk factor for hip fracture.

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