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RESEARCH ARTICLE

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Neck and Intertrochanteric Femur Fracture in Elderly in Emergency Department at Medical City

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ABSTRACT

In elderly people, hip fractures are the commonest cause for acute orthopedic admissions and the second leading cause of hospitalization and prolonged length of stay.

Aim of study: To evaluate proximal femoral fractures of elderly patients presented to emergency department of Baghdad Teaching hospital and to determine risk factors related to these fractures.

Patients & Methods: A cross sectional study carried out in Emergency Department of Baghdad Teaching hospital for period from 1st of December, 2013 to 1st of December, 2014 on convenient sample of 26 elderly patients with femoral neck and intertrochanteric fractures. A detailed clinical history and full physical examination was performed. All the patients received conservative management and stabilization then transferred to orthopedic unit for operative care.

Results: Males were more than females. More than half of injured patients had fracture of femur neck and 42.3% of them had intertrochanteric femoral fracture. There was a significant association between osteoporosis and female gender (p=0.01). A significant association was observed between females and steroids use (p=0.03). There was a significant association between femoral neck fractures and osteoporosis (p=0.05).

Conclusions & Recommendations: Femoral neck fractures were more prevalent than Intertrochanteric fractures and were more prevalent among elderly females with history of osteoporosis. Encouragement of vitamin D and calcium supplementation in high-risk individuals especially elderly peoples.

ARTICLE HISTORY

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Abbreviations

AP: Anterioposterior

BMD: Bone Material Density

CAD: Coronary Artery Disease

ED: Emergency Department

HF: Hip Fracture

LOS: Prolonged Length of Stay

RTA: Road Traffic Accident

SD: Standard Deviation

SPSS: Statistical Package for Social Sciences

UK: United Kingdom

USA: United States of America

Introduction

Proximal femoral fractures or hip fractures can be divided into intra- or extra-capsular fractures. Intracapsular fractures (cervical fractures) occur proximally to the attachment of the hip joint capsule or of the femoral neck. Extracapsular (trochanteric) femur fractures occur distally to the hip joint capsule or a fracture below the femoral neck. Intermediate fractures are called basocervical fractures [1].

In elderly people, hip fractures (HF) are the commonest cause for acute orthopedic admissions and the second leading cause of hospitalization and prolonged length of stay (LOS). One of the important challenges in the management of HF is to identify patients who are at high risk of poor outcome [2-4].

Although HFs dominantly are regarded as homogenous, anatomical types–cervical and trochanteric–differ in bone composition and parameters of proximal femur geometry, as well as in epidemiological, demographic and clinical characteristics [5-16]. It is possible that shared biological mechanisms underlie the site, accompanying comorbidities and risks of postoperative complications and outcomes for each type of HF. Apparently osteoporotic HFs and their outcomes are attributable to complex interactions between multiple factors, however, there may exist some common mechanisms determining specific conditions linked to the HF type. These may be indicators that would enable clinicians to identify patients at risk and provide appropriate management [16].

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Various factors have been reported to affect HF outcomes, but the role of anatomic location and the potential implications for clinical practice have been addressed in only few investigations with conflicting results. Studies comparing cervical and trochanteric HFs often evaluated only some clinical and/or laboratory parameters or selected outcomes. The prevailing view was that patients with trochanteric compared to cervical HF have poorer outcomes [17-20]. However scientific reports on the association of HF type with pre-existing medical conditions, postoperative complications, LOS, functional outcomes 28, and mortality are controversial [21-29].

Hip fracture incidence increases exponentially with age, and the mean age is approximately 83 years. Until the turn of 21st century 75 % of those who sustained hip fractures were women. However, during the last few years there has been an increase among men, amounting to 30% in 2004 [30]. The one-year mortality rate after a hip fracture is 10-20 % higher among women than would be expected for their age and the figure for men is even greater. There are other sex differences: men are younger when they sustain the fracture, have more concomitant disorders and are more likely to suffer from postoperative complications. Thus, hip fracture patients are old, frail, have multiple diseases and are generally difficult to treat. In addition approximately one third of patients with hip fracture have dementia. A hip fracture can permanently change the old person's housing situation and mobility and most of them never regain their pre-fracture activity level. Several interventions have tried to improve the rehabilitation outcome for hip-fracture patients. All have been randomized controlled trials but only one showed any effect in the long term perspective regarding functional recovery. Others showed that hospitalization could be shortened with intensive geriatric rehabilitation. One failed to reveal any difference between orthopedic and geriatric rehabilitation [31-35].

Anatomy of the Femur

Skeletal Anatomy

The femur is the longest and strongest bone in the human body and is routinely subjected to substantial forces produced during powerful muscle contraction and weight transmission.

In an anatomic position, the two femurs extend obliquely from the pelvis medially to the knee and bring the legs closer to the midline, where they can best support the body. Structurally, the femoral neck serves as an oblique strut between the pelvis (the horizontal beam) and the shaft of the femur (the vertical beam) [36].

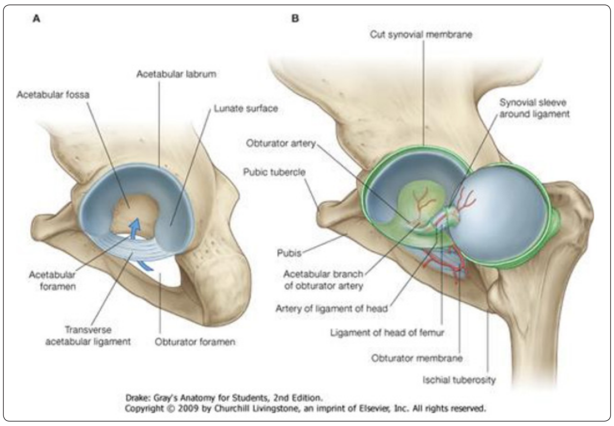

Figure 1: Proximal femoral anatomy

A fracture results when these forces exceed the strength of the bone.

As drawn on an anteroposterior (AP) radiograph, the intertrochanteric line, an oblique line connecting the greater and lesser trochanters, marks the junction of the femoral neck and its shaft.

The bone in the femoral head, neck, and intertrochanteric region is predominantly cancellous, which is less resistant to torsional forces.

Distal to the intertrochanteric region, including both the subtrochanteric region and femoral shaft, the bone is cortical, requiring great forces to break. At the distal metaphysis, the femur widens and the cortical bone thins, lessening its resistance to stress [36].

Vascular Anatomy

Arterial Supply

The arterial supply to the femoral head arises from two main sources. The major source is the ascending cervical arteries as they branch off the extracapsular ring and run along the femoral neck beneath the synovium. Some blood is supplied to the femoral head from the second source, within the marrow spaces—the intraosseous cervical vessels. A third and minor source is the foveal artery, which lies within the ligamentumteres. As the external iliac artery passes beneath the inguinal ligament, it becomes the common femoral artery. At this point the artery is located midway between the anterior superior iliac spine and the symphysis pubis. Approximately 3 to 4 cm distal to the inguinal ligament, the common femoral artery branches to form the superficial and deep femoral arteries. The larger superficial femoral artery passes along the anteromedial aspect of the thigh and terminates at the junction of the middle third and lower third of the thigh. Here, the superficial femoral artery passes through the adductor hiatus and becomes the popliteal artery. The deep femoral artery runs posterolaterally to the superficial femoral artery, supplies the hamstrings, and terminates in the distal third of the thigh as small branches piercing the belly of the adductor magnus. These perforating branches constitute an additional site of potential injury. The abundant muscle coverage and blood supply of the thigh aid in healing fractures of the femoral shaft.

Nerves

The femoral and sciatic nerves are the major nerves within the thigh. The femoral nerve is the largest branch of the lumbar plexus; it passes under the inguinal ligament lateral to the femoral artery and divides into anterior and posterior branches soon after entering the thigh. The sensory divisions of the anterior branch, the intermediate and medial cutaneous nerves, supply sensation to the anteromedial aspect of the thigh. The motor division of the anterior branch innervates the pectineus and sartorius muscles. The posterior femoral branch gives off the saphenous nerve, which supplies sensation to the skin along the medial aspect of the lowerpart of the leg. The posterior branch also supplies motor function to the muscles of the quadriceps femoris group. The sciatic nerve is the largest peripheral nerve in the body. It arises from the sacral plexus. The sciatic nerve exits the pelvis through the greater sciatic foramen and travels through the posterior thigh; it extends from the inferior border of the piriformis to the distal third of the thigh. The sciatic nerve gives off articular branches that supply the hip joint. In the thigh, muscular branches innervate the adductor magnus and hamstring muscles. Just proximal to the popliteal fossa, the sciatic nerve divides to form the tibial and common peroneal nerves [36].

Pathophysiology

Fractures and Trauma of the Femur

The vast majority of hip fractures occur in elderly patients with preexisting bone disease and result from relatively low-energy trauma, usually a ground-level fall, major trauma, such as a motor vehicle collision or a fall from a significant height, is responsible for the majority of fractures.

Osteoporosis of the Femur

Osteoporosis is the leading cause of femur fracture. although the incidence in women has been decreasing in recent years, probably because of an increased awareness and more aggressive treatment of osteoporosis. One in five patients dies during the first year after a hip fracture, mostly from causes other than the fracture itself; one third require nursing home placement after hospital discharge; and less than one third regain their pre-fracture level of physical function.

The pathophysiology of osteoporosis is not completely understood, but strong associations with hormonal changes related to aging, genetic predisposition, vitamin D deficiency, lack of physical activity, and smoking have been recognized. Severe osteoporosis and femur fractures are most common in elderly white women [34].

Osteoarthritis of the Hip

As the population ages, a greater percentage of the population will develop chronic pain from degenerative osteoarthritis of the hip. Disability often results from persistent pain and limited physical mobility. The progression of osteoarthritis can be demonstrated with serial radiographs of the affected hip; however, radiographic findings do not necessarily correlate with symptoms [24].

Neoplastic Disease in the Hip

The most common neoplastic disease of bone is metastatic, generally from breast, kidney, lung, thyroid, or prostate tumors. Primary bone lesions also occur, with the most common being osteoid osteoma. Bone lesions may be osteoplastic or osteolytic. Patients may come to the ED with significant bone pain or a large bothersome mass, such as a solitary osteochondroma. Neoplasms place the patient at higher risk for pathologic fracture, especially if the lesions are large or lytic or have eroded the cortex.

Clinical Features

History

Age and gender are predisposing factors for certain injuries. With trauma, details of the mechanism of injury may aid in predicting injury patterns. With stress fractures, an alteration in physical activity or exercise routine provides a clue to the diagnosis. Systemic illnesses or known metabolic disorders should be noted. Previous cancer, irradiation, and chemotherapy are clues to pathologic fractures. Any past steroid use, including inhaled steroids, is important to identify because it predisposes patients to AVN of the femoral head. Atypical pain may be the result of nephrolithiasis, pelvic inflammation, infection or tumor, inguinal and femoral hernia, or adenopathy from genital or cutaneous infection. The history should also focus on comorbid conditions and injuries. They often have severe dehydration, electrolyte abnormalities, rhabdomyolysis, and renal insufficiency and require a thorough evaluation of these metabolic parameters before surgery is considered.

Physical Examination

Management principles for injuries of the femur are the same as those for traumatic injuries elsewhere in the body. Hypotension is a problem commonly encountered during the initial resuscitation of a multi trauma patient. Although hypotension might result from the loss of up to 3 units of blood into the thigh with a femoral fracture, other conditions (cardiac, pulmonary, intra-abdominal, and pelvic trauma) must be considered. Hemorrhagic shock from an isolated femoral fracture should bea diagnosis of exclusion. Hypotension, neurovascular compromise, or suspicion for multiple injuries will necessitate consideration of transfer to a trauma center. After lifethreatening conditions have been addressed, the injured extremity should be carefully evaluated. Visual inspection will reveal any pallor, ecchymosis, asymmetry, or deformity. Abrasions, lacerations, and open wounds are critical because their presence alters the management of concomitant fractures. The position that the leg assumes offers a clue to what may be found radiographically. In the presence of a displaced femoral neck fracture, the leg classically assumes the position of external rotation, abduction, and shortening.

Diagnostic Strategies

Radiographic Anatomy and Evaluation

Normal radiographic and skeletal anatomy is familiar to emergency physicians. True AP and lateral radiographs of the femur are usually adequate for the evaluation of potential fractures. The femur should be in as much internal rotation as possible. Fracture lines may be very subtle, particularly with femoral neck fractures. Experts have found three methods useful for identifying inconspicuous fractures. The use of Shenton's line is described in a subsequent section on hip dislocations. This produces a S curve and a reverse S curve, regardless of the orientation of the radiographic projection. A fracture produces a tangential or sharp angle, indicative of disruption of the normal anatomic relationship.

A third method, useful in the evaluation of seemingly unremarkable hip radiographs, is to trace the trabecular lines as they pass from the femoral shaft to the femoral head. These lines will be disrupted as they pass through the fracture site. If a fracture is found, radiographs of the knee should be obtained as well. It is a basic orthopedic principle to image the joint above and below any fracture.

Femoral Neck Fractures

Pathophysiology

Many experts now refer to femoral neck fractures as insufficiency fractures in acknowledgment of the major role played by osteoporosis. Age-related bone loss is believed to be the most important etiologic factor in femoral neck fractures. The theory that these fractures result from primary skeletal pathology is supported by the fact that minimal or no injury is associated with most of these fractures.

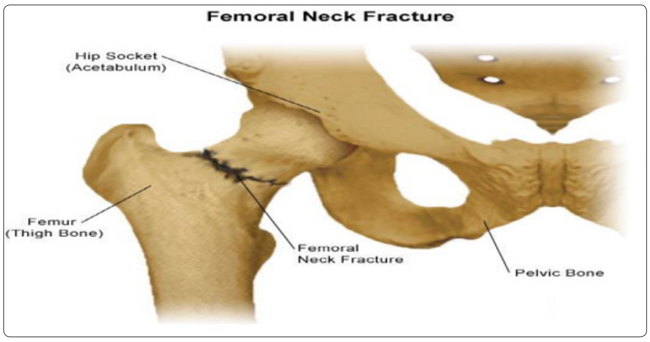

Figure 2: Femoral neck fracture

Classification

Although several classification systems were formerly used to describe these fractures, they have been abandoned because of poor inter-rater reliability and limited clinical utility. Currently, femoral neck fractures should be classified as either non-displaced or displaced fractures. From 15 to 20% of all femoral neck fractures are non-displaced fractures. The fracture line often may be very subtle. Techniques described for detection of subtle fracture lines may be useful for this reason.

Evaluation of the continuity of the subcapital cortical lines, search for an indistinct broad band of increased subcapital density, and identification of the S and reverse S curves will lead to the correct diagnosis in most cases. In impacted femoral neck fractures, the neck cortex is driven into the cancellous femoral head. Bone impaction lends a certain inherent stability. Because of this inherent stability, two different management approaches have been advocated: early ambulation and internal fixation. Internal fixation has been associated with a reduced length of hospital stay and improved rehabilitation and has become the preferred treatment modality. Without impaction, a non-displaced femoral neck fracture is unstable and will become displaced without internal fixation [36].

Intertrochanteric Fractures:

Anatomy

The fracture line of intertrochanteric fractures extends between the greater and lesser trochanters of the femur. These injuries are considered to be extracapsular fractures. The fracture line extends through cancellous bone, which has an excellent blood supply. The hip's short external rotators remain attached to the distal fracture fragment, and the internal rotators are attached to the proximal fracture fragment. Owing to the strong action of the iliopsoas muscle, the leg is shortened and externally rotated.

Pathophysiology

An intertrochanteric fracture in younger adults usually is the result of high-speed collisions or high-energy trauma, such as falls from heights. An elderly person may sustain this injury during a fall from any height. The fracture lines are the result of both direct and indirect forces. The direct forces act along the axis of the femur and on the greater trochanter as it strikes the ground. Indirect forces are produced as the iliopsoas pulls the lesser trochanter and the abductors pull the greater trochanter; these forces often cause fractures at the site of insertion.

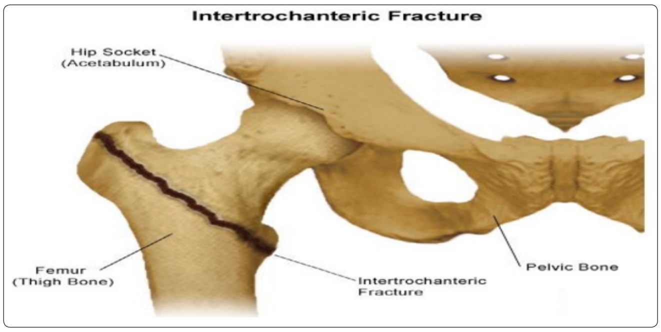

Figure 3: Intertrochantric fracture

Classification

A large number of classification systems for intertrochanteric fractures have been proposed to predict the possibility of achieving and maintaining stable reduction.

Management

Patients with traumatic fracture of the femur should have blood typed and cross matched for at least 2 units of blood. Currently, treatment of these fractures is hemiarthroplasty or open reduction and internal fixation for femoral neck fractures [12].

Internal fixation with a sliding compression screw generally is used to treat intertrochanteric fractures. The goal is to promote immediate postoperative mobilization. It has become widely accepted that the risks of surgery in elderly patients are minimal when compared with the risks of prolonged bed rest, deep vein thrombosis, pulmonary embolism, pneumonia, and urosepsis from an indwelling Foley catheter. If possible, the repair is conducted with use of spinal anesthesia to decrease the operative risk. Operative repair should be performed after the patient is resuscitated and is in optimal preoperative condition. Care of an elderly patient with a fracture requires a multidisciplinary approach and often involves coordination of the efforts of the emergency physician, orthopedist, internist, neurologist, and cardiologist to stabilize the patient before surgery. Comprehensive hip fracture programs for the elderly that include co-managementby geriatricians and orthopedic surgeons have been shown to improve short-term outcomes and may even lower mortality,highlighting the importance of medical management of these complex patients.

Traction and Immobilization

Emergency rescue personnel often place a Hare splint, Sager splint, or similar device that applies traction to the leg before transport if they suspect a femoral fracture. This management strategy is popular as it provides pain relief and immobilization and limits blood loss. However, great care should be taken to ensure the proper use of these devices [17]. Prolonged traction during the assessment and management of other injuries can cause or worsen serious neurologic injury in the thigh. The traction used in the field for transport may cause skin breakdown at pressure points and may produce potentially damaging tension on the nerve. The femoral and sciatic nerves are more likely to be injured from traction or during surgery than from a femoral fracture. Contraindications to the use of traction splints include pelvic fractures, patellar fractures, ligamentous knee injuries, and tibia or fibula fractures. Traction in the prehospital setting should not be applied to any open fracture that has exposed bone. Such reduction pulls grossly contaminated bone fragments back into the wound before adequate debridement can be undertaken in the operating room. A study that evaluated patients with multisystem trauma in whom traction splints were placed in the field for femur fractures showed that up to 38% of the cases had contraindications to the splints that were placed. With or without traction, the injured extremity should be immobilized when the patient is moved, to prevent further damage from mobile bone fragments [14]. This can be done with simple splinting in the prehospital setting. In the ED, maintaining the leg in slight flexion at the hip reduces intracapsular pressure, whereas extension of the leg increases pressure and potential for ischemic necrosis of the femoral head. Therefore traction for proximal femur fractures may be discontinued once the patient has arrived in the ED. The leg may be supported in a position of comfort with a pillow placed under the thigh. The theoretic advantages for continuation of traction in the ED are pain control and fracture reduction, making operations easier to perform. This is likely true in femoral shaft fractures; however, a Cochrane systematic review looking at preoperative traction for fractures of the proximal femur in adults found no evidence to support these proposed advantages.

Open Fracture Care

An open fracture is any fracture in which a break in the integrity of the skin and soft tissue allows communication with the fracture and its hematoma. Any nearby wound or break in the skin must be considered to communicate with the fracture. Open fractures are divided into three categories. A bone piercing from the inside outward often causes only a small wound. The contaminated bone tip may then slip deceptively back into the soft tissue; therefore any break in the integrity of the skin makes the fracture an open one. Open wounds should be irrigated and then covered with sterile saline-moistened gauze. For all type I open fractures, a first-generation cephalosporin should be administered intravenously.

Types II and III may require additional gram-negative coverage because of the amount of devitalized tissue and increased gram-negative skin flora found in the groin. This additional coverage could be provided by an aminoglycosidesuch as gentamicin or tobramycin. The use of perioperative first-generation cephalosporins has been shown to reduce postoperative infection even in closed fractures in patients who are to undergo surgery. Great care should be taken to identify tetanus-prone wounds so that appropriate prophylaxis can be provided with tetanus immune globulin when indicated. Immunization status should be verified in all patients and immunizations updated as needed.

Aim of study

To evaluate proximal femoral fractures (neck and intertrochanteric femur) of elderly patients presented to ED of Baghdad Teaching hospital and to determine risk factors related to these fractures.

Patients & Methods

Study design & settings

A cross sectional study carried out in Emergency Department (ED) of Baghdad Teaching hospital for period from 1st of December, 2013 to 1st of December, 2014.

Population of the study

All the elderly patients with femoral neck and intertrochantric fractures were the population of the study.

Inclusion criteria

1. Femoral neck fractures.
2. Intertrochanteric fractures.
3. Age more than 65 years.

Exclusion criteria

1. Acetabular fractures.
2. Subtrochantric femur fractures.
3. Stroke.
4. Paget's disease.
5. Refuse to participate.

Sampling

A convenient sample of 26 elderly patients with femoral neck and intertrochantric fractures were included after their approval to participate.

Data collection

The data were collected by the researcher by direct interview and filling a prepared questionnaire. A detailed clinical history and full physical examination was performed. All the patients received conservative management after admission to ED and stabilization then transferred to orthopedic unit for operative care. Data captured were entered into Excel spreadsheets and an Access database. An Orthopedic surgeon reviewed X-ray reports for each femur fracture, and if any ambiguity remained, a radiologist reviewed them. All fractures were described according to fracture class: (a) Femoral neck and (b) intertrochanteric fractures. The questionnaire included the followings:

1. Demographic characteristics: as gender.
2. Mechanism of injury.
3. Site of Injury.
4. History of risk factors: osteoporosis, malignancy, smoking, alcohol, steroids use, chronic medical diseases (hypertension, coronary artery disease (CAD), previous myocardial infarction, atrial fibrillation, transient ischemic attack, dementia, diabetes mellitus, Parkinson's disease, chronic obstructive pulmonary disease, and chronic kidney disease) and social risk factors (living alone).

Ethical considerations

1. Oral consent was taken from the patient before participation in the study.
2. Approval was taken from Baghdad Teaching hospital administration.

Statistical analysis

All patients' data entered using computerized statistical software; Statistical Package for Social Sciences (SPSS) version 17 was used. Descriptive statistics presented as (mean ± standard deviation) and frequencies as percentages. Kolmogorov Smirnov analysis verified the normality of the data set. Multiple contingency tables conducted and appropriate statistical tests performed, Chi-square used for categorical variables. In all statistical analysis, level of significance (p value) set at ≤ 0.05 and the result presented as tables and/or graphs. Statistical analysis of the study was done by the community medicine specialist.

Results

A total of twenty six elderly patients (>65 years) with femur fractures were included in this study. Males were 14 patients and females were 12 patients, figure 1.

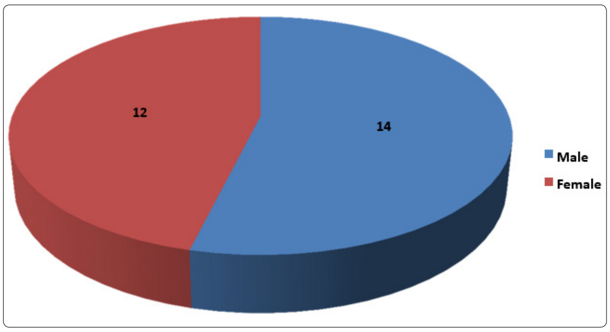

Figure 1: Gender distribution

Fall on ground was the mechanism of injury for 8 patients, RTA for 9 patients and blast for 9 patients. More than half (57.7%) of injured patients had fracture of femur neck and 42.3% of them had intertrochantric femoral fracture, table 1 and figures 2, 3.

Table 1: Distribution of mechanism and site of injuries

Variable	No.	%
Mechanism of injury		
Fall	8	30.8
RTA	9	34.6
Blast	9	34.6
Total	26	100.0
Site of injury		
Neck of femur	15	57.7
Intertrochantric fracture	11	42.3
Total	26	100.0

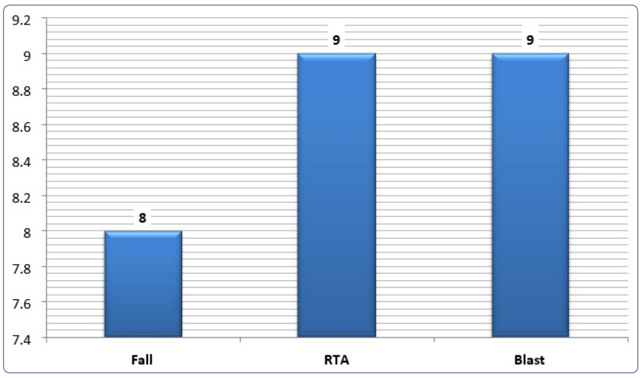

Figure 2: Mechanism of injury

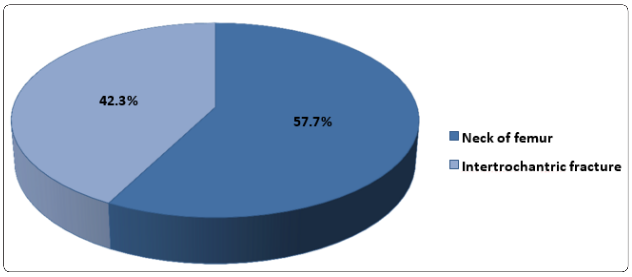

Figure 3: Site of injury

Osteoporosis was present among 15 patients, malignancy among 6 patients, 16 patients were smokers, 5 patients were alcohol drinkers, 6 patients had history of steroids use, 3 patients had live alone and all studied patients had history of chronic medical diseases, table 2 and figure 4.

Table 2: Risk factors of femoral fractures

Variable	No.	%
Osteoporosis		
Positive	15	57.7
Negative	11	42.3
Total	26	100.0
Malignancy		
Positive	6	23.1
Negative	20	76.9
Total	26	100.0
Smoking		
Positive	16	61.5
Negative	10	38.5
Total	26	100.0
Alcohol		
Positive	5	19.2
Negative	21	80.8
Total	26	100.0
Steroids use		
Positive	6	23.1
Negative	20	76.9
Total	26	100.0
Chronic medical diseases		
Positive	26	100.0
Negative	0	0
Total	26	100.0
Live alone		
Positive	3	11.5
Negative	23	88.5
Total	26	100.0

No significant difference was observed between males and females regarding mechanism of injury (p=0.1), table 3.

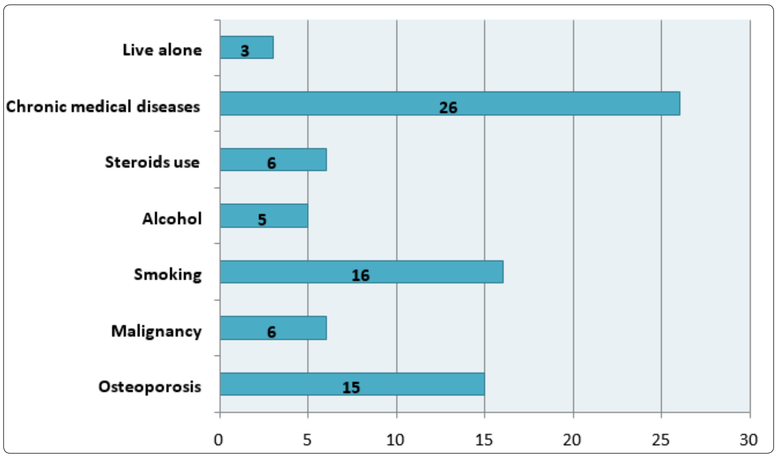

Figure 4: Distribution of risk factors

No significant difference was observed between males and females regarding mechanism of injury (p=0.1), table 3.

Table 3: Distribution of mechanism of injury according to gender

Variable	Male		Female		χ^2	P
	No.	%	No.	%		
Mechanism of injury					3.8*	0.1
Fall	2	14.3	6	50.0		
RTA	6	42.9	3	25.0		
Blast	6	42.9	3	25.0		

*Fishers exact test.

There was a significant association between osteoporosis and female gender (p=0.01). No significant differences were observed between males and females regarding malignancy, smoking and live alone (p>0.05). There was a significant association between male gender and alcohol drinking (p=0.02). A significant association was observed between females and steroids use (p=0.03), table 4 and figures 5, 6.

Table 4: Distribution of risk factors for femoral fractures according to gender

Variable	Male		Female		χ^2	P
	No.	%	No.	%		
Osteoporosis					4.2*	0.01
Positive	5	42.9	10	75.0		
Negative	9	57.1	2	25.0		
Malignancy					0.04*	0.8
Positive	3	21.4	3	25.0		
Negative	11	78.6	9	75.0		
Smoking					1.2*	0.2
Positive	10	71.4	6	50.0		
Negative	4	28.6	6	50.0		
Alcohol					5.3*	0.02
Positive	5	35.7	0	-		
Negative	9	64.3	12	100.0		
Steroids use					4.3*	0.03
Positive	1	7.1	5	41.7		
Negative	13	92.9	7	58.3		
Live alone					0.2*	0.6
Positive	2	14.3	1	8.3		
Negative	12	85.7	11	91.7		

*Fishers exact test.

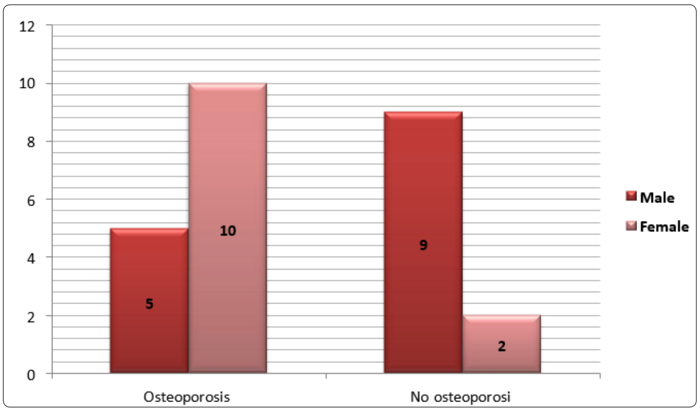

Figure 5: Osteoporosis distribution according to gender

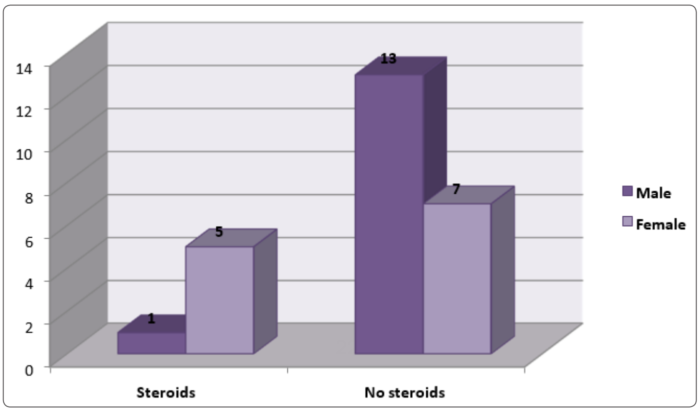

Figure 6: Steroids use distribution according to gender

No significant differences were observed between patients with different sites of fractures according to gender and mechanism of injury (p>0.05), table 5 and figures 7, 8.

Table 5: Distribution of gender and mechanism of injury according to site of fractures

Variable	Neck		Intertrochantric		χ^2	P
	No.	%	No.	%		
Gender					0.04	0.9
Male	8	53.3	6	54.5		
Female	7	46.7	5	45.5		
Mechanism of injury					3.6*	0.1
Fall	6	40.0	2	18.2		
RTA	3	20.0	6	54.5		
Blast	6	40.0	3	27.3		

*Fishers exact test.

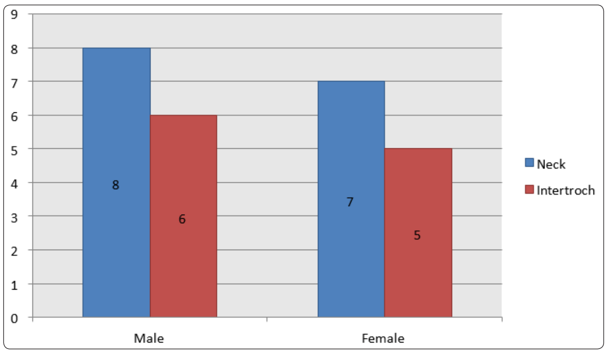

Figure 7: Distribution of fracture sites according to gender

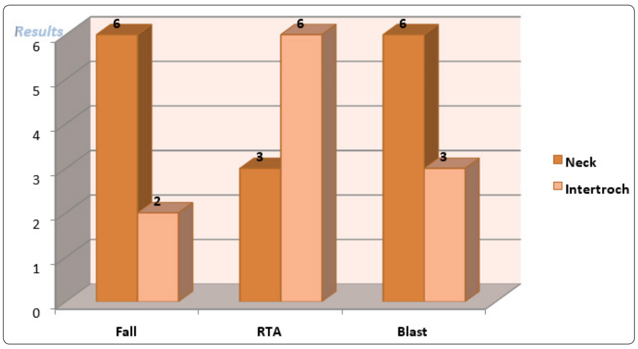

Figure 8: Distribution of fracture sites according to mechanism of injury

There was a significant association between femoral neck fractures and osteoporosis (p=0.05). No significant differences were observed between patients with different sites of fractures according to malignancy, smoking, alcohol drinking, steroids use and liver diseases (p>0.05), table 6 and figure 9.

Table 6: Distribution of risk factors for femoral fractures according to site of fractures

Variable	Neck		Intertrochantric		X^2	P
	No.	%	No.	%		
Osteoporosis					3.5*	0.05
Positive	11	73.3	4	36.4		
Negative	4	26.7	7	63.6		
Malignancy					0.1*	0.6
Positive	3	20.0	3	27.3		
Negative	12	80.0	8	72.7		
Smoking					0.03*	0.8
Positive	9	60.0	7	63.6		
Negative	6	40.0	4	36.4		
Alcohol					1.2*	0.2
Positive	4	26.7	1	9.1		
Negative	11	73.3	10	90.9		
Steroids use					0.2*	0.6
Positive	4	26.7	2	18.2		
Negative	11	73.3	9	81.8		
Live alone					0.1*	0.7
Positive	2	13.3	1	9.1		
Negative	13	86.7	10	90.9		

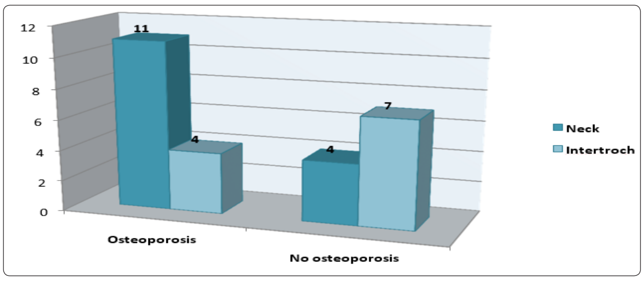

Figure 9: Osteoporosis according to fracture sites

Discussion

Hip fractures are associated with significant morbidity and mortality and impose a large economic burden [37]. Prevalence of osteoporosis among studied patients in our study was 57.7%, significantly prevalent among females with femoral neck fractures. This finding is consistent with results of Leytin V, et al study in USA (2010) and Park-Wyllie study in UK (2011) [38,39]. Few premenopausal women have osteoporosis; however, the prevalence increases with age because of the progressive loss of bone. In the United States, it has been estimated that up to 54% (16.8 million) of postmenopausal white women have low bone mass and another 20% to 30% (6.9 million) have osteoporosis [40]. In the United States, the prevalence of osteoporosis increases from 15% in 50- to 59-year-old women to 70% in women aged 80 years. Epidemiologic studies in other countries have reported similar findings [41]. A fracture is considered to be osteoporotic (fragility fracture) if it is caused by relatively low trauma, such as a fall from standing height or less; a force which in a young healthy adult would not be expected to cause a fracture. Overwhelming evidence has shown that the incidence of fracture in specific settings is closely linked to the prevalence of osteoporosis or low bone mass. In a prospective study of 8134 women older than 65 years in age, previous study showed that the women with bone material density (BMD) of the femoral neck in the lowest quartile have 8.5-fold greater risk of sustaining a hip fracture than those in the highest quartile 40. Each 1 standard deviation decrease in femoral neck BMD increases the age adjusted risk of having a hip fracture 2.6-fold. Thus, a strong correlation exists between BMD and fracture risk [41].

In present study, malignancy was present in 6 patients with no significant difference between males and females and no significant effect between hip fractures. This finding is similar to results of Panula J, et al study in Finland (2011). A recent systematic epidemiologic review, however, showed that patients are at increased risk for premature death for many years after hip fracture. Excess morbidity after hip fracture may be linked to complications following the fracture, such as pulmonary embolism infections and heart failure. Factors associated with the risk of falling and sustaining osteoporotic fractures may also be responsible for the excess morbidity [43-46].

In present study, males were more than females. This finding might be due to high proportion of injury mechanisms are RTA and blast injuries. This finding unlike results of nationwide sample study done in USA that found predominance of female gender among elderly patients presented with hip fracture [48]. This difference is attributed to the security situations and war in Iraq.

The fall mechanism of injury instituted only 30% of mechanism of injury for studied patients. Falls occur in about 35-40% of the elderly during one year and about half of them experience repeated falls. In the USA, accidents are the fifth common cause of elderly mortality and falls are the most common cause of trauma in this age group [49]. Femoral neck fractures in our study were more prevalent than intertrochanteric fractures. This finding is consistent with results of Gilasi HR et al study in Iran (2015) and Mangram A, et al study in USA (2014) [37-50]. However, it remains unclear whether there is a difference in femur fracture pattern distribution (femoral neck vs. trochanteric) in geriatric trauma patients [50]. Smoking history was positive among 61.5% of hip fractures patients and alcohol drinkers were 5 patients. No significant difference was observed between males and females regarding smoking but alcohol drinking constrained on male gender. No significant differences were observed between hip fractures regarding smoking and alcohol drinking. This finding is inconsistent with Mangram A, et al study in USA (2014) [37]. This inconsistency might be due to cultural and religion differences between communities. Although there are reports showing some decline in the incidence of femur fractures among patients who stopped smoking and drinking alcohol or have been treated for osteoporosis with vitamin D [51].

All studied hip fractures patients had history of medical diseases. This finding is consistent with Ramenmark A, et al study in Sweden (2000). Elderly people living in institutions have an increased risk of hip fracture, which is largely due to co-morbidity [33].

This study revealed that 6 patients had history of steroids use, significantly females and with no significant differences between hip fracture types. This finding is similar to results of van Staa TP, et al study in UK (2000) [53]. Clinical risk factors that contribute to fracture risk independently of BMD include age, previous fragility fracture, premature menopause, a family history of hip fracture, and the use of oral corticosteroids [54].

Living alone was present among 3 patients only with no significant differences regarding gender and hip fracture types. This finding is inconsistent with Reimers A, et al study in Sweden (2007) which concluded that the attributes of both people and places may contribute to a better understanding of the occurrence of hip fractures among the elderly. The effects of individual marital status, country of birth, and social status of the living area are noticeably robust. This inconsistency might be due to difference in sociocultural believes between two communities [55].

Patients who sustain hip fractures are exposed to significant morbidity and treatment cost between 10.3 to 15.2 billion dollars per year in USA [56,57]. These observations illustrate that hip fractures, especially in the elderly, represent significant health and economic challenges in need of focused attention. Thus, trauma centers across the country are trying to develop ways to improve the quality of care given to elderly trauma patients, which includes a better understanding of hip fracture patterns [37].

Limitations of the study

1. Small sample size of study.
2. Because of its cross-sectioned design no inference can be made on causal relationships.
3. Although the ED visits may best reflect the incidence of hip fractures, we also recognize that not all cases of hip fractures are seen in an ED. Referrals from private doctors' clinics admitted directly to the orthopedic ward.

Conclusions & Recommendations

Conclusions

- Femoral neck fractures were more prevalent than Intertrochanteric fractures.
- Femoral neck fractures were more prevalent among elderly females with history of osteoporosis.
- Intertrochanteric fractures were more prevalent among males.
- Steroids use was more prevalent among females.

Recommendations

❖ Primary providers should screen for both risk factors for osteoporosis and the disease itself, including bone density screening.

❖ Encouragement of vitamin D and calcium supplementation in highrisk individuals especially elderly peoples.

❖ Hip protectors should be considered for residential elders and those at high-risk of hip fracture.

❖ Large sample size studies should be supported.

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