

Risk Factors, Post-operative Complications and outcome of management of Hip Fracture in Arar, Northern Saudi Arabia

Saud Rteamy R Alanazi¹, Malik Azhar Hussain², Hamdan Ayed H Albathali¹, Fatimah Khalifah A Alshammari¹, Zaid Qati F Alshammari¹, Adel Turki D ALenezi¹, Muaz Bilal Abdulhameed Wali¹, Razan Fahad S Alotayfi¹, Khalid Nadi M Alanazi¹, Bader Arar Shadad Alruwaili¹, Abdalla Mohamed Bakr Ali³

1 Faculty of Medicine, Northern Border University, KSA

2 Assistant professor of surgery, College of Medicine, Northern Border University, Arar, Saudi Arabia.

3 Faculty of Medicine, Sohag University, Egypt

Abstract:

Background: Hip fractures are defined as any fracture of the femur between the articular cartilages of the hip joint to 5 cm below the distal point of the lesser trochanter. Hip fracture is a worldwide public health problem that primarily affects osteoporotic individuals and the elderly. Up to 30 % of the elderly patients with a hip fracture die within the first year. **Objective:** to show the risk factors and post-operative complications of hip fracture in cases attending orthopedic department of Arar Central Hospital in Arar city. **Methods:** a cross sectional study conducted during the period from 1 December 2017 to 31 March 2018. A predesigned questionnaire was used for data collection, and included inquiries about sociodemographic data of the studied patients, performing muscular exercise, osteoporosis, diminished vision and disorders in equilibrium, causes of fracture, type and site of fracture, occurrence of complications of surgery, postoperative care and the final outcome of treatment. **Results:** Most (70.1%) of the studied population aged 22-59 years, males constituted 59.8%. Causes of hip fracture were accident in 66.7% and fall in 25.0%. Among hip fracture cases, 43.9% were obese, 13.1% have osteoporosis, and 17.8% have disorders in equilibrium. Males reported insignificant higher percentage of hip fracture than females (25.0% Vs. 18.6%). Osteoporosis, diminished vision, chronic diseases, continuous use of medications and smoking showed significant relation with hip fracture ($P < 0.05$). While BMI, disorders in equilibrium and performing muscular exercise showed insignificant relation. Complications after surgery was osteomyelitis in 12.6%, early fixation failure in 4.2%, wound infections in 8.4% and hospital acquires pneumonia in 4.2%. Only two thirds of the cases were completely cured. **Conclusion:** in our study population in Arar city, males reported insignificant higher percentage of hip fracture than females. Osteoporosis, diminished vision, chronic illnesses, continuous use of medications and smoking were significant risk factors of hip fracture. Complications after surgery was included, osteomyelitis, early fixation failure, wound infections and hospital acquire pneumonia. Only two thirds of the cases were completely cured, the rest of cases showed disability and movement limitation.

Keywords: hip fractures, risk factors, surgical complications, outcome.

Introduction:

Hip fractures are defined as any fracture of the femur between the articular cartilage of the hip joint to 5 cm below the distal point of the lesser trochanter^[1]. Fracture of the femoral neck is classified as a type of hip fracture. A hip fracture is an uncommon fragility fracture due to a fall or minor trauma in someone with weakened osteoporotic bone. Most hip fractures in people with normal bone happens to individuals with unaccustomed strenuous activity or changes in activity, such as runners or endurance athletes, and as a result of high-energy trauma such as falling from heights, sports injuries or car accidents^[2].

Hip fractures are incisive events for senile people and over 90% of hip fracture patients are older than 65-year-old. Overall complication rates after hip fracture surgery may reach 50%^[3, 4]. Up to 30 % of the patients with a hip fracture die within the first year^[5] which is an excess mortality of 8-18 % at one year compared to matching cohorts without a hip fracture^[6].

Gender can play a role as male sex proved to be a risk factor as the study of **Algarni et al.**^[7] in Riyadh revealed that the prevalence of hip fracture was higher in males than in the females.

Medical complications may affect around 20% of patients with hip fracture. In the study

of **Carpintero *et al.***^[8] it was reported that Cognitive and neurological alterations, cardiopulmonary affections (alone or combined), venous thromboembolism, gastrointestinal tract bleeding, urinary tract complications, perioperative anemia, electrolytic and metabolic disorders, and pressure scars are the most important medical complications after hip surgery in terms of frequency, increase of length of stay and perioperative mortality.

The aim of this study was to show the risk factors and post-operative complications of hip fracture in cases attending orthopedic department of Arar Central Hospital in Arar city.

Materials and Methods

Study design and participants:

The current study is a cross sectional study conducted in the Central Hospital of Arar city in the Northern Borders Province of the Kingdom of Saudi Arabia, during the period from 1 December 2017 to 31 March 2018. The sample was non-probability; don't represent the general population of Arar city. The study included 107 individuals attending the Orthopedic Department of Arar Central Hospital during the study period. The participants were invited to participate in the study and included in the study after taking an informed consent. Each person was interviewed separately to collect the needed data and fill out the questionnaires. The Hospital provides services in an acceptable atmosphere of both privacy and confidentiality. Exclusion criteria included patients who refused to participate in the study.

Collecting patients' data was conducted through interviewing the patients included in the study and reviewing their medical files. A predesigned questionnaire was used for data collection, and included inquiries about sociodemographic data of the studied patients, body weight and height to calculate the Body Mass Index (kg/m²) status, caffeine drinking, performing muscular exercise, osteoporosis, diminished vision and disorders in equilibrium. As regards fracture, data was collected about causes of fracture, type and site of fracture, type of anesthesia during the operation, need to another operation,

occurrence of complications of surgery, postoperative care and the final outcome of treatment.

Ethical consideration:

Written informed consent after explaining the purpose of the study was obtained from all patients who participated in the study. The questionnaires used in data collection were anonymous and confidentiality of data was assured. **The study was approved by the Ethics Board of Ain Shams University.**

The statistical analysis:

The statistical analysis was carried out using SPSS version 16. Sample characteristics were summarized as numbers and percentages for qualitative variables. Chi-Square test was used for testing the association between sociodemographic characters of the studied cardiac cases and conducting the coronary bypass operation. A 5% level was chosen as a level of statistical significance in all statistical tests used in the study.

Results:

Table 1 shows the socio-demographic characteristics and smoking among the studied population. Most (70.1%) of the studied population aged 22-59 years, males constituted 59.8%, and 67.3% have university education, smokers were 13.1% and 6.5% were ex-smokers.

Table 2 and figure 1 illustrate the percentage of hip fracture and other related chronic diseases among the studied participants. It was clear that the percentage of hip fracture among our study group was 22.4%. 43.9% were obese, 13.1% confirmed to have osteoporosis, and 17.8% have disorders in equilibrium

Causes of hip fracture were accident in 66.7%, fall in 25.0% and unknown cause in 8.3%. Type of fracture was simple in 79.2% and comminuted fracture in 20.8%. The site was the head of the femur in 37.5% and neck in 33.3%. As regards complications after surgery the table shows that, osteomyelitis 12.6%, early fixation failure 4.2%, osteomyelitis and wound infections 8.4% and hospital acquires pneumonia 4.2%. Outcome of treatment was complete cure in only two thirds (66.7%) of cases (Table 3).

Males reported insignificant higher percentage of hip fracture than females (25.0% Vs. 18.6%). Hip fracture prevalence was 21.3% in obese, 26.1% in overweight, 20.0% in normal and 28.6% in underweight. Osteoporosis, diminished vision, chronic diseases, continuous use of medications articular cartilage and smoking showed significant association with prevalence of hip fracture ($P<0.05$). BMI group, disorders in equilibrium and performing muscular exercise showed no significant association with prevalence of hip fracture (Table 4&5).

Table 1: Socio-demographic characteristics and smoking among the studied population, Arar, 2017 (N=107)

Variables	Frequency (No.)	Percent (%)
Age group		
• <21	26	24.3
• 22-59	75	70.1
• 60+	6	5.6
• Mean age (\pm SD)	28.7 \pm 14.0	
Sex		
• Female	43	40.2
• Male	64	59.8
Education		
• Primary	3	2.8
• Preparatory	4	3.7
• Secondary	22	20.6
• University or more	72	67.3
• Illiterate	6	5.6
Working status		
• No work	73	68.2
• Working	34	31.8
Marital status		
• Single	66	61.7
• Married	38	35.5
• Divorced	3	2.8
Smoking		
• Non smoker	86	80.4
• Smokers	14	13.1
• Ex-Smoker	7	6.5

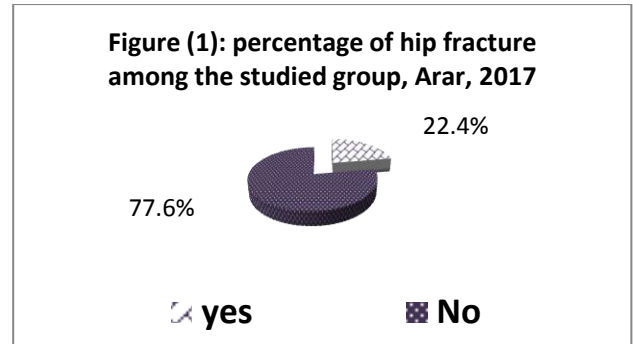


Table 2: Percentage of Hip fracture and other related chronic diseases among the studied participants, Arar, 2017 (N=107)

Hip fracture	No.	%
• Yes	24	22.4
• No	83	77.6
Related chronic diseases		
• Yes	11	10.3
• No	96	89.7
Body Mass Index (kg/m2) status		
• Underweight	7	6.5
• Normal	30	28.0
• Overweight	23	21.5
• Obese	47	43.9
Mean BMI (\pm SD)	32.0 \pm 25.7	
Continuous medications		
• No	90	84.1
• Yes	17	15.9
Caffeine drinking		
• No	39	36.4
• Yes	68	63.6
Performing muscular exercise		
• No	95	88.7
• Yes	12	11.2
Osteoporosis		
• No	58	54.2
• Yes	14	13.1
• Don't know	35	32.7
Diminished vision		
• No	75	70.1
• Yes	32	29.9
Disorders in equilibrium		
• No	88	82.2
• Yes	19	17.8

Table 3: Hip fracture related variables among the studied cases (N=24)

Causes of fracture	Frequency	Percent
• Accident	16	66.7
• Fall	6	25.0
• Unknown cause	2	8.3
Doctors diagnosis		
• External cause	15	62.5
• Calcium deficiency	1	4.2
• Osteoporosis	8	33.3
Type of fracture		
• Simple fracture	19	79.2
• Comminuted fracture	5	20.8
Site of fracture		
• Head of the femur	9	37.5
• Neck of the femur	8	33.3
• Just below the neck of the femur	7	29.2
Type of anesthesia during operation		
• General	14	58.3
• Spinal	10	41.7
Need to another operation		
• No	15	62.5
• Yes	9	37.5
Occurrence of complications of surgery		
• No	16	66.7
• Yes	8	33.3
Type of complications after surgery		
• Osteomyelitis	3	12.6
• Early fixation failure	2	4.2
• Osteomyelitis and wound infection	2	8.4
• Hospital-acquired pneumonia	1	4.2
Good postoperative care		
• No	6	25.0
• Yes	18	75.0
Outcome of treatment		
• Complete cure	16	66.7
• Disability and movement limitation	8	33.3

Table 4: relationship between hip fracture and sociodemographic characteristics of the studied population

Variables	Hip fracture		Total (N=107)	P value
	Yes (N=24)	No (N=83)		
Sex				
• Female	8	35	43	0.297
	18.6 %	81.4 %	100.0 %	
• Male	16	48	64	
	25.0 %	75.0 %	100.0 %	
Age group				
• < 21	5	21	26	0.001
	19.2 %	80.8 %	100.0 %	
• 21-59	14	61	75	
	18.7 %	81.3 %	100.0 %	
• 60 +	5	1	6	
	83.3 %	16.7 %	100.0 %	
Marital status				
• Single	9	57	66	0.022
	13.6 %	86.4 %	100.0 %	
• Married	14	24	38	
	36.8 %	63.2 %	100.0 %	
• Divorced	1	2	3	
	33.3 %	66.7 %	100.0 %	
Educational level				
• Primary	3	0	3	0.001
	100.0 %	.0 %	100.0 %	
• Secondary	4	18	22	
	18.2 %	81.8 %	100.0 %	
• University or more	10	62	72	
	13.9 %	86.1 %	100.0 %	
• Illiterate	5	1	6	
	83.3 %	16.7 %	100.0 %	
• Preparatory	2	2	4	
	50.0 %	50.0 %	100.0 %	
Working status				
• Not working	11	62	73	0.009
	15.1 %	84.9 %	100.0 %	
• Working	13	21	34	
	38.2 %	61.8 %	100.0 %	

Table (5): relationship between Hip fracture and fracture related factors

Variables	Hip fracture		Total (N=107)) 0.297	P valu e
	Yes (N=24)	No (N=83)		
Smoking				
Ex-smoker	1	6	7	0.02 9
	14.3%	85.7%	100.0%	
• No	16	70	86	
	18.6%	81.4%	100.0%	
• Yes	7	7	14	
	50.0%	50.0%	100.0%	
Continuous use of medications				
• No	17	73	90	0.04 9
	18.9%	81.1%	100.0%	
• Yes	7	10	17	
	41.2%	58.8%	100.0%	
Caffeine drinking				
• No	7	32	39	0.27 7
	17.9%	82.1%	100.0%	
• Yes	17	51	68	
	25.0%	75.0%	100.0%	
Performing muscular exercise				
• No	22	73	95	0.46 6
	23.2%	76.8%	100.0%	
• Yes	2	10	12	
	16.7%	83.3%	100.0%	
Chronic diseases				
• No	17	79	96	0.00 2
	17.7%	82.3%	100.0%	
• Yes	7	4	11	
	63.6%	36.4%	100.0%	
Osteoporosis				
• No	8	50	58	0.00 0
	13.8%	86.2%	100.0%	
• Don't know	7	28	35	
	20.0%	80.0%	100.0%	
• Yes	9	5	14	
	64.3%	35.7%	100.0%	
Diminished vision				
• No	13	62	75	0.04 9
	17.3%	82.7%	100.0%	
• Yes	11	21	32	
	34.4%	65.6%	100.0%	
Disorders in equilibrium				
• No	17	71	88	0.09 1
	19.3%	80.7%	100.0%	
• Yes	7	12	19	
	36.8%	63.2%	100.0%	
BMI group				
Underweight	2	5	7	0.92 6
	28.6%	71.4%	100.0%	
Normal	6	24	30	
	20.0%	80.0%	100.0%	
Overweight	6	17	23	
	26.1%	73.9%	100.0%	
Obese	10	37	47	
	21.3%	78.7%	100.0%	

Discussion:

Hip fracture, one of the most common traumatic injuries in elderly patients, is a serious problem in the elderly and continues to be unsolved fractures, and the guidelines for management are still evolving^[9]. It occurred in the narrowed section of the upper femur between the rounded femoral head and bony projections called trochanters. The incidence of femoral neck fractures, constituting 53% of all fractures of the proximal femur^[10]. A study estimated that there would be an increase in femoral neck fractures incidence from about 1.7 million cases in 1990 to 6 million cases in 2050^[11].

Our study reported that the percentage of hip fracture among our study group was 22.4%. Another study in the Eastern Province of Saudi Arabia reported the fractures at the neck of the femur by 42%^[6]. Another study conducted among 794 patients from them 87 patients with a hip fracture; there were 52 femoral neck fractures (60%)^[12]. In São Paulo a prospective observational study carries out among 113 patients found that femoral neck fractures accounted for 42.5% of the fractures^[13].

As regards complications after surgery our study reported osteomyelitis 12.6%, early fixation failure 4.2%, osteomyelitis and wound infections 8.4% and hospital acquires pneumonia 4.2%. Another study^[14], conducted among 242 patients found that 56.7% of them had at least one complication; acute urinary retention (39.3%) and urinary tract infection (24.0%) were most common, urinary tract infection (24.0%), deep vein thrombosis (8.6%), chest infection (4.5%), upper gastrointestinal bleeding (3.3%) and myocardial infarction (2.1%).

A study conducted by Flikweert *et al.*^[15] stated that 479 patients with a mean age of 78.4 years; the overall complication rate was 75%. Delirium was the complication seen most frequently (20%), pneumonia (10%) and congestive heart failure (5%). Another study reported, the two most frequently encountered medical complications were neurovascular complications (58%) and infection in joints (61.3%)^[16].

In Iran another study conducted among 35 patients (16-20 years) with femoral neck

fractions found that 40% of patients had some sort of complications; a vascular necrosis accounts for 30% of complications, whereas, movement limitation and limb shortness accounts for 40% and 30% of complications respectively^[17].

Another study conducted among 2448 patients reported; the most common complications were chest infection (9%), heart failure (5%), and urinary tract infection (4%)^[18].

A retrospective cohort study carried out among 8930 patients with hip fracture from them 1737 patients had postoperative medical complications; Cardiac and pulmonary complications were most frequent (8% and 4% of patients, respectively), gastrointestinal tract bleeding (2% of patients), and venous thromboembolism, transient ischemic attack or cerebrovascular accident, isolated hypotension, and multiple complications (in about 1% of patients for each)^[19].

In United Kingdom a prospective, observational study of 2660 patients who underwent surgery of a hip fracture found that the most common postoperative complications were chest infection (223 patients, 8.4%), cardiac failure (124 patients, 4.7%), urinary tract infection (103 patients, 3.9%) and deep wound infection developed in twenty-eight patients (1.1%)^[8].

As regards causes of hip fracture our study reported accidents in 66.7% and fall 25%. In Tanzanian study it was reported that 49% of femoral fractures were caused by motor traffic accidents and 42% by falls^[9].

Another study reported that low-energy trauma was the cause of 92.9% of the fractures^[15]. Another study found falling from a height was the most common cause of fracture by 40%, followed by motor accident 25% and car accident 20%^[20].

In this study, males reported insignificant higher percentage of hip fracture of the neck of the femur than females (25.0% Vs. 18.6%). Chronic diseases and continuous use of medications showed significant association with hip fracture ($P<0.05$).

Algarni *et al.*^[7] in Riyadh revealed that the prevalence of hip fracture was higher in males than in the females, hip fractures was found

with insignificant relations with age, gender, chronic diseases (diabetes mellitus, anemia).

In the current study, osteoporosis showed significant association with hip fracture ($P<0.05$).

Most hip fractures are caused by factors that weaken bone, combined with the impact from a fall. Bone strength decreases with age as bones become very weak and fragile due to osteoporosis^[18]. Osteoporosis can play a role, it was proved to be a risk factor as the study of **Konetsky *et al.***^[2] revealed that the prevalence of hip fracture was higher with osteoporosis.

Conclusion and recommendations:

In our study population in Arar city, males reported insignificant higher percentage of hip fracture than females. Osteoporosis, diminished vision, chronic illness, continuous use of medications and smoking were significant risk factors of hip fracture. Complications after surgery was included, osteomyelitis, early fixation failure, wound infections and hospital acquire pneumonia. Only two thirds of cases were completely cured, the rest of cases showed disability and movement limitation. We recommend health education to stress the public for good exercise and good nutrition especially elderly population who are most probably liable to hip fracture.

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