One Year Mortality in Elderly Patients with Fracture Proximal Femur Managed Surgically in District Headquarter Hospital Rawalpindi

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Authorship and contribution Declaration:
Each author of this article fulfilled ALL 4 Criteria of Authorship:

1. Conception and design or acquisition of data, or analysis & interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.
4. All authors agree to be responsible for all aspects of their research work.

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ABSTRACT

Objective: To determine one year mortality rate in elderly patients who were operated for fracture proximal femur in District Headquarter Hospital Rawalpindi.

Methods: This descriptive study was conducted in Orthopaedic Department District Headquarter Hospital Rawalpindi from 3rd January 2017 to 25th December 2019.All patients with proximal femur fracture (neck of femur, per trochanteric and sub trochanteric fractures) fulfilling the inclusion criteria and who were operated were included in our study. Post operatively all these patients were followed up at regular intervals up to one year to document mortality. Chi square test for independence was used to calculate *P* values of important variables and *P* value of <0.05 was considered statistically significant.

Results: A total of 161 patients with mean age was 71.1± 10.0 years were included in our study. There were 90(55.9%) males and 71(44%) females. Majority(62.1%,n=100) of fractures were pertrochanteric followed by neck of femur(34.8%,n=56) and subtrochanteric fractures(3.1%,n=5).Dynamic Hip screw(DHS) was used to fix fractures in 105(65.2%),Austion Moore Prosthesis(AMP)in 31(19.3%),Total Hip Replacement(THR) in 17(10.6%) and Dynamic Condylar Screw(DCS) in 3(1.9%) patients. At one year the overall mortality rate was 20.5% (n=33). Patients of 80 years and above had significantly higher mortality (34.8%, n=15) rate than others (*P*= 0.006337).The mortality was also significantly greater in females (28.2%,n=20) than male patients (14.4%,n=13) with *P* value of 0.032201. Patients operated for neck of femur fractures had significantly higher mortality rate (30.4%, n=17) than those operated for pertrochanteric fractures (16%, n=16) with *P* value of 0 .02361.

Conclusion: Elderly female patients age 80 years and above operated for neck of femur fractures exhibited a higher mortality rate at one year follow up than others.

Key words: Death rate, Elderly patients, Fatal outcome, Femur Neck, Mortality, Rate.

This article may be cited as: Anjum S, Rahman OU, Riaz S, Bashir MA, Qayyum N. One Year Mortality In Elderly Patients With Fracture Proximal Femur Managed Surgically In District Headquarter Hospital Rawalpindi. J Pak Orthop Assoc. 2020;32(2):

INTRODUCTION

In old age bones are weak due to Osteoporosis and Osteomalacia on one hand while there is a decrease in visual acuity, slow reflexes, decrease daily living activities and malnutrition on the other hand. A minor fall therefore, can cause fracture and the most

common fracture in elderly patients is in proximal femur region.[1] There can be fractures in the neck, per trochanteric and sub trochanteric areas of femur and they account for 62% to 84% of all bone fractures.[2,3] In advancing age patients often have other comorbidities thus causing not only a high mortality rate but disability, social problems, family problems, rehabilitation problems, high medical and hospital expenses as well.[2] Patients with proximal femur fracture may undergo delirium, which increases morbidity and mortality.[4] Furthermore, in old age, polymorphonuclear cells and phagocytic activity declines while interlukin (IL-6) level rises contributing to higher mortality rates. [5]

Timing of surgery in elderly patients is very important and surgery should ideally be done within 24 to 48 hours because delay in surgery increases the risk of death with an odds ratio (OR) of 1.3 per 24 hour of delay. [6] Thus one important modifiable risk factor for mortality is time to surgery and the mortality rate can be reduced avoiding delay in surgery. [7] Pre-operative anemia is another modifiable risk factor for mortality in hip fracture in old age. [8] Physiotherapy and antibiotics have also been recommended as modifiable risk factors, which can be used postoperatively to reduce the mortality rate.[9]

Previous studies had reported that the mortality risk was highest within the first 3 months following fracture and two years after fracture the standardized mortality ratio approached that of a person who had not sustained a hip fracture. [10] It has also been documented that approximately 40% of surviving patients regained their previous level of mobility and approximately 25% achieved their former functional status one year after a hip fracture.[11]

Although there is abundant data available across the globe showing one-year mortality in elderly patients with hip fractures but not from Pakistan specially from Northern part of Pakistan.[12] It is important to document the present status in our region so that we can identify any adverse trends and implement practical measures to improve the outcome. Mortality rates can monitor the improvement in performance of a hospital over time and are also used to compare the performance amongst a number of hospitals. To our knowledge this would be the first study from northern part of Pakistan. The objective of our study was to determine one year mortality rate in elderly patients who were operated for fracture proximal femur in District Headquarter Hospital Rawalpindi.

METHODS

We conducted this descriptive study in Orthopaedic Department District Headquarter Hospital Rawalpindi from 3rd January 2017 to 25th December 2019.Patients of either gender and age more than 60 years with fracture neck of femur, per trochanteric and sub trochanteric fractures were included. Patients with poly trauma and multiple fractures requiring multi-disciplinary approach and those presenting two or more weeks of sustaining the fractures were excluded. The study protocols were approved by the Ethical Review Board of the hospital and informed consent was obtained from all participants. The pre-operative risk assessment of all patients were done with the help of American Society of Anaesthesiolgists (ASA) grading system.[13]

Relevant radiographic and laboratory tests were done and all the patients were optimally stabilized before surgery. Depending upon the fracture type Dynamic Hip screw (DHS), Austion Moore Prosthesis (AMP), Total Hip Replacement (THR) and Dynamic Condylar Screw (DCS) were used to treat these fractures. A standard uniform surgical technique was adopted for each case and surgeries were performed by surgeons with more than 7 years post fellow ship experience. All the patients and their attendants were instructed to strictly follow a uniform supervised physiotherapy protocol, wound care and nutritional support at home which was taught to them in hospital. Follow up visits were scheduled at 2nd week, 4th week, 6th week,8th week and then monthly for one year. In each visit radiological and clinical status of the patient was evaluated. Address and contact information of all the patients were collected and were utilized in cases of inability to come for follow up visits.

Patient data was compiled in Excel sheet and descriptive statistics, averages and standard deviations were calculated. Chi square test for independence was used to calculate *P* values of important variables and *P* value of <0.05 was considered statistically significant. Data presented in tables where necessary.

RESULTS

A total of 161 patients fulfilled the inclusion criteria. Their average age was 71.1± 10.0 years. There were 90(55.9%) males and 71(44%) females in the study group with average ages of 70.8± 9.4 and 71.5± 10.6 years respectively (*P*=0 .673043). Majority (62.1%, n=100) of fractures were pertrochanteric followed by neck of femur (34.8%,n=56) and sub

trochanteric fractures (3.1%,n=5). The preoperative risk assessment with American Society of Anesthesiologists (ASA) grading system revealed that majority(81.9%,n=132) of patients were ASA grade II followed by grade I(15.5%,n=25) and grade III(2.4,n=4).Dynamic Hip screw(DHS) was used to fix fractures in 105(65.2%), Austin Moore Prosthesis(AMP)in 31(19.3%),Total Hip Replacement(THR) in 17(10.6%) and Dynamic Condylar Screw(DCS) in 3(1.9%) patients. At one year the overall mortality rate was 20.5 %(n=33). Gender and age wise mortality rate is shown in table I. There was no significant difference in the incidence of fractures in different age decades in male and female patients (*P*=0 .147494). Thus male and female cohorts were seen to be well matched. Maximum number of dead patients had pre-operative ASA grade II(75.7%, n=25) followed by grade I(21.2%,n=7) and grade III(3%,n=1).Majority(60.6%,n=20) of patients were reported dead within 6 to 8 months of surgery. Majority(63.6%,n=21) of the deceased patients were operated within three days of their admission while 12(36.3%) patients were operated within 3 to 5 days of their admission to hospital.

When compared the incidence of different types of fractures in male and female groups pertrochanteric fracture was the commonest in both groups (62.1% combined incidence, 64.4% in males and 57.7% in females).The incidence of neck of femur fracture was greater in female group (42.3%) as compared to male group (28.9%) but this difference was not statistically significant (*P*=0.077095).No subtrochanteric fracture (ST) was recorded in female patients.

When we analyzed the death and survival rates at one year the overall mortality rate was found to be 20.5%(n=33). However, in patients of 80 years and above the mortality was significantly higher (34.9%,n=15) than other age groups(*P*= 0.006337). The mortality was also significantly greater in females (28.2%,n=20) when compared to male patients (14.4%,n=13) with *P* value of 0.032201. Amongst male patients the increase in mortality risk associated with advanced age did not assume significant proportion (33.3% versus 12.9% with *P* value of 0.127852).However this was well defined in female patients (43.5% in ≥ 80 years versus 20.8% in ≤years with *P* value of 0.047132).

Table I: Gender and age wise mortality rates.

Variable		Death (n=33)		Survived (n=128)		Total (n=161)	
		Number	Percentage	Number	Percentage	Number	Percentage
Gender	Female	20	60.6%	51	31.7%	71	44.1%
	Male	13	39.4%	77	68.3%	90	55.9%
Age Range(Years)	60 to 69	11	33.3%	69	53.9%	80	49.7%
	70 to 79	7	21.2%	31	24.2%	38	23.6%
	80 and above	15	45.5%	28	21.9%	43	26.7%

Table II: Mortality rates in different Fracture types and with different implants.

Variable		**Number of Deaths(n=33)**	**Number of Survived(n=128)**	**Total(n=161)**	**Percentage**
Fracture Type	Neck of femur	17	39	56	34.8%
	Per trochanteric	16	84	100	62.1%
	Sub Trochanteric	0	5	5	3.1%
Implant Type	DHS	16	89	105	65.2%
	DCS	1	2	3	1.9%
	THR	3	14	17	10.6%
	AMP	13	18	31	19.3%

By analyzing death associated with type of fracture, patients with neck of femur fracture had significantly increased mortality rate than those with pertrochanteric fractures (*P* = 0.02361), showing 30.4%(n=17) death rate in neck of femur patients versus 16%(n=16) death rate in pertrochanteric fractures as shown in table II. On examining the female group it was noted that 40% of females with

neck of femur fractures succumbed within one year of fracture as compared to 19.5% patients with pertrochanteric fractures(*P* =0.057995). In male group the mortality in neck of femur and pertrochanteric fractures (19.2% and 12.5% respectively) were quite similar (*P* =0.410351) and thus differed from female cohort. Post-operative complications were noted in only 5(15.1%) patients who were reported dead later on. These complications were superficial surgical site infection in 2(6%) deep venous thrombosis in 1(3%) delayed union in 1(3%) and screw cut out in 1(3%) patient. However no re-surgery or readmission was noted. No in-hospital mortality was documented. Furthermore the exact cause of death could not be confirmed to be attributed to surgery but we presumed that the general ill health or other comorbid conditions of the patients were responsible for the death of those patients.

DISCUSSION

In this study we found that one year mortality rate in elderly patients with proximal femur fracture surgery was 20.5%. Variable mortality rates have been reported in literature. Meessen et al[4] observed it to be 20.7%. Guerra[2] reported mortality rate of 23.6% while Ricci[14] noted 28.7% mortality rate. Pereira and colleague [9] acknowledged that the 1-year mortality of 35% obtained in their study was high compared with mortality rates in some previous studies from developed countries, in which mortality rates were reported between 15% and 25%. However, similar to our study Qazi and Taufiq [12] had reported mortality rate of 21.3% at one year.

We are well aware of the importance of early surgical intervention in elderly patients with proximal femur fractures and we had taken all steps to reduce waiting period as much as possible. In our series majority (63.6%,n=21) of the deceased patients were operated within three days of their admission while 12(36.3%) patients were operated within 3 to 5 days of their admission to hospital. Belmont[15] from Texas using data from National Trauma Data Bank (NTDB) was of the opinion that time to surgery was one of the most important modifiable risk factors for mortality and other complications. Leung[16] reviewed the literature extensively and concluded that it is beneficial to the elderly patients to receive surgical treatment as an urgent procedure as soon as the body meets the basic anesthetic requirements. They cited lower mortality in patients operated within 24 hours, whereas a delay of hip fracture surgery of more than 4 days was reportedly associated with significantly increased mortality at 90 days and 1 year. However, to the contrary, Kopp[17] found that the interval between injury and surgery was not a risk factor for survival.

As was expected increasing age was an uncompromising risk factor for mortality. The higher the age, the shorter the time of survival. [16] Our patients in ninth decade and over, showed significantly worse prognosis than those under 80 years (34.9% vs 15.3% mortality). In fact 45.5% of all deaths seen in our patients were aged 80 years and over. Older patients have high association of comorbidities such as hypertension, diabetes mellitus, ischemic heart disease, parkinsonism and low immunity as has been documented by Qazi and colleague.[12]

Gender was found to be a risk factor for mortality in our study. Incidence of mortality was twice as high in females than in males in our study. The mortality ratio of female to male deaths was reported by Guerra[2] as 3:1, while for every man, 2 to 5 females is the ratio commonly documented in other studies.[1,18,19] However on contrary,Kopp[17]observed that male gender had a significantly shorter time of survival.

Pertrochanteric fractures accounted for more admissions than neck of femur fractures in our study. Same distribution was also documented by Qazi[12] and Saul.[20] Mortality rate is reduced when elderly patients with hip fracture are admitted in critical care and there is use of enhanced peri-operative care. [21]

Our study had few limitations. Our sample size was small and the design of our study was descriptive. We were not able to determine the exact causes of mortality of our patients. We therefore, recommend further studies to address these limitations.

CONCLUSION

Elderly female patients age 80 years and above operated for neck of femur fractures exhibited a higher mortality rate at one year follow up than others.

Conflicts of Interests: None

Grants/Funding: None

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