ECRONICON OPEN ACCESS

EC ORTHOPAEDICS
Research Article

Total Hip Arthroplasty for Femur Neck Fractures in Elderly Patients. A Multi-Centre Study from Pakistan

Mujahid Jamil Khattak[3], Sajjad Ahmed[2], Marij Zahid[3], Israr Ahmed[1], Arif Khan[1] and Zeeshan Khan[1,2]*

[1]*Departments of Trauma and Orthopedics, Hayatabad Medical Complex, Peshawar, Pakistan*

[2]*Departments of Trauma and Orthopedics, Rehman Medical Institute, Peshawar, Pakistan*

[3]*Departments of Trauma and Orthopedics, Aga Khan Hospital, Karachi, Pakistan*

***Corresponding Author:** Zeeshan Khan, Assistant Professor and Consultant Orthopedics, Orthopaedic A Unit, Hayatabad Medical Complex, Phase 4, Hayatabad, Peshawar, Pakistan. **E-mail:** zeek1978@yahoo.co.uk

Received: November 22, 2019; **Published:** January 03, 2020

Abstract

Introduction: The burden of hip fractures on health care systems and professionals is increasing with increase in life expectancy of patients. There is an increasing global trend for total hip replacement rather than Hemiarthroplasty for femur neck fractures in elderly patients. This is based on large series reported from various countries showing efficacy, safety and better functional outcome associated with this procedure. The concerns with Total hip replacement procedure include increased risk of dislocation, infection and anaesthetic complications. The adoption of this practice in developing countries pose additional challenges including access to medical facility, availability of equipped operating room, financial burden and the surgical expertise required for Total Hip Replacement for this unique group of patients.

Objectives: To evaluate the effectiveness and associated complications of total hip arthroplasty for femur neck fractures in elderly patients from various centres in Pakistan.

Materials and Methods: Retrospective cohort of patients from 3 different hospitals in the country was included. Data was obtained from prospectively held databases and patients with at least 12 months follow up were included in the study.

Results: A total of 63 patients were included in the study, including 27 males and 36 females with an average age of approximately 62 years. The commonest implant type used was cemented hip replacement with commonest head size being 32 mm. Only two patients had superficial wound infection, 1 patient had pulmonary embolism and 1 patient had dislocation at 2 months. No mortalities were reported during the study period.

Conclusion: THA is a safe option for carefully selected patients with neck of femur fractures. In a developing country, despite numerous constraints we are still able to reproduce the same results as published in the international literature.

Keywords: *Total Hip Arthroplasty; Hip Fracture; Complications; Cost-Effectiveness; Dislocation*

Introduction

The burden of hip fractures on health care systems and professionals is increasing with increase in life expectancy of patients. Displaced femoral neck fractures can be treated by closed reduction and internal fixation, hemi-arthroplasty, bipolar arthroplasty and total hip arthroplasty [1]. Treatment by closed reduction and internal fixation is influenced by many factors like age of patient, duration from

injury to surgery, displacement of fracture, quality of bone, delay in treatment, quality of fracture reduction, type of fixation devices and final position of the fracture [2-4]. This method of treatment however gives high rate of non-union and avascular necrosis in elderly patients ultimately requiring revision surgery. Skinner and Powles [5] reported 26% non-union and 33% avascular necrosis of hip joint in these cases.

Intra capsular hip fracture patients have been treated traditionally with hemiarthroplasty in the elderly age group because of high risk of non-union and failure. Historically a mono block Hemiarthroplasty was used and then a trend towards bipolar Hemiarthroplasty was noted. Majority of the patients treated with hemi arthroplasty experience the degeneration of acetabular cartilage and erosion of the prosthesis which may require revision surgery with an overall revision rate of 7 to 12% within a few years [6,7]. Over the last few years, there has been an increasing trend towards Total Hip Arthroplasty rather than Hemiarthroplasty in elderly patients with neck of femur fractures [8,9]. Total hip arthroplasty gives good functional outcomes in terms of pain relief and is cost effective in the long term as compared to Hemiarthroplasty [10,11]. Stafford., *et al*. [12] concluded in their study from the national joint registry UK and Wales that total hip replacement for neck of femur fractures lead to lower reoperation rates and better functional outcomes compared with Hemiarthroplasty and are equally comparable to total hip arthroplasty performed for other indications such as osteoarthritis and avascular necrosis. The main concern with THA in hip fracture patients is the risk of dislocation, infection and anaesthetic risks [13]. Our study evaluates the effectiveness of total hip arthroplasty for neck of femur fractures in elderly patients in our population.

Materials and Methods

Data for this retrospective cohort was collected from three different tertiary care hospitals of Pakistan including Aga Khan University Hospital Karachi, Hayat Abad Medical Complex Peshawar and Rehman Medical Institute Peshawar. All the patients who presented with acute hip fractures (within 1 week) and underwent primary total hip replacement from July 2015 to March 2017 were included in the study with a minimum of 12 months follow up. Selection criteria for total hip replacement in these cases included patients whose ASA was less than 2, previously independently mobile or mobilizing with one stick, fully compos mentis and consenting for the procedure. Clinical and radiographic information on all patients had been prospectively collected as a routine part of monitoring of joint replacement procedures at these institutions. All patients were admitted under the care of a consultant Orthopaedic surgeon and were operated on a dedicated list with the component selection by the primary surgeon. Procedures were performed either via a lateral Harding's or posterior Moore's approach. All patients received antibiotics and venous thromboembolism prophylaxis as per hospital policies. Complications relating to the hip, general complications, living conditions and hip function were recorded as part of this study along with hip related complications which included dislocations, infection, hip pain, peri-prosthetic fracture and loosening of components. Categorical variables were recorded as frequency and percentages while continuous variables were expressed as means with standard deviation. SPSS version 22 was used for data entry and analysis. Cross tabulations were made and recorded where required for emphasis.

Results

A total of 63 patients were included in the study, including 27 males and 36 females with an average age of 62 years (range 40 to 90 years). The average time from injury to surgery was 4 days. Left side was involved in 35 patients and right side was involved in 28 patients. All patients presented with acute trauma and none of the patients had bilateral neck of femur fracture. Combined spinal and epidural anaesthesia was most commonly used along with standard antibiotics as per hospital protocols. In majority of the cases a lateral approach was used (76%) while posterior Moore's approach was used in 24% of the patients (Table 1). The commonest implant used was cemented with commonest head size being 32 (Figure 1). Third generation cementing technique was used in all cemented hips (Figure 2). Dual mobility articulation cups were used in 10 patients, which were all cemented. Metal on cross-linked polyethylene was the most common articular surfaces used (82%) followed by ceramic on cross-linked polyethylene (18%). Forty patients (63%) patients had cemented cups, 13 (21%) had un-cemented cups and 10 (16%) had cemented dual mobility cups, with the most common cup size being 48.

Patient Characteristics	Results
Mean Age (in years)	62.8+/-12.3 SD
Gender	**Frequency (Percentage)**
Male	27 (42.9%)
Female	36 (57.1%)
ASA Grade	**Frequency (Percentage)**
Grade I	17 (27%)
Grade II	37 (58.7%)
Grade III	8 (12.7 %)
Grade IV	1 (1.6%)
Anesthesia Type	**Frequency (Percentage)**
General	15 (23.8%)
Spinal	9 (14.3%)
Spinal + Epidural	19 (30.2%)
General + Spinal	20 (31.7%)
Laterality of fracture	**Frequency (Percentage)**
Right	28 (44.4%)
Left	35 (55.6%)
Surgical approach	**Frequency (Percentage)**
Moore's	15 (23.8%)
Hardinge	48 (76.2%)

Table 1: *Patient demographics and fracture characteristic.*

Figure 1: *Uncemented THA for neck of femur fracture in 60 years old female at 2 years post-operative period.*

Figure 2: *Cemented THR for fragility fracture. Per operative avulsion of part of greater trochanter was fixed with cerclage wires, with no post-operative sequalae.*

The type of antibiotics used at induction of anaesthesia varied depending on hospital policy and included second generation cephalosporin in 82 % cases and Cefoperazone/Sulbactam combination in 18% cases. In addition, all patients who received a second-generation cephalosporin also received a single dose of Gentamycin at induction of anaesthesia. Post-operative use of antibiotics varied again from 24 - 72 hours, as per institutional policy. Venous thromboembolism prophylaxis also varied depending on the hospital policy and included the use of thromboembolic deterrent stockings in all cases and a mix of low molecular weight heparin and Aspirin (300 mg once a day) for 6 weeks post operatively.

Fifty-five (87.3%) patients were mobilized full weight bearing immediately after surgery while the rest were mobilized at 6 weeks post-operative status after review of x rays on their second outpatients visit. Two patients had superficial wound infection, 1 patient had pulmonary embolism on 2nd post-operative day and was managed with heparin infusion and fully recovered (see table 2) and continued using oral anticoagulants for 6 months in liaison with haematologist. One patient had dislocation at 2 months, which was reduced closed and has remained stable at 12 months follow up (Table 2). Approximately 36.5% of our patients needed blood transfusion. At final follow up (minimum 12 months), all the patients were alive and mobilizing full weight bearing.

Lateral Harding's	Superficial surgical site infection (SSI) Dislocation Urinary tract infection	2 (3.1%) 1 (1.6%) 1 (1.6 %)
Posterior Moore's	Pulmonary embolism	1 (1.6%)

Table 2*: Complications according to approach.*

Discussion

The incidence of hip fractures is increasing throughout the world due to an increase in life expectancy of patients. It is estimated that annual number of hip fractures will rise from 1.7 million in 1990 to 6.3 million by the year 2050 [7]. Total Hip arthroplasty is a well-known successful procedure for primary and secondary arthritis of the hip joint. This procedure has been introduced as treatment for femur neck fractures in elderly fit and well patients in the very recent past, whereas, internal fixation and Hemiarthroplasty was used traditionally for treatment of these fractures. The risk of failure of internal fixation and recurrent pain after Hemiarthroplasty has popularized total hip arthroplasty internationally. The procedure however poses unique challenges of adequate soft tissue balancing, leg length equality and increased risk of dislocation in acute femur neck fractures as opposed to osteoarthritis. Fellowship trained high volume hip surgeons, therefore, should perform total hip replacement in this particular group of patients to reduce the risk of aforementioned complications [14]. Furthermore, Elderly patients with femur neck fractures need to be dealt with as soon as possible, ideally within 48 hours. Their comorbidity index is usually higher requiring expert anaesthetic management and all-round perioperative care for safe intervention and rehabilitation.

Despite its unique challenges, the efficacy and safety of Total hip replacement for femur neck fractures has been reported internationally. Zhang., *et al.* [15] conducted a meta-analysis and reported that THA is associated with a lower risk of reoperation (2.8%) as compared with Hemiarthroplasty (7.4%) for displaced femur neck fractures. Although Hemiarthroplasty is technically easier to perform, it is getting less popular because of residual thigh pain, pain in the groin due to wear of acetabular cartilage over a period of time and guarded functional outcome eventually requiring revision surgery with associated physiological and financial implications.

Total hip arthroplasty is proven to have better functional outcome and in expert hands minimizes the chances of revision surgery. One of the worst anticipated complications of total hip arthroplasty is dislocation and it is reported to be higher in hip replacement for femur neck fractures as compared to Hip replacement for Arthritis [16]. One of the reasons for higher dislocation rate is a relatively mobile hip in acute fractures versus stiffness in arthritic hip. Rutz., *et al.* [17] reported a 5.6% dislocation rate in patients with fracture neck of femur treated with total hip arthroplasty. In our study, we had 1 hip with dislocation (1.6%) which was reduced closed and did not required any surgical intervention. The availability of larger femoral heads (from 22 mm a decade ago to 36 mm and even 40 mm today) and dual mobility cups for total hip replacement has substantially helped in reducing the dislocation rate. The risk of dislocation also depends on the surgical approach, the restoration of hip biomechanics, the quality of capsular closure and the experience of the surgeon [18]. Literature reports hip dislocation as more common in elderly patients with mental dysfunction and hence THA should be avoided if possible for this group of patients [18].

Cost difference is another major consideration as Total Hip replacement appears costlier than hemiarthroplasty due to the increased cost of the implant, increased duration of surgery and hospital stay. Jun-Hui., *et al.* [19], in a meta-analysis reported that THA for displaced fracture neck of femur is, eventually, more cost effective considering the overall complications, mortality, reoperation or revision rate and functional outcomes over a 2 year's period. Total hip replacement surgery is therefore, a better choice in the long term considering fewer chances of revision surgery and better patient's functional outcome. A number of other studies have also suggested total hip arthroplasty as a better option in patients with acute femoral neck fracture in comparison to other alternative surgical procedures [20-22].

Avery., *et al.* [23] conducted a randomized control trial comparing both THA and hemiarthroplasty for displaced neck of femur fractures and reported 3 dislocations in THA group while none in hemiarthroplasty group. We had 1 dislocation via Lateral Hardinge's approach with no revision surgery required and no mortality at 1 year, which is comparable to this and most of other studies reported in the literature. One of our patients developed pulmonary embolism at 2nd post op day though but resolved with heparin infusion, which is within acceptable limits considering the size of our study.

We accept that our study is a small retrospective series, but consideration should be given to the variations in local health system. Our study is a multicentre series with 4 fellowship trained surgeons performing all these operations which can be considered by some as a weakness but in our point of view it should be considered as a strength of this study, as this proves the safety of this procedure in well trained hands and set ups. Although our follow up is short, but most of the complications associated with hip fractures and surgery occur within the first 12 months and we focussed mainly on the results within this time period. However, further patients are being inducted prospectively in this series and medium and long terms results of this series will be presented in due course.

Conclusion

Our study confirms that total hip replacement is a safe option for carefully selected patients with neck of femur fractures. These procedures performed by high volume and fellowship trained arthroplasty surgeons with good over all perioperative and post-operative care show promising results. In a developing country like Pakistan, despite numerous constraints we are still able to reproduce the same results as published in the world literature.

Conflict of Interest

None.

Bibliography

1. Hansson S., *et al*. "Reduced risk of reoperation after treatment of femoral neck fractures with total hip arthroplasty: A matched pair analysis". *Acta Orthopaedica* 88.5 (2017): 500-504.

2. Marya S., *et al*. "Prosthetic replacement in femoral neck fracture in the elderly: Results and review of the literature". *Indian Journal of Orthopaedics* 42.1 (2008): 61.

3. Anakwe RE., *et al*. "Total hip replacement in patients with hip fracture: a matched cohort study". *Journal of Trauma and Acute Care Surgery* 73.3 (2012): 738-742.

4. Carroll C., *et al*. "Hemiarthroplasty and total-hip arthroplasty for treating primary intracapsular fracture of the hip protocol" (2011).

5. Skinner P and Powles D. "Compression screw fixation for displaced subcapital fracture of the femur. Success or failure?" *The Journal of Bone and Joint Surgery British Volume* 68.1 (1986): 78-82.

6. Taine W and Armour P. "Primary total hip replacement for displaced subcapital fractures of the femur". *The Journal of Bone and Joint Surgery British Volume* 67.2 (1985): 214-217.

7. Mani K., *et al*. "Total hip arthroplasty for displaced femoral neck fractures in elderly patients". *Orthopedic and Muscular System* 4 (2015): 204.

8. Ravikumar KJ and Marsh G. "Internal fixation versus hemiarthroplasty versus total hip arthroplasty for displaced subcapital fractures of femur-13 year results of a prospective randomised study". *Injury* 31.10 (2000): 793-797.

9. Gregory J., *et al*. "One-year outcome for elderly patients with displaced intracapsular fractures of the femoral neck managed non-operatively". *Injury* 41.12 (2010): 1273-1276.

10. Bhandari M., *et al*. "Operative management of displaced femoral neck fractures in elderly patients: an international survey". *Journal of Bone and Joint Surgery* 87.9 (2005): 2122-2130.

11. Parker M., *et al*. "Hemiarthroplasty versus internal fixation for displaced intracapsular hip fractures in the elderly: A randomised trial of 455 patients M". *The Journal of Bone and Joint Surgery British Volume* 84.8 (2002): 1150-1155.

12. Stafford G., *et al*. "Total hip replacement for the treatment of acute femoral neck fractures: results from the National Joint Registry of England and Wales at 3-5 years after surgery". *The Annals of The Royal College of Surgeons of England* 94.3 (2012): 193-198.

13. Thürig G., *et al*. "Safety of total hip arthroplasty for femoral neck fractures using the direct anterior approach: a retrospective observational study in 86 elderly patients". *Patient Safety in Surgery* 10.1 (2016): 12.

14. Michael Maceroli., *et al*. "Total Hip Arthroplasty for Femoral Neck Fractures: Improved Outcomes with Higher Hospital Volumes". *Journal of Orthopaedic Trauma* 30.11 (2016): 597-604.

15. Zhang C., *et al*. "Hemiarthroplasty versus total hip arthroplasty for displaced femoral neck fractures: a meta-analysis of the literature". *Asian Biomedicine* 7.5 (2013): 635-647.

16. Anders Enocson., *et al*. "Dislocation of total hip replacement in patients with fractures of the femoral neck A prospective cohort study of 713 consecutive hips". *Acta Orthopaedica* 80.2 (2009): 184-189.

17. Rutz E., *et al*. "Total hip arthroplasty for fractures of the proximal femur in older patients". *Hip International* 20.2 (2010): 2152-2120.

18. Ames JB., *et al*. "Does surgeon volume for total hip arthroplasty affect outcomes after hemiarthroplasty for femoral neck fracture?" *American Journal of Orthopedics* 39.8 (2010): E84-E89.

19. Lu-Yao GL., *et al*. "Outcomes after displaced fractures of the femoral neck. A meta-analysis of one hundred and six published reports". *The Journal of Bone and Joint Surgery* 76.1 (1994): 15-25.

20. Jun-Hui H., *et al*. "Meta-analysis comparing total hip arthroplasty with hemiarthroplasty in the treatment of displaced femoral neck fractures in patients over 70 years old". *Chinese Journal of Traumatology* 15.4 (2012): 195-200.

21. Ossendorf C., *et al*. "Treatment of femoral neck fractures in elderly patients over 60 years of age-which is the ideal modality of primary joint replacement?" *Patient Safety in Surgery* 4.1 (2010): 16.

22. Iorio R., *et al*. "Displaced femoral neck fractures in the elderly: outcomes and cost effectiveness". *Clinical Orthopaedics and Related Research* 383 (2001): 229-242.

23. Avery P., *et al*. "A Seven-To Ten-year Follow-up Report Of A Prospective Randomised Controlled Trial: total hip replacement and hemiarthroplasty in mobile, independent patients with a displaced intracapsular fracture of the femoral neck". *The Journal of Bone and Joint Surgery-British Volume* 93.8 (2011): 1045-1048.

Volume 11 Issue 2 February 2020
©All rights reserved by Zeeshan Khan.*, et al.*