

Total Hip Arthroplasty in Displaced Fracture Neck Femur in Active Elderly Patients

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ABSTRACT

Background: Femoral neck fracture is an established public health concern globally owing to longer life expectancy especially that femoral neck fractures and hip fractures in general are more common in older population. The aim of the present study was to evaluate the clinical and radiological outcome results of total hip arthroplasty after displaced neck femur fractures.

Methods: This interventional clinical trial included 18 elderly patients with displaced neck femur fractures who attended the Orthopedic department, Faculty of Medicine, Zagazig University Hospitals. Modified Harris Hip Score (MHHS) was evaluated pre and post operatively. The follow up period was 2 years.

Results: The mean age of the studied group was 62.6 ± 1.8 years. The average post-operative MHHS was 78.7 ± 18.6 . There was a statistically significant improvement in the MHHS score. There was significant difference regarding modified Harris hip pain scores pre and postoperatively for patients with neck femur fractures. There was high significant difference regarding modified Harris functional hip score for activities pre and postoperatively. Most of patients didn't have any postoperative complications, one case had a dislocation (5.6%), one case had a Periprosthetic fracture (5.6%) and one case had a superficial infection (5.6%).

Conclusions: THR is an effective technique for management of displaced neck femur fractures in active elderly people.

Keywords: Neck Femur Fracture; Total Hip Arthroplasty; Active Elderly Patients

INTRODUCTION

The proximal femur fracture is more common as people age. The best course of therapy for displaced fractures of the femoral neck is debatable. Reduction and internal fixation, unipolar hemiarthroplasty, bipolar hemiarthroplasty, and complete hip arthroplasty are surgical options for treating misplaced femoral neck fractures [1].

After femoral neck fracture, the rate of osteonecrosis in these patients ranged from 12 to 86%. This terrible consequence may cause the femoral head to collapse and become avascular necrotic. Osteoarthritis may then develop, necessitating arthroplasty [2].

Young patients have significant functional demands, so preservation of the native hip architecture and mechanics is a goal in management. Complete hip replacement is the

best option for those who have displaced neck femur fractures, especially in cases where the fractures have been neglected for a long time or when there is suspicion that the fractures have been delayed in becoming fixed after 24 hours after impact [3].

Femoral neck fractures in older people are linked to decreased mobility, loss of independence, and an excess of morbidity and mortality. Several studies back up the benefits of arthroplasty over internal fixation for the treatment of displaced femoral neck fractures. The debates over unipolar versus bipolar hemiarthroplasty and total hip arthroplasty (THA) versus hemiarthroplasty are supported by a number of studies. Patients with an active, lucid personality and a reasonably long life expectancy may benefit the most from THA[2].

Total hip replacement (THR) is recommended in cases of rheumatoid arthritis and osteoarthritis that are simultaneously present, and it has also been used as the main technique for misplaced femoral neck fractures. THR is also advised as the main course of treatment due to its low reoperation rate and improved hip function right away [4].

THA either be cemented or cementless; in patients receiving THA for a femoral neck fracture, cementless femoral fixation was linked with a decreased short-term incidence of periprosthetic fractures, a greater incidence of medical problems, and equal unplanned readmission rates within 6 months postoperatively. Less postoperative infection is a benefit of cementless THR, but there is a higher chance of periprosthetic fractures in the future [5].

Therefore, this study evaluated the clinical and radiological outcomes following total hip arthroplasty in elderly, active patients with displaced neck femur fractures.

METHODS

This prospective trial included 18 patients who admitted to the orthopaedic department of the Zagazig University Hospital between May 2021 and December 2022 with injuries resulting in neck femur fractures. THA was used to treat all patients.

Inclusion criteria:

Surgically fit patients with displaced neck femur fracture (esp. Sub capital, posterior comminuted neck femur), with history of obvious trauma causing the fracture, and neglected fractures > 1 week with age above 60 years in both genders were included in the study.

Exclusion criteria:

Patients who have pathological neck femur fractures with no evident trauma history. Those who are medically unfit for surgery and have poor overall health in general are not candidates for general anaesthesia or surgery, People displaying infection symptoms or other symptoms, patient age less than 60 years, Non-displaced or early fracture < 24 hours were excluded from the study.

Pre-Operative evaluation:

Complete history taking with a focus on the following information: name, age, sex, address, and prior orthopaedic surgery. comprehensive general assessment to rule out further illnesses or systemic conditions. Then, a local hip examination is performed to check the hip's range of motion, pain, and leg length disparity. In order to rule out any disease or fractures from the

incident, the back and knees were examined. A pelvic X-ray is required in every situation.

It is important to note that all incisions should be made along the identified line of the incision but the initial incision is best made within the middle half of the incision line so that if needed this can be extended in both directions. The preoperative evaluation for different surgical approaches:

(a) Based on direction:

1. Anterior (Smith Peterson approach).
2. Lateral (Hardinge) and antero-lateral (Watson Jones).
3. Posterior (Southern Approach).
4. Medial.
5. Combined e.g., anterior and posterior.

b. Based on incision and invasiveness:

1. Standard incision e.g., direct lateral.
2. Mini incisions as mini-incision posterior (MIS).

Every instance was assessed using the modified Harris hip score (MHHS). Similar to the original Harris hip score, the modified Harris hip score's result interpretation was as follows: 70 (bad result), 70-79 (fair result), 80-89 (good result), and >90 (good result) (excellent result) [6].

The most essential views required prior to surgery are an anteroposterior view of the pelvis displaying the proximal femur and a lateral view of both hips and the proximal femur.

Ethical Consideration:

The technical and ethical committee at Zagazig University approved the study. Written informed consent was obtained from all patients. The Declaration of Helsinki, the International Medical Association's code of ethics for studies involving humans, guided the conduct of this work.

Surgical technique:

In all patients, spinal or epidural anaesthesia was used, as it was considered the safest and most dependable procedure in this age range. The surgical technique was illustrated in **Figure (1)**. In every case, the lateral (Modified Hardinge) hip method was chosen. By identifying the gluteus medius muscle, which is separated at its bottom third and keeping sutures for the gluteus medius and minimus throughout the approach for hip arthroplasty, which is later approximated at the conclusion of surgery, residual abductor weakness following this technique was prevented (Radi procedure). The femoral head is seen after a transverse hip capsule incision. Through flexion, adduction, and external rotation of the hip, the helper aids in dislocating the head.

Following hip dislocation, the femoral head is transected with an oscillating saw, removed with a

corkscrew, and the acetabulum is prepared as normal with an inclination angle of about 45° and an anteversion angle of about 15°. Excision of the labrum: To see the entire acetabular region, the acetabular labrum should be excised circumferentially. If necessary, significant osteophytes should also be removed. The true floor of the acetabulum and the transverse acetabular ligament are important acetabular landmarks that must be present for the cup to be placed correctly. If the transverse acetabular ligament needs to be cut, do it in the posterior half to stop obturator artery haemorrhage.

The chosen sizing trial is carefully positioned, inserted into the acetabulum, and tested to ensure a stable press-fit using the acetabular trial handle. After femoral preparation, remove the trial and insert the final cup, which should be stable. Then, test for stability and range of motion. Until the cup is completely seated in its position and a change in impact tone can be heard, insert the cup firmly with hammer blows.

The proximal femur is gradually and ascendingly reamed to prepare the femur for the femoral stem. Attach the desired trial neck after inserting the femoral stem trial neck with the stem trial/rasp in the ready femur. The trial neck length collar was fully inserted with the correct trial head that matched the cup bore size. After trial reduction, the range of motion, hip telescoping test for stability assessment, impingement, and leg length of the two lower limbs are assessed. As soon as resistance is encountered, the decisive head is firmly pressed on the neck sleeve. To achieve correct seating, it is imperative that the head is neither inclined or positioned at an angle on the sleeve (**Figure 1**).

Postoperative Management:

All patients received DVT prophylaxis for 35 days. Subcutaneous Clexane injection 40-60 mg/day for one week then oral anticoagulant was given for 28 days. Antibiotics were given for 10 days I.V (Unictam 1.5 gm/12h and Cefepime 1 gm/12h) were given for 5 days then oral antibiotic (Hibiotic 1gm/12h) for 7 days. Anti-edematous, anti-inflammatory (Celebrex, Naprosyn, Ibuprofen) was given. Early mobilization was recommended in all patients.

A continuous ankle up-and-down motion should be used to begin active assisted exercises on the first postoperative day, depending on the patient's health. Radiographs were taken right away. After surgery, the average hospital stay was 4 days. In order to conduct a clinical and radiological evaluation, patients were required to visit the out-

patient clinic every two weeks during the first month and then once a month after that. The follow up period was 2 years.

The post-operative radiological findings and evaluation of the THA was performed including angles, position, bone integration of cementless THA and cement mental evaluation in the cemented THA.

The MHHS was assessed both before and six months after surgery. The functional result was assessed in accordance with MHHS. Successful results equal postoperative increase in MHHS of > 20 points and radiographically stable implant with no clinical nor radiographic signs of dislocation.

STATISTICAL ANALYSIS

SPSS version 23 was used for data processing and analysis. The results of this investigation were analysed using the following statistical techniques. For quantitative variables, the data were reported as mean + standard deviation (SD), and for qualitative variables as number and percentage. Chi-square, the fisher exact test, and the paired t test were used. The level of significance for all of the aforementioned statistical tests was set at 5%. (P-value). P value greater than 0.05 denotes insignificant findings. Results that are significant have a P value of less than 0.05.

RESULTS

The current study showed the average age of the studied group was (62.6±1.8) ranging from 61 to 67 years. Regarding sex, most of them (72.2%) were males, and (27.8%) were females. More than half (61.1%) of the studied group were left-sided affected and (38.9%) were right-sided. More than two-thirds of the studied group (77.8%) had a cementless implant and (22.2%) had cemented implant. Fall was the commonest mode of trauma (66.7%) among the studied group followed by R.T.A (33.3%) of the studied group. Half of the studied group (50.0%) were grade 3 Garden's classification and the other half (50.0%) were grade 4 (**Table 1**).

The average post-operative Modified Harris Hip Score (MHHS) among the studied group was (78.7±18.6) ranging from 10 to 91. Nine cases (50.0%) had a good outcome, four cases (22.0%) had an excellent outcome, 3 cases (16.7%) had a fair outcome, and 2 cases (11.1%) had a poor outcome (**Table 2**). There was a highly statistically significant increase (improvement) in the MHHS score from (18.7±7.6) ranging from 10 to 42 to become (78.7±18.6) ranging from 10 to

91 (p-value<0.001) with an average percent of improvement (70.1%) (Table 3).

Regarding modified Harris functional hip score for pain pre and postoperatively for patients with neck femur fractures. There was significant difference regarding modified Harris hip pain scores pre and postoperatively for patients with neck femur fractures (Table 4).

Concerning modified Harris functional hip score for activities: (shoes/ socks) pre and postoperatively for patients with neck femur fractures. There was high significant difference regarding modified Harris functional hip score for activities: (shoes/ socks) pre and postoperatively for patients with neck femur fractures (Table 5). The majority of the study group (15 instances, or 83.3%) experienced no postoperative problems; however, one case (5.6%) experienced a dislocation, one case (5.6%) experienced a

periprosthetic fracture, and one case (5.6%) experienced a superficial infection (Table 6).

A case of male, 63 years old former employee from Fakous, El-Sharkia. He presented with pain, tenderness and limited mobility of the left hip joint after fall in the bathroom and inability to weight bear. Patient transferred to hospital one week after trauma and admitted to emergency unit where X-ray was requested and diagnosed as left fracture neck femur Garden grade 3 with O.A hip joint. Preoperative preparation was done with routine lab investigations and preoperative cardiac consultation and showed that patient was fit for major operation. He diagnosed as post-traumatic displaced neglected left hip neck femur fracture. Harris hip score was improved from 23 preoperative to 87 post-operatives. Radiological evaluation showed Angle of inclination 45 degree. In another case, cementless THR was done (Figure 2,3).

Table 1: Demographic and Clinical characteristics of the studied group:

Demographic data	The studied group	
	No= (18)	%
Age (years) Mean ± SD Median (Range)	62.6±1.8 62 (61-67)	
Sex Male Female	13 5	72.2% 27.8%
The affected side Right Left	7 11	38.9% 61.1%
The type of implant Cemented Cementless	4 14	22.2% 77.8%
The mode of trauma Fall R.T.A	12 6	66.7% 33.3%
The Garden's classification Grade 3 Grade 4	9 9	50.0% 50.0%

Table 2: Post-operative Modified Harris Hip Score among the studied group:

Post-operative Modified Harris Hip Score	The studied group	
	No= (18)	%
MHH Score Mean ± SD Median (Range)	78.7±18.6 83.5 (10-91)	
MHH Score classification Poor	No 2	% 11.1%

Fair	3	16.7%
Good	9	50.0%
Excellent	4	22.2%

Table 3: Comparing pre- and post-operative Modified Harris Hip Score among the studied group:

MHHS score	Preoperative	Postoperative	Paired t-test	p-value
Mean ± SD	18.7±7.6	78.7±18.6	13.7	0.001**
Median (Range)	16 (10-42)	83.5 (10-91)		
Percent of improvement	70.04% (50.0%-87.95%)			

**Statistically highly significantly different.

Table 4: Modified Harris functional hip score for pain pre and postoperatively for patients with neck femur fractures:

Pain	Pre-operative		Post-operative		P value
	N (N=18)	(%)	N (N=18)	(%)	
None or ignore it	0	(0.0%)	9	(50.0%)	0.002 [£] (S)
Slight, occasional	1	(5.5%)	4	(22.2%)	
Mild rarely moderate	2	(11.1%)	3	(16.7%)	
Moderate	7	(38.9%)	1	(5.5%)	
Marked	5	(27.8%)	1	(5.5%)	
Totally disabled, pain in bed	3	(16.7%)	0	(0.0%)	

£: Fissure's exact test, S: Significant

Table 5: Modified Harris functional hip score for activities: (shoes/ socks) pre and postoperatively for patients with neck femur fractures:

Activities: (shoes/ socks)	Pre-operative		Post-operative		P value
	N (N=18)	(%)	N (N=18)	(%)	
With ease	0	(0.0%)	12	(66.7%)	<0.001 [£] (HS)
With difficulty	8	(44.4%)	5	(41.7%)	
Unable to do	10	(55.6%)	1	(5.5%)	

£: Fissure's exact test, HS: High Significant

Table 6: Postoperative complications among the studied group:

Postoperative complications	The studied group	
	No= (18)	%
Dislocation	1	5.6%
Periprosthetic fracture	1	5.6%
Superficial infection	1	5.6%
No	15	83.3%

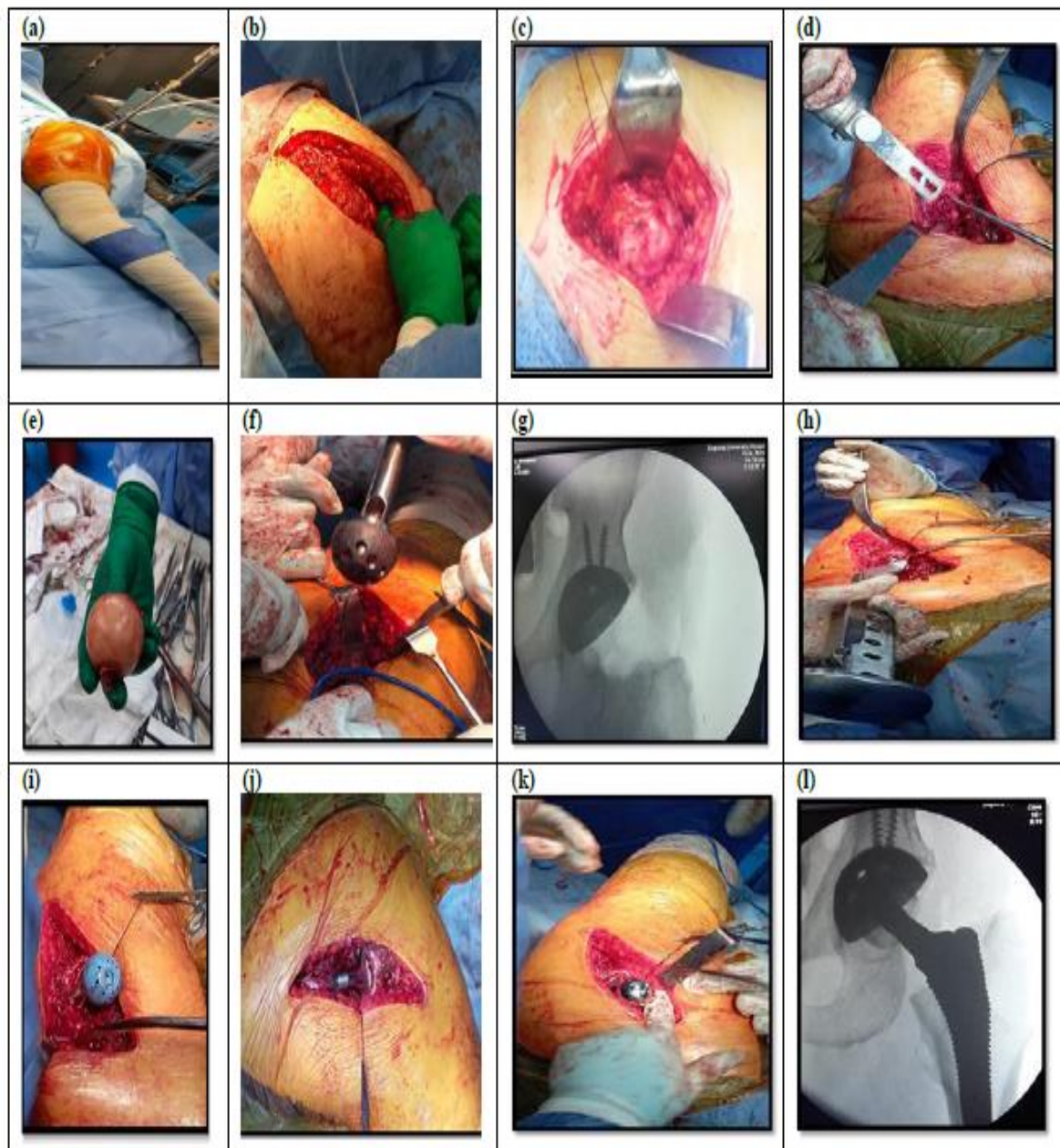


Figure 1: Surgical technique showing (a) patient with arthroplasty draping; (b) the lateral (Modified Hardinge) hip approach ; (c) stay suture for gluteus minimus ; (d) femoral neck osteotomy; (e) head femur after excision; (f) acetabular preparation and cup insertion; (g) fluoroscopic assessment for cup orientation and screw fixation; (h) femur preparation and rasp insertion; (i) reduction trial on rasp; (j) original stem application; (k) head application; and (l) fluoroscopic assessment for cup and stem orientation and size.

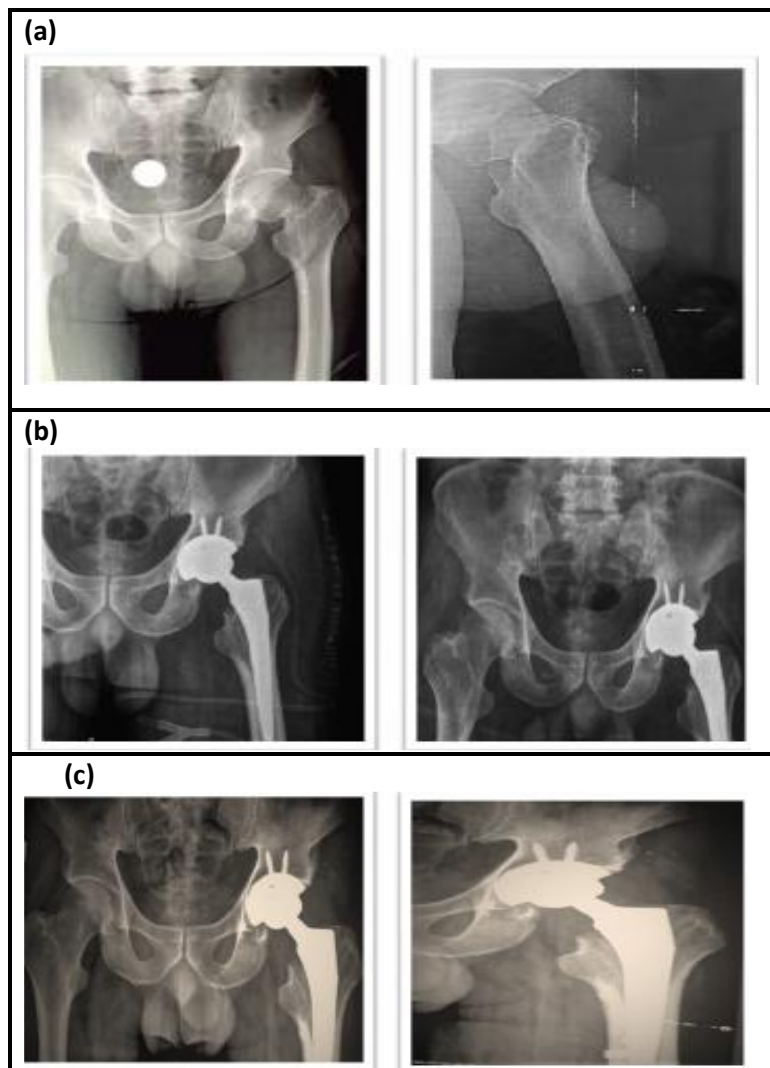


Figure 2: (a): X-ray shows LT fracture neck femur AP and lateral views; (b): X-ray shows immediate post-operative X-ray of total hip replacement (cemented); (c) Follow up X-ray after 2 years.

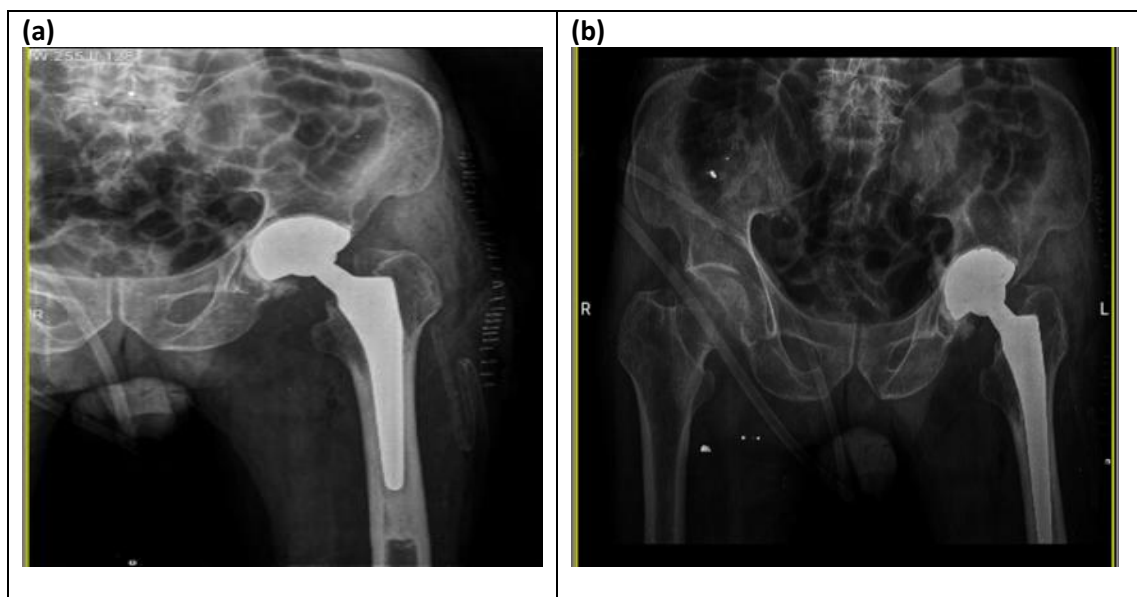


Figure 3: (a): post-operative X-ray of THA (cementless);and (b) Follow up X-ray after 2 years.

DISCUSSION

Total hip arthroplasty (THA) is indicated when hip pain becomes intolerable and when the femoral head has collapsed and the joint shows advanced arthritic changes[7].

The success of primary total hip arthroplasty is well-documented in the literature with survival rates over 90% at 15-year follow-up[8].

The purpose of hip joint arthroplasty (THR), one of the most effective and affordable surgical procedures in medicine, is to restore hip function and activity as soon as possible with the least amount of discomfort or problems. The idea that THA, either cementless or cemented, should be used to treat active patients with a fractured neck of femur (NF) and a decent life expectancy [9].

Orthopedic surgeons all around the world have tried to treat femoral neck fractures [7]. Thus, the goal of the study is to evaluate the role of THA in NF fracture in elderly individuals who are active.

Regarding studied group; the present study included 72.2% males and 27.8% females. This convenient with findings of Wapabeti [10] who defined that 64.5% was males and 35.5% of patients were females. Contrast with Khatod et al. [11] defined that sex distribution of neck hip fracture patients were treated by THA was 59.8% female and 40.2% male.

Tutega et al. [12] found the male to female ratio was 8 to 13. 90 patients who underwent THR owing to trauma were retrospectively analysed by Lima et al. [13], with a female-to-male ratio of 66:24.

The reverse in sex distribution in present study can be explained by fact that increased activity of males rather than females in elderly populations so they are more susceptible to fall and accidents.

According to the current study, the average age of patients with fractured neck femurs was 62.6 years old, with patients' ages ranging from 61 to 67. The mean age of patients involved in THA, as determined by Tutega et al. [12], was 63.52 range (50–82years).

But, Sassoon et al. [14] found the average age of patients with neck femur fractures was 79.1 with range 45–99 years. Khatod et al. [11] defined that average age at surgery was 73.2 years (range 30–81). Lima et al. [13] retrospectively reviewed 90 patients that underwent THA due to trauma. They found that; their age 70 ± 11 years.

The aforementioned data showed that the mean age of our patients was considerably younger than that of earlier research, which was explained by the fact that the average life expectancy of Egyptians is quite low.

Concerning side of lesion, the present study defined that neck hip fracture was right side

38.9% and left side 61.1%. In agreement with Khatod et al. [11] who determined that the right side of a neck hip fracture was 47.8% and the left side was 52.2%. Conflict with Tutega et al. [12] who observed that among patients with neck femur fractures who had THA, the affected Side - right: left ratio was 7:14. Clinical presentation of neck femur fracture; the present study detected that all studied group had pre-operative pain (100%), which is triggering for seeking medical advice, 94.4% had limited mobility, 72.2% had severe limping.

Similar to Wang and Shi [15] explained that the main signs and symptoms of NF fracture included: Extreme hip or groin pain, inability to bear weight on the injured hip's side, stiffness, bruising, and swelling around the hip area; shorter leg on the injured hip's side; and twisting outward of the leg on the injured hip.

Antero-posterior and lateral views of the fractured hip joint, whole femur, and ipsilateral knee joint are taken prior to surgery, together with an antero-posterior view of the pelvis. According to an X-ray of our patients, 50.0% of the study group were grade 3 Garden's classification, and 50.0% were grade 4. A comprehensive physical examination, a complete history, plain-film radiographs of the troublesome hip, and a diagnosis of hip fracture are typically possible. Other imaging modalities, such as computed tomography scans and MRI to demonstrate AVN of head femur in early stage, can be helpful in confirming the diagnosis if radiographic features are worrisome for a hip fracture if it is not obvious in plain x-ray [16].

In accordance with Rogmark and Leonardsson [17] found that infection was the most frequent complication following fracture THA, our current study determined that the majority of the studied group (15 cases, 83.3%) had no postoperative complications. However, one case had a dislocation (5.6%), one case had a periprosthetic fracture (5.6%), and one case had a superficial infection (5.6%).

Our current study showing that 5.6% of all THA patients experienced post-operative hip dislocation. According to meta-analysis, the dislocation rate after THA for NF fracture was 6.9% [16]. Moreover, Sassoon et al. [14]. studied analysis of hospital complication rates revealed that acute dislocation happened in 0.14% of patients with NF fractures.

Some studies proposed that THR has a higher dislocation risk than HA for hip fractures. Others, however, seem to indicate the opposite. According to Mohamed et al. [18] study, THR performed in a trauma environment had a 2%

dislocation rate, 2% deep infection rate, and 2% early revision rate.

The risk of dislocation after THA is explained by the heterogeneity of the dislocation rate, which includes factors like age, sex, comorbidities, neuromuscular and cognitive disorders, as well as surgical risk factors like surgical approach, component positioning, soft tissue dissection and tension, and artificial stem head size [11].

McKinley and Robinson [19] compared patients treated for failed internal fixation of NF fractures were compared to a group of those who had received acute THA for a neck femur fracture and were of similar age and sex. Comparing those treated for failed internal fixation to those treated acutely with THA, they discovered that those treated for failed internal fixation had considerably worse early complications, a higher revision rate at 5 to 10 years, and worse functional results.

In our current study less than half of the studied group (44.4%) don't have any medical comorbidities, hypertension was the commonest comorbidity (33.3%) followed by diabetes mellitus (11.1%), and both hypertension and diabetes mellitus together (11.1%). Two of the three cases that had post-operative complications have medical comorbidities.

In our current investigation, the Hardinge's direct lateral approach in lateral position was used during surgery. To prevent the significance of recurring dislocations and their early incidence, the direct lateral approach is preferred. A cohort study of 713 THA patients, however, indicated that the rate of dislocation was 2% with the straight lateral approach, 12% with the posterior route with a posterior repair, and 14% without a posterior repair. The techniques were chosen based on the surgeons' preferences. The only factor linked to a higher risk of dislocation was the posterior approach. Recurrent dislocation is a very severe problem that causes the artificial prosthesis to lose its stability [20].

An unfavourable prognostic indication for cemented THA was previously reported studies using cemented prostheses, which did not provide good outcomes. The first-generation cementing procedures were used for these THAs. Better clinical outcomes were seen in a more recent publication using improved cementing procedures in patients with osteonecrosis, although they were still inferior to those of cementless implants. Lim et al. [21] reported that the sensible choice of cemented fixation was made due to discoveries of low-quality bone (assessed on preoperative x-rays or during the treatment), post-traumatic remodelling of the medullary canal, and bone loss.

In our study, more than two-thirds of the studied group (77.8%) had a cementless implant and (22.2%) only had cemented implant, two of the patients whom operated with cemented THA had a postoperative complication.

In current study post-operative follow up ranged from 6-9 months with average 6 months. Tutega et al. [12] used a mean follow-up length of 9.7 months with a range of 6 – 22 months. Also, Khatod et al. [11] recommended an 18-month follow-up time for THA patients, with a minimum of three months of follow-up.

Regarding improvement quality of life, the present study clarified that neck femur fracture patients managed by THA pre-operative mean MHHS for studied group was 18.7 ± 7.6 with range 10-42. Post-operatively, the value was raised to 78.7 ± 18.6 with a range of 10 to 91. The MHHS score increased (improved) by a very statistically significant amount (P-value 0.001), with an average improvement rate of 70.1%. Consistent with the outstanding functional results reported by Rudelli et al. [22].

For the study group, the pre-operative MHHS grade was 100% with a subpar Harris grade. While the post-operative MHHS grade for the study group was roughly half (50.0%) good, four (22.0%) excellent, three (16.7%) fair, and two (11.1%) poor, these outcomes were all attributed to postoperative complications such periprosthetic fracture and dislocation. According with Tutega et al. [12], MHHS was categorised as outstanding for 19%, good for 66.7%, and fair for 14.3% at the end of six months.

Consistence with Mingli et al. [23] who reported the patients' mean MHHS before and after THA was 47 and 85, respectively. 82.7% of results are excellent or good. There was a statistically significant difference in the MHHS before and after the procedure.

Limitations of our study are that it has small number of cases and short follow up period. On the other hand, this study gives us a proof and a guide that THA in a selected group of patients (active elderly population) especially with neglected displaced neck femur fracture particularly with osteo-arthritis of the acetabulum (that is usually common in elderly population) gives good results compared to other methods of management as internal fixation and hemiarthroplasty results in literature.

We recommend THA for all cases of neck femur fractures with old neglected NF fracture in active elderly populations especially those with little comorbidities. We recommend direct lateral approach for THA rather than posterior approach.

CONCLUSIONS

THR is an effective technique for management of displaced neck femur fractures in active elderly people. The functional outcome and pain scoring was high significantly improved in cases of NF fracture treated by THA.

REFERENCES

- 1- **Bhandari M, Devereaux PJ, Swiontkowski MF, Tornetta P, Obremsky W, Koval KJ, Nork S. et al.** Internal fixation compared with arthroplasty for displaced fractures of the femoral neck. A meta-analysis. *J Bone Joint Surg Am.* 2003; 85(9):1673-81.
- 2- **Robinson CM, Saran D, Annan IH.** Intracapsular hip fractures. Results of management adopting a treatment protocol. *Clin Orthop Relat Res.* 1994 ;(302):83-91.
- 3- **Ly TV, Swiontkowski MF.** Treatment of femoral neck fractures in young adults. *J Bone Joint Surg Am.* 2008; 90(10):2254-66.
- 4- **Hopley C, Stengel D, Ekkernkamp A, Wich M.** Primary total hip arthroplasty versus hemiarthroplasty for displaced intracapsular hip fractures in older patients: systematic review. *BMJ.* 2010 ; 340:c2332.
- 5- **Karantana A, Boulton C, Bouliotis G, Shu KS, Scammell BE, Moran CG.** Epidemiology and outcome of fracture of the hip in women aged 65 years and under: a cohort study. *J Bone Joint Surg Br.* 2011; 93(5):658-64.
- 6- **Kumar P, Sen R, Aggarwal S, Agarwal S, Rajnish RK.** Reliability of Modified Harris Hip Score as a tool for outcome evaluation of Total Hip Replacements in Indian population. *J Clin Orthop Trauma.* 2019;10(1):128-30.
- 7- **Elsersawy A, Ahmed H, Elsedeeq H.** Revision Total Hip Arthroplasty. *ZUMJ* 2013, 19 (5), 1-8.
- 8- **Hefni MI, Soudy ESEE.** Cementless Total Hip Arthroplasty in Steroid induced Osteonecrosis of Femoral head. *ZUMJ* 2021; 29 (2).
- 9- **Rogmark C, Leonardsson O.** Hip arthroplasty for the treatment of displaced fractures of the femoral neck in elderly patients. *Bone Joint J.* 2016 ; 98-B(3):291-7.
- 10- **Wapabeti J.** Determination of the Functional Outcomes of Total Hip Replacement, By Using the Harris Hip Score, In Adults Presenting at Hospitals in Lusaka, A Cross Sectional Study (Doctoral dissertation, University of Zambia); Cha. 4. 2017. p. 14.
- 11- **Khatod M, Barber T, Paxton E, Namba R, Fithian D.** An analysis of the risk of hip dislocation with a contemporary total joint registry. *Clin Orthop Relat Res.* 2006; 447:19-23.
- 12- **Tuteja SV, Mansukhani SA, Mukhi SR.** Functional outcome with bipolar hemiarthroplasty as against total hip arthroplasty in intracapsular fracture neck femur *Int J Med Res Health Sci.* 2014; 3(4): 945-53.
- 13- **Lim JW, Ng GS, Jenkins RC, Ridley D, Jariwala AC, Sripada S.** Total hip replacement for neck of femur fracture: Comparing outcomes with matched elective cohort. *Injury.* 2016; 47(10):2144-8.
- 14- **Sassoon A, D'Apuzzo M, Sems S, Cass J, Mabry T.** Total hip arthroplasty for femoral neck fracture: comparing in-hospital mortality, complications, and disposition to an elective patient population. *J Arthroplasty.* 2013; 28(9):1659-62.
- 15- **Wang J, Shi ZJ.** Total hip arthroplasty via lateral approach in supine position. *Orthop Surg.* 2014; 6(2):165-7.
- 16- **Brunner LC, Eshilian-Oates L, Kuo TY.** Hip fractures in adults. *Am Fam Physician.* 2003; 67(3):537-42.
- 17- **Rogmark C, Leonardsson O.** Hip arthroplasty for the treatment of displaced fractures of the femoral neck in elderly patients. *Bone Joint J.* 2016; 98-B(3):291-7.
- 18- **Mohamed MSAEM, Khaled SA, El-Nahal A, El-Geady I.** Short-term (2 years) results of primary total hip replacement in 40 mobile elderly patients with fractured neck of femur. *EOJ* 2017; 52(3), 175.
- 19- **McKinley JC, Robinson CM.** Treatment of displaced intracapsular hip fractures with total hip arthroplasty: comparison of primary arthroplasty with early salvage arthroplasty after failed internal fixation. *J Bone Joint Surg Am.* 2002 ;84(11):2010-5.
- 20- **Enocson A, Hedbeck CJ, Tidermark J, Pettersson H, Ponzer S, Lapidus LJ.** Dislocation of total hip replacement in patients with fractures of the femoral neck. *Acta Orthop.* 2009;80(2):184-9.
- 21- **Lim SJ, Kim SM, Kim DW, Moon YW, Park YS.** Cementless total hip arthroplasty using BioloX@delta ceramic-on-ceramic bearing in patients with osteonecrosis of the femoral head. *Hip Int.* 2016; 26(2):144-8.
- 22- **Rudelli S, Viriato SP, Meireles TL, Frederico TN.** Treatment of displaced neck fractures of the femur with total hip arthroplasty. *J Arthroplasty.* 2012; 27(2):246-52.
- 23- **Mingli F, Huiliang S, Guanglei C, Zheng L, Shibao L, Limin L, Shuai A.** A clinical study on arthroplasty for failed internal fixation of hip fractures and review of literature. *Pak J Med Sci.* 2017;33(4):798-803.

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