The Egyptian Journal of Hospital Medicine (July 2020) Vol. 80 (3), Page 1092-1096

Short Term Result of Revision Total Hip Replacement after Failed Hemiarthroplasty

Khaled Mohamed Hassan[1], Mohamed Mansour Elzohairy [1], Fahmy Samir Fahmy[1], Abdulsalam Esmaeil Alkadoushi*[2]

[1]Department of Orthopedic Surgery, Faculty of Medicine – Zagazig University, Sharkia, Egypt

[2]Department of Orthopedic Surgery, Faculty of Medicine – Tripoli University, Tripoli, Libya

***Corresponding Author:** Abdulsalam Esmaeil Alkadoushi, **Mobile:** (+20) 01023634549, Email**:** alkadoshi85@gmail.com

ABSTRACT

Background: Total hip arthroplasty is the most common surgery performed for complications of hip hemiarthroplasty. Hemiarthroplasty has been a good method of treating displaced fracture neck of femur. With the increased demands placed on the prosthesis by highly active patients, the failure rate increased following hemiarthroplasty. Pain is the most reliable complaint that indicates failure. Pain may be due to many complications related to hemiarthroplasty as loosening, sepsis, protrusio, dislocation, and periprosthetic and prosthetic fractures. Conversion to total hip replacement is a good method for treating patients with painful hemiarthroplasties.

Objective: This study aimed to evaluate the result of revision total hip replacement after failed hemiarthroplasty.

Patients and Methods: This is a retrospective study included 62 patients with ages ranged from 38 years to 75 years with a mean (62.7±11.38), with the conversion of failed hip hemiarthroplasty to total hip arthroplasty between 2000 and 2015 with a minimum follow up 5 years and maximum follow up 10 years at Zagazig University Hospital. Males represented 54.8% (34 cases) and females were 45.2% (28 cases).

Results: Our study that the mean Harris hip score significantly increased from 21.87±8.31 preoperative to 74.21±18.3 postoperative P=0.00** and postoperative radiologically we find that 58 patients (93.5%) has fixed implants and 4 patients (6.5%) has loose implants.

Conclusions: This present study showed that the conversion of failed hemiarthroplasty to THR is a good way of treatment for painful hemiarthroplasties. Conversion is a complicated surgery with a higher rate of complications both intra and postoperatively.

Keywords: Total hip replacement, Failed hemiarthroplasty, Hip arthroplasty.

INTRODUCTION

Total hip arthroplasty is the most common surgery performed for complications of hip hemiarthroplasty [(1)]. Pain is the most common indication for conversion from a hemiarthroplasty to total hip replacement. Pain following aseptic, undislocated hemiarthroplasty is usually due to one of two pathological processes, articular cartilage erosion of the acetabulum and/or loosening of the femoral stem [(2)]. Other indications of conversion include periprosthetic fractures, prosthetic fracture, dislocation, and infection [(3)].

Conversion of a hip hemiarthroplasty to total hip replacement (incidence 5% to 24%) is considered by many authors a revision arthroplasty because it is associated with a high rate of intra-operative difficulties if compared to the primary total hip replacement [(1, 4)].

Reconstruction of the proximal femur is considered as one of the major problems in Revision hip arthroplasty. Several causes are leading to deficiencies in the proximal femur as follows: (1) Osteolysis caused by wear or infection. (2) Perforation or creation of windows during removal of previous stems or another implant. (3) Stress shielding from the excessively stiff or extensively porous-coated implant. (4) Preexisting osteoporosis and thin femoral cortices. (5) Periprosthetic femoral fractures [(5, 6, 7)].

This study aimed to evaluate the result of revision total hip replacement after failed hemiarthroplasty.

PATIENTS AND METHODS

This is a retrospective study that included 62 patients with ages ranged from 38years to 75 years with a mean (62.7±11.38), with the conversion of failed hip hemiarthroplasty to total hip arthroplasty between 2000 and 2015 with a minimum follow up 5 years and maximum follow up 10 years at Zagazig University Hospital. Males represented 54.8% (34 cases) and females were 45.2% (28 cases). Thirty-four cases (54.8%) were right and twenty-eight cases (45.2%) were left.

Ethical approval

Approval for performing the study was obtained from Orthopedic Surgery Departments, Zagazig University Hospitals after taking Institutional Review Board (IRB) approval.

The work has been carried out following the code of ethics of the world medical association (Declaration of Helsinki) for studies involving humans.

Received:14 /5 /2020
Accepted:23 /6 /2020

Inclusion criteria

Patients aged 25-70 years. The patients' post failed hemiarthroplasty and fit for surgery.

Exclusion criteria

Patients unfit for surgery. Neuromuscular disorders.

The indication for surgery was pain due to Aseptic loosening and Osteolysis (A.L.O) 48 cases (77.4%), Periprosthetic fracture 14 cases (22.4%), Acetabular Erosion 8 cases(12.9%), Septic loosening and Osteolysis (S.L.O) 4cases (6.5%), Fracture prosthesis 4 cases (6.5%), Osteolysis and Greater Trochanter Fracture (O.G.T.F) 2 cases (3.2%).

The American Academy of Orthopaedic Surgeon (AAOS) Classification System was used for classification of femoral and acetabular bone loss, and Vancouver classification for periprosthetic fracture.

All patients were subjected to complete clinical and radiological examination preoperative and postoperative and follow up and the clinical assessment of affected hip was done with Harris Hip Score System. Using a standard surgical technique and a Hardinge approach, all patients underwent surgery and the THR technique was cementless in 34 cases, cemented in 16 cases, and hybrid in 12 cases.

Surgical procedures

We classify the patients into two groups; the first group included the patients with infected hemiarthroplasty and the second group included the patients with any other cause of failure as erosion, loosening, etc. According to these two groups, conversion of the failed hemiarthroplasty to total hip arthroplasty was done in two ways of surgical interventions:

a) One stage exchange arthroplasty: In which the hemiarthroplasty prosthesis was removed and the total hip arthroplasty prosthesis was implanted in the same sitting.
b) Two stages exchange arthroplasty: In which the removal of the infected prosthesis and all infected materials and preimplantation of the antibiotic-loaded spacer was done. Total hip arthroplasty was introduced after the infection subsided.

In this study, there were 58 cases treated as one stage and 4 cases treated as two-stage exchange arthroplasty.

Twenty patients (32.3%) underwent general anesthesia and 34 patients (54.8%) underwent spinal anesthesia and 8 patients (12.9%) underwent epidural anesthesia.

Postoperative management:

- Antibiotic was given to all patients (3rd generation cephalosporin) for 5 days postoperatively.
- Pethidine (100mg) was given in the operative day in divided doses and 25 mg of indomethacin t.d.s for 5 days.
- The patients received 40 IU of Enoxparin/day for 1 week after surgery and then oral anticoagulant for an additional 5 weeks as thromboprophylaxis.
- Active movement of both ankles and feet and isometric exercise of quadriceps muscle were encouraged at the operative day.
- Patients were usually discharged 5 days after the day of surgery and instructed to avoid extreme hip movement.

Follow Up

The patients were followed monthly for 1st three months, then at 6th month and then at 12 months and then every year enquiring about data in their Harris Hip Score (HHS) form and recording any changes in their score values. The hip function was assessed according to the Harris-Hip score.

Statistical methods

Data management and statistical analysis were done using SPSS vs.20. Numerical data were summarized as means and standard deviations. Categorical data were summarized as frequencies and percentages. A comparison between two groups for numerical variables was done using the Mann Whitney U test. Categorical variables were compared using the Chi-square test. A P-value of less than 0.05 was considered significant.

CASES PRESENTATION

48 years old male patient with a history of bipolar hemiarthroplasty for 4 years back, and complaining of left hip pain and restriction of movement, no history of trauma and infection. X-ray shows the failure of the bipolar prosthesis. The patient underwent revision total hip replacement with cementless acetabular cup and head exchange and retained femoral stem and he had a good function. **(Figure 1)**

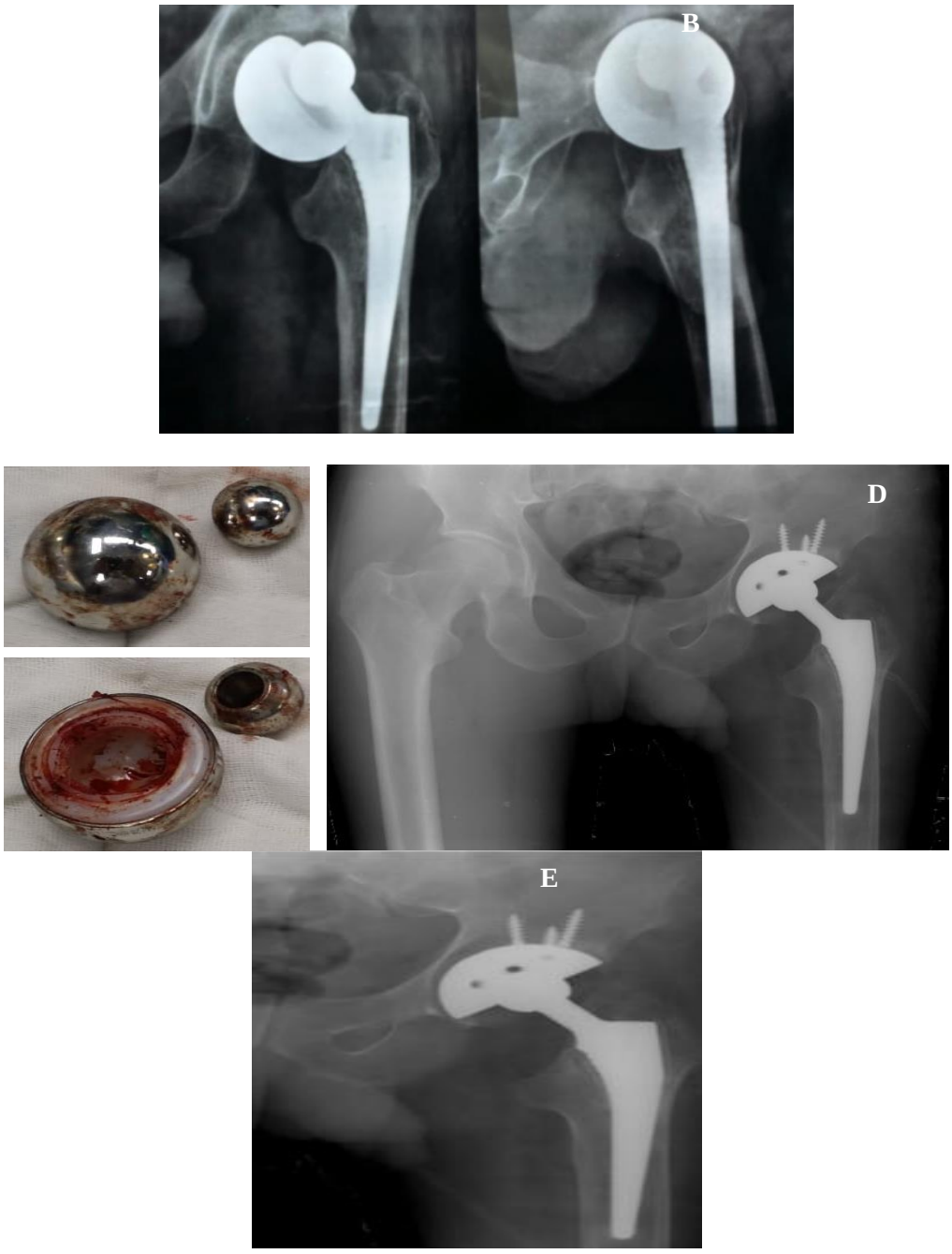

Figure (1):

A) X-ray-AP view shows failed bipolar prosthesis.
B) X-ray-lateral view shows failed bipolar prosthesis.
C) Gross picture shows failed implant.
D) Immediate post-operative x-ray
E) Follow-up X-ray post 2 years.

RESULTS

1-Age and sex distribution among the studied group (N=12)

The study was conducted on 62 patients their age was ranging from 38 to 75 years with a mean age of 62.7±11.38. Males represented 54.8% (34 cases) while females were 45.2% (28 cases) (**Table** 1).

Table (1): Distribution of patients according to age and sex

		Age	
Mean± SD		62.7±11.38	
		N	**%**
Sex	**Female**	28	45.2
	Male	34	54.8
	Total	62	100.0

2-Side and previous surgery distribution among the studied group:

Thirty-four cases (54.8%) were right and twenty-eight cases (45.2%) were left. Regarding previous surgery, the majority were Austine more 45.2% (28 cases) and Thompson 32.3% (20 cases). The Cemented Bipolars were 16.1% (10 cases) and Cementless Bipolars were 6.5% (4 cases). (Table 2)

Table (2): Distribution of patients according to side and previous surgery.

		N	%
Side	**Left**	28	45.2
	Right	34	54.8
Previous surgery	**Austine more**	28	45.2
	Cemented Bipolar	10	16.1
	Cementless Bipolar	4	6.5
	Thompson	20	32.3
	Total	62	100.0

3-Pre and post-operative Harris score distribution among the studied group:

Harris score significantly increased from **21.87±8.31** to **74.21±18.3** P=0.00**. (Table 2).

Table (3): Distribution of patients according to pre and postoperative Harris Hip Score

	Preoperative Harris score	**Postoperative Harris score**
Mean± SD	21.87±8.31	74.21±18.3
Median (Range)	17.1 (0-49)	78.9 (0-92)

4-Complication distribution:

22.6% (14cases) from all cases were complicated, and the intraoperative fracture was the majority with 12.9% (8cases), dislocation was 8.1% (5cases), infection with 4.8%(3 cases) and limping were 1.6% (1 case). Some cases had more than one finding, so there was an overlapping of the final finding. (Table 4)

Table (4): Distribution of patients according to the complications

		N	%
Complication	**No**	48	77.4
	Dislocation	5	8.1
	Dislocation & Limping	1	1.6
	Infection	3	4.8
	Fracture	8	12.9
Complication overall	**Not**	48	77.4
	Complicated	14	22.6
	Total	62	100.0

DISCUSSION

Harris Hip Score (HHS) for functional evaluation in the preoperative, postoperative, and follow-up assessment. The higher score in the HHS demonstrates less dysfunction. A total score of 70 is considered a poor result; 70 to 80 is considered fair, 80 to 90 is good, and 90 to 100 is an excellent result [8].

Our results showed that conversion of painful hemiarthroplasty gives good results concerning the pain relief and functional scores which our HHS was improved in follow-up sessions and increased greatly where Pre and post-operative Harris score distribution among studied groups, was assessed and revealed that Harris hip score significantly increased from 21.87±8.31 to 74.21±18.3 P=0.001. This was in line with **Hammad and Abdel-Aal's** [9] study which also showed the improvement of HHS from preoperative to the last follow-up. Also, the results of **Pankaj *et al.*** [3] study were similar to our results regarding HHS follow-up.

Also in agreement with the present study, the study of **Taheriazam and Saeidinia**[2] revealed that HHS score improved from a mean preoperative score of 44.93±8.40 (ranged 30–62) to 89.76±9.97 (ranged 45– 96) after 6 months follow-up. The mean of 12 months follow-up HHS score and final follow-up scores were 94.54±2.31 (ranged 90–98) and 95.41±2.27 (ranged 92–99) respectively. All of the differences between the preoperative HHS score and its follow-ups were significantly improved (P=0.0001).

In the present study, we made radiological assessment pre and post-operation and found that Preoperative radiological majority were ALO (Aseptic loosening and Osteolysis) with 77.4% followed by Peri-prosthetid fracture 22.4% and Acetabulum Erosion with 12.9% but post-operative 93.5% were fixed implants and only 6.5% were loose implants.

In accordance to the current study, the study of **Pankaj *et al.*** [3] revealed that preoperative diagnosis of acetabular erosion and protrusion was made in 14 hips (32%), aseptic femoral loosening in 15 (34%), septic loosening in six (12%), prosthesis breakage in four (9%), dislocation in three (7%), and periprosthetic fracture in two hips (5%).

While in another study of **Katchy *et al.*** [10] in which at the time of review, none of the participant patients' radiological assessment showed aseptic loosening. And it was believed that the reason for this is the timing of the review, as aseptic loosening due to osteolysis occurs 10–20 years after total joint replacement [11].

In the present study, as regarding overall complications 22.6% were complicated and the intraoperative fracture was the most type of complication with 12.9% followed by dislocation with 8.1%, infection with 4.8%, and limping with 1.6%.

In **Amstutz and Smith** [12] study they evaluated 41 patients with conversion arthroplasty; they had 5

intraoperative proximal femoral fractures, 2 perforations of the medial cortex with stem protrusion, 2 cases with instability, 2 cases with infection, 3 patients with deep venous thrombosis, and 6 patients with progressive loosening. Three patients had required revision by the end of follow-up at a mean of 36 months.

Hammad and Abdel-Aal [9] showed that there were 9 complications occurred in 8 patients in their study; 1 patient had early wound infection which cured completely after debridement, suction–irrigation and 6 weeks of intravenous antibiotics; 2 patients had incomplete sciatic nerve lesion which recovered completely in 1 patient and improved in the other at 1-year follow-up; 6 patients had persistent groin pain.

Cossey and Goodwin [13] showed that 46 patients who had conversion arthroplasty; they had no loosening, no dislocation but 2 patients with superficial infection and 3 patients were dead at the time of the study.

The incidence of dislocation after conversion arthroplasty has been reported as1.6%. Similar to our results **Pankaj *et al.* [3]** had 1 dislocation and in the early postoperative period which contributed to postoperative instability and technique related. They also reported 1 patient with loosening. **Sierra and Cabanela [14]** study which was performed on 132 hemiarthroplasties converted to THA reported a 10% rate of loosening after a mean follow-up of 7.1 years and major complications in 45%, including 12 intraoperative femoral fractures (9%) and 13 dislocations (9.8%).

These results showed that complications of THA in our study was lower than others and was similar to **Pankaj *et al.* [3]** study. It can contribute with short-term follow-up but we had fewer complications than similar follow-up studies. Because of this type of surgery and previous neck of femur fracture in the patients, it should consider a careful selection of patients for each type of arthroplasty (hemiarthroplasty vs THA) to improve the outcome of arthroplasty for this group of patients.

In the current study, complicated cases were significantly lower in patients with higher postoperative Harris scores and significantly associated with O.G.T.F and S.L.O also with loose implants.

In the study of **Katchy *et al.* [10]** the comorbidity did not affect the post-op HHS ($P > 0.05$). The reason for this may be attributed to the protocol which inevitably produced a particular cohort of patients whose conditions were adequately attended to before surgery.

CONCLUSION

The result of the present study showed that the conversion of failed symptomatic hemiarthroplasty to THA is a safe option which can lead to good functional outcomes. The conclusions of this study were limited by we did not have a big series number for every type of classification and we have not separate identical numbers.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Funding information: None declared

REFERENCES

1. **Diwanji S, Kim S, Seon J *et al.* (2008):** Clinical results of conversion total hip arthroplasty after failed bipolar hemiarthroplasty. J. Arthroplasty, 23:1009–15.
2. **Taheriazam A, Saeidinia A (2017):** Conversion of failed hemiarthroplasty to total hip arthroplasty: a short-term follow-up study. Medicine (Baltimore), 96(40): 8235-42.
3. **Pankaj A, Malhotra R, Bhan S (2008):** Conversion of failed hemiarthroplasty to total hip arthroplasty: a short to a mid-term follow-up study. Indian J. Orthop., 42: 294–300.
4. **Sah A, Estok D (2008)**: 2nd Dislocation rate after conversion from a hip hemiarthroplasty to total hip arthroplasty. J Bone Joint Surg Am., 90:506–16.
5. **Sheth N, Nelson C, Paprosky W (2013):** Femoral bone loss in revision total hip arthroplasty: evaluation and management. JAAOS- J Am Acad Orthop Surg., 21: 601–12.
6. **A Jahnke S, Engl C, Altmeyer E *et al.* (2014):** Changes of periprosthetic bone density after a cementless short hip stem: a clinical and radiological analysis. Int Orthop., 38: 2045–50.
7. **Abele J, Swami V, Russell G *et al.* (2015):** The Accuracy of Single Photon Emission Computed Tomography/Computed Tomography Arthrography in Evaluating Aseptic Loosening of Hip and Knee Prostheses. J Arthroplasty, 30: 1647–51.
8. **Nilsdotter A, Bremander A (2011):** Measures of hip function and symptoms: Harris Hip Score (HHS), Hip Disability and Osteoarthritis Outcome Score (HOOS), Oxford Hip Score (OHS), Lequesne Index of Severity for Osteoarthritis of the Hip (LISOH), and American Academy of Orthopedic Surgeons (A. Arthritis Care Res., 63: 200–07.
9. **Hammad A, Abdel-Aal A (2006):** Conversion total hip arthroplasty: functional outcome in the Egyptian population. Acta Orthop. Belg., 72:549–54.
10. **Katchy A, Katchy S, Ekwedigwe H *et al.* (2018):** Total hip replacement for management of severe osteoarthritis in a developing country: A 5-year assessment of functional outcome in 72 consecutive hips. Niger. J Orthop Trauma, 17: 46-52.
11. **Harris W (2001):** Wear and periprosthetic osteolysis: the problem. Clin Orthop Relat Res., 393:66–70.
12. **Amstutz H, Smith R (1979):** Total hip replacement following failed femoral hemiarthroplasty. J Bone Joint Surg Am., 61: 1161–6.
13. **Cossey A, Goodwin M (2002):** Failure of Austin Moore hemiarthroplasty: total hip replacement as a treatment strategy. Injury, 33: 19–21.
14. **Sierra R, Cabanela M (2002):** Conversion of failed hip hemiarthroplasties after femoral neck fractures. Clin Orthop Relat Res., 399: 129–139.